San Luis & Delta-Mendota Water Authority

Westside-San Joaquin Integrated Water Resources Plan

DRAFT



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Prepared by:

RMC water and environment

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Abbreviations

AB303	Assembly Bill 303, Local Groundwater Management Assistance Act of 2000
AF	acre-feet
BMPs	Best Management Practices
BOD	Board of Directors
CCID	Central California Irrigation District
CDFW	California Department of Fish & Wildlife
cfs	cubic feet per second
COA	Coordinated Operating Agreement
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-term Sustainability initiative
CVPIA	Central Valley Project Improvement Act
CWC	California Water Code
DAC	Disadvantaged Community
Delta	Sacramento-San Joaquin Bay-Delta
Divisions	Discrete sub-areas within the Water Authority
DMC	Delta-Mendota Canal
DOI	Department of Interior
DPH	California Department of Public Health
DPWD	Del Puerto Water District
DWR	California Department of Water Resources
ESA	Endangered Species Act
EWA	Environmental Water Account
FCWD	Firebaugh Canal Water District
GHG	Greenhouse gas
IRP	Integrated Resources Plan
IRWM	Integrated Regional Water Management
JPA	Joint Powers Authority
M&I	Municipal and Industrial
MAF	million acre-feet

Abbreviations

MCAG	Merced County Association of Governments
MP	Monitoring Program
MOU	Memorandum of Understanding
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations & Maintenance
PDD	Panoche Drainage District
PAEP	Project Assessment Evaluation Plans
PEIS	CVPIA Programmatic Environmental Impact Statement
Plan or WIWRP	Westside-San Joaquin Integrated Water Resources Plan
QAPP	Quality Assurance Program Plan
Region	Sum of Service Areas of SLDMWA Member Agencies
RMS	Resource Management Strategy
RWMG	Regional Water Management Group
RWSDP	Level 2 & Level 4 Refuge Water Supply Diversification Program
SCVWD	Santa Clara Valley Water District
SJRIP	San Joaquin River Improvement Project
SJRECWA	San Joaquin River Exchange Contractors Water Authority
SJRWQG	San Joaquin River Water Quality Group
SLC	San Luis Canal (Federal) & California Aqueduct (State) Joint-Use Facility
SLDMWA	San Luis and Delta-Mendota Water Authority
SLR	San Luis Reservoir
SLRLPIP	San Luis Reservoir Low-Point Improvement Project
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
UWMP	Urban Water Management Plan
USACOE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency

Abbreviations

USFWS	United States Fish & Wildlife Service
Water Authority	San Luis & Delta-Mendota Water Authority
WIWRP	Westside-San Joaquin Integrated Water Resources Plan
WQCP	Water Quality Control Plan
WRDP	Westside Regional Drainage Plan
WRDPJPA	Westside Regional Drainage Plan Joint Powers Authority
WTP	SJRECWA and Water Authority Water Transfer Program
WWD	Westlands Water District

Chapter 1 Governance

1.1 Regional Water Management Group

The Regional Water Management Group (RWMG) for the Westside-San Joaquin Integrated Regional Water Management (IRWM) Region is the San Luis & Delta-Mendota Water Authority (SLDMWA or Water Authority) Board of Directors. SLDMWA was established in January of 1992 and consists of 29 Member Agencies representing approximately 1.1 million acres of federal and exchange water service contractors within the western San Joaquin Valley, from the City of Tracy in the north to Kettleman City in the south, as well as portions of San Benito and Santa Clara counties. The Water Authority is responsible for delivery of approximately three million acre feet (AF) of water to its Member Agencies. Of this amount, 2.5 million AF are delivered to highly productive agricultural lands, 150,000 to 200,000 AF to municipal and industrial (M&I) uses, and between 250,000 to 300,000 AF to wildlife refuges for habitat enhancement and restoration. Table 1 presents the SLDMWA Member Agencies, while Figure 1 shows those Member Agencies located within the Westside-San Joaquin Region.

Table 1: SLDMWA Member Agencies

Banta-Carbona Irrigation District	**Henry Miller Reclamation District #2131**	**San Luis Water District**
Broadview Water District	**James Irrigation District**	**Santa Clara Valley Water District**
Byron Bethany Irrigation District	Laguna Water District	**Tranquility Irrigation District**
Central California Irrigation District	Mercy Springs Water District	Turner Island Water District
City of Tracy	Oro Loma Water District	**West Side Irrigation District**
Columbia Canal Company	**Pacheco Water District**	**West Stanislaus Irrigation District**
Del Puerto Water District	**Panoche Water District**	**Westlands Water District**
Eagle Field Water District	**Patterson Irrigation District**	
Firebaugh Canal Water District	Pleasant Valley Water District	
Fresno Slough Water District	Reclamation District 1606	
Grassland Water District	**San Benito County Water District**	

*Bold text indicates Member Agency representative is on the Board of Directors as a Director or Alternate.

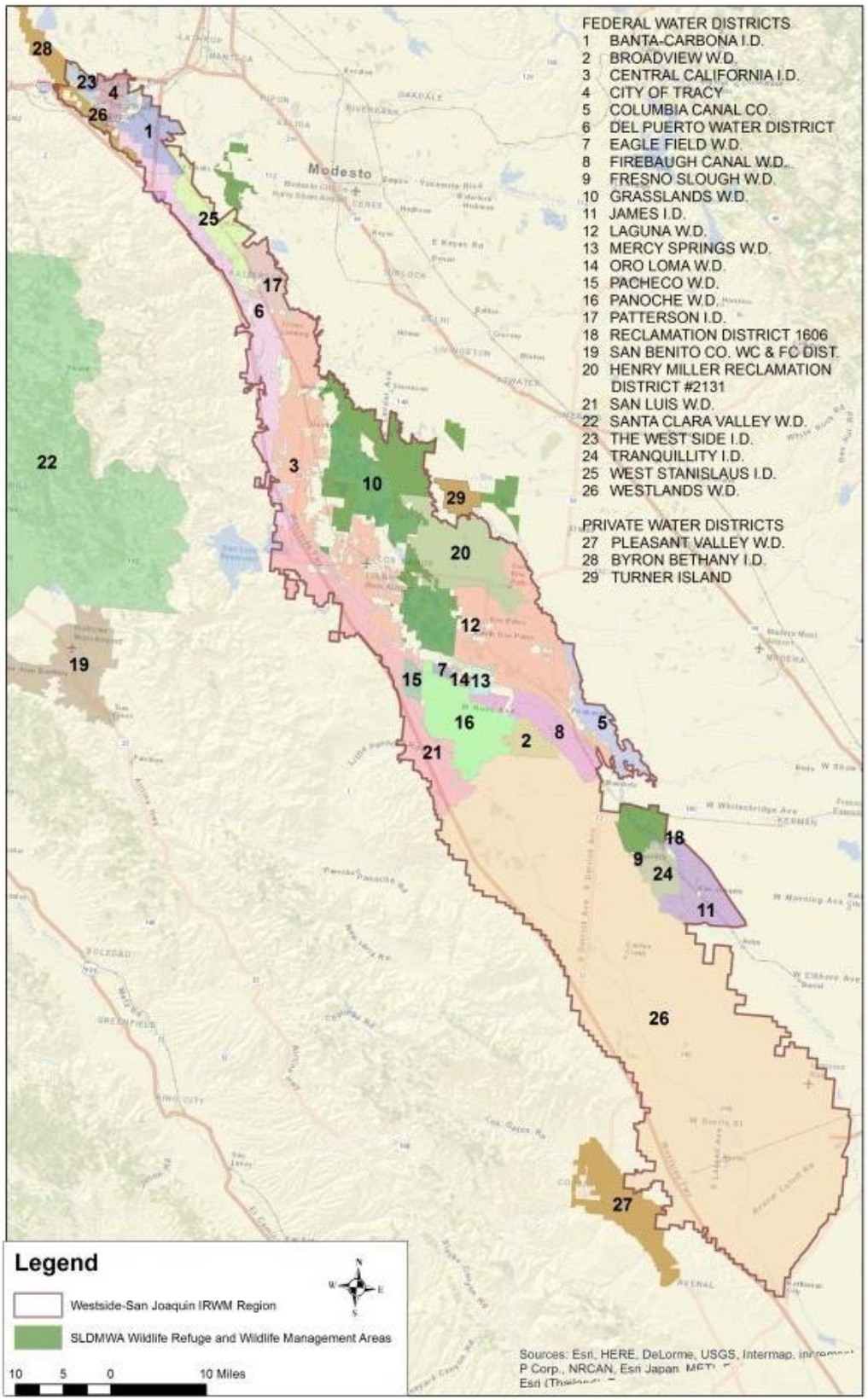


Figure 1: SLDMWA Member Agencies in the Westside-San Joaquin Region

As shown in Table 1, SLDMWA meets California Water Code (CWC) Section 10539 as it consists of more than three local agencies, all of which have statutory authority over water supply and management. While the RWMG includes only water and irrigation districts, other land use and local planning entities participated in the IRWM planning process.

One of the primary purposes of establishing the Water Authority was to assume the operation and maintenance (O&M) responsibilities of certain U.S. Bureau of Reclamation (USBR) Central Valley Project (CVP) facilities, with the goal of increasing reliability of the facilities and containing costs. In addition, the Water Authority serves the information and representation needs of its members by developing information and protecting the common interests on a variety of issues such as: Sacramento-San Joaquin Delta (Delta) exports, water supply, water quality, water development, conservation, distribution, drainage, contractual rights, surface and groundwater management, and any other common interest of the member agencies. This information is made available to members, the general public, and legislative, regulatory and judicial bodies. Combined, the Member Agencies have legal authority to complete the following:

- Acquire works and to produce, store and distribute water for irrigation, domestic, M&I purposes, and provide drainage or reclamation works incidental thereto.
- Furnish water for any present or future beneficial use; acquire, appropriate, control, conserve, store and supply water, including drainage and flood waters; drain and reclaim lands, use water under district control for recreational purposes.
- Furnish sufficient water for, and put water to, any beneficial use and to control, distribute, store, spread, treat, recapture any water for beneficial use.
- Reclaim and protect land from overflow and to irrigate lands within or outside the Reclamation Districts.
- Store water in surface or underground reservoirs for the common benefit of Santa Clara Valley Water District, to conserve and reclaim water for present and future use; to acquire water and water rights, import water and conserve water for a sufficient supply for every present or future beneficial use of the lands or inhabitants within the district; to control flood and storm waters; protect watercourses and watersheds of streams flowing into the district; conserve flood and storm waters for beneficial uses; increasing and preventing of waste or diminution of water supply; obtain, retain and reclaim storm, flood or other waters.
- Enter into contracts, undertake acts necessary to their purposes, and exercise a variety of related powers.

The governing body of the Water Authority consists of a 19 member Board of Directors, classified into five Divisions, with directors and alternates selected within each Division. The Board of Directors is listed on the SLDMWA website and updated as needed. Divisions were established by location and type of water contract. Each Director, and respective Alternate Director, is a member of the governing body or an appointed staff member of his or her agency. The Board is supported by standing committees that synthesize various technical and policy issues, such as financial and water related matters, and make recommendations for the full Board's consideration. Other standing committees direct the affairs of sub-groups of members, such as the Grassland Basin Drainage Management Activity Agreement, subject to review and approval by the full Board. In addition, working groups and steering committees are formed as necessary to focus on matters of particular expertise such as water quality and groundwater management.

The Water Authority assumed responsibility for the O&M of the certain South-of-Delta federal facilities in phases. In October of 1992, the Water Authority entered into the first of a multi-phased Cooperative Agreement with the USBR, with the first phase for the O&M of the Delta-Mendota Canal (DMC). The purpose of this Agreement was to provide the personnel, materials, supplies and equipment necessary to properly operate, maintain and repair certain portions of the Delta Division, San Luis Unit, and West San Joaquin Divisions of the CVP.

In October of 1993, the second phase was initiated. This included the addition of the Tracy Pumping Plant, O'Neill Pumping and Generating Plant, Tracy O&M Facilities, and the San Luis Drain to the list of facilities the Water Authority was to operate and maintain. The maintenance functions at the Tracy Fish Facility were included in this phase as well.

October of 1994 saw the third phase begin. This included the added maintenance responsibilities for the Delta Cross Channel and the two fish release sites on the Delta. In October of 1996 the O&M of the Mendota Pool and Kesterson Reservoir were also included.

In March of 1998, the Water Authority entered into a Transfer Agreement with the USBR wherein all O&M costs related to the above referenced facilities are funded directly by the water users themselves. The Water Authority continues to perform O&M of the Tracy Fish Facility, Delta Cross Channel and fish release sites under a separate Service Contract with funding provided by the USBR.

The Water Authority will continue to provide the leadership necessary to pursue additional reliable water supply for its Member Agencies and deliver the water with a reliable system in a cost efficient manner. The SLDMWA's role in IRWM planning for the Westside-San Joaquin Region is described in more detail in Chapter 1.3.

1.2 History of IRWM Planning

The initial Westside Integrated Water Resources Plan (WIWRP) was an effort undertaken by USBR, the Water Authority, and other local stakeholders beginning in 2001 to develop an Integrated Regional Plan to provide guidance for future water management and planning decisions. The Water Authority and its members were responding to diminishing supplies from the CVP due to implementation of the Endangered Species Act, Clean Water Act, and Central Valley Project Improvement Act (CVPIA). The original WIWRP served as the basis for subsequent versions, which has evolved through a series of stakeholder driven revisions.

The Region performed project solicitation, revised portions of the WIWRP, and sought Proposition 50 (Prop 50) and Prop 84 IRWM grant funding. In order to ensure the Westside-San Joaquin Plan meets the 2012 IRWM Guidelines, addresses current day conditions, and provides a living, planning document that can help guide water resources planning in the Region, it was updated again in 2014. Prior to updating the Plan, the Water Authority published a notice of intent to prepare the Plan in accordance with Section 6066 of the Government Code. The SLDMWA will work with its Member Agencies and project proponents to update and implement the Plan. Financing, Data Management, and Plan Performance and Monitoring, each described in their respective sections, will enable the Region to implement the Plan in a sustainable, effective manner over the near- and long-term timeframe.

1.3 Governance

The SLDMWA Board of Directors (BOD) acts as the RWMG for the Region. Under Activity Agreements (task- or project-specific agreements between member agencies), the SLDMWA Member Agencies agreed to perform administrative tasks such as submitting grant applications, completing and submitting progress reports and invoices, tracking funds, and facilitating the preparation and updates of the

IRWMP. Memorandum of Agreements (MOA) are also executed with non-Member Agencies for IRWM planning coordination. Working under the direction of the BOD are various committees, including the Delta Habitat Conservation and Conveyance Plan Steering Committee, the Finance and Administration Committee, the Grassland Basin Drainage Steering Committee, the O&M Technical Committee, the Water Resources Committee, and the Westside Regional Drainage Steering Committee. In addition, ad-hoc working groups are formed as necessary to focus on matters of particular expertise or interest, including the update of the Westside-San Joaquin IWRP. The various committees and working groups provide opportunities to foster integration across jurisdictional boundaries and include multiple agencies and stakeholders in the identification of regional needs, articulation of region-wide objectives, and the selection and prioritization of projects that are consistent with the objectives. The stakeholders interact on at least a monthly basis through the BOD, committee, and working group meetings. The committees and working groups, with input from stakeholders, evaluate and synthesize information and develop recommendations to the BOD which serves as the final decision-making body for the Region. This structure allows for effective decision making and communication by having the BOD direct processes and approve final decisions, while creating the opportunity for a broad base of input, comments, and questions from all SLDMWA Member Agencies, as well as stakeholders and interested parties both within and outside the IRWM Region. The SLDMWA has effectively managed water resources in its Member Agency service areas for over two decades and has done so through excellent decision making processes, coordination, and communication, both internally and externally. These practices are applied during all aspects of the Water Authority responsibilities, including preparation and implementation of the Westside-San Joaquin IWRP.

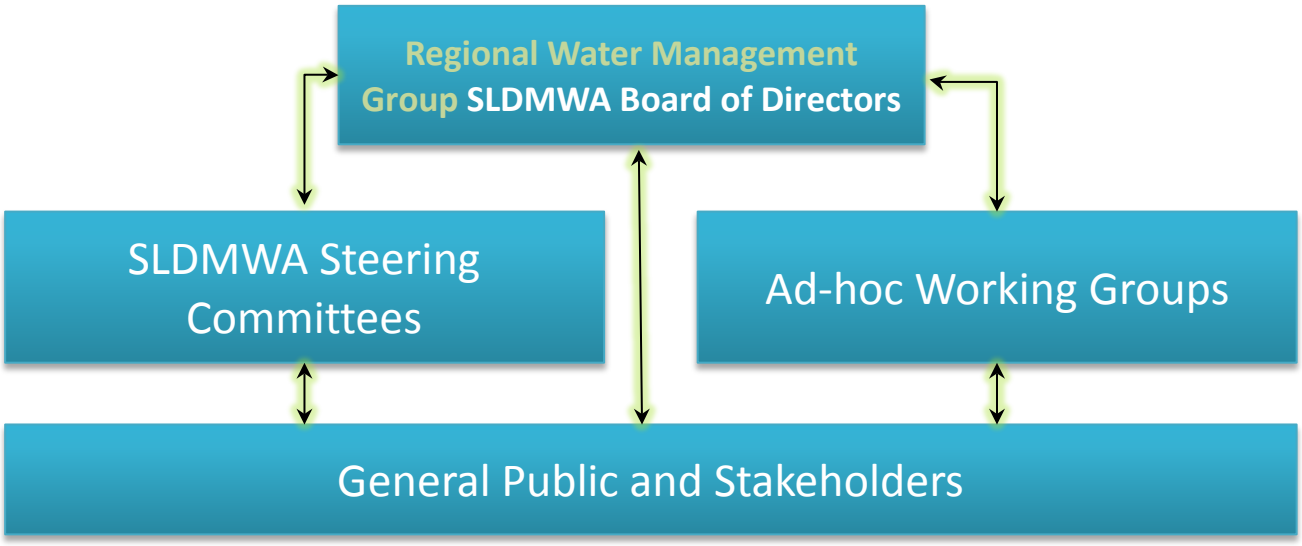


Figure 2: Governance Structure

The Region's governance process includes public outreach and involvement processes through the BOD, Steering Committee, and working group meetings. All of the meetings are open to the public and posted on the SLDMWA website. Additionally, the Westside-San Joaquin IRWM planning project manager, Ara Azhderian, a Water Policy Administrator for the Water Authority, coordinates the meeting announcements and emails the stakeholder contact list (Appendix A) with IRWM-specific information. By attending meetings and participating as members of the working groups, balanced access and opportunity for participation in the Westside-San Joaquin IRWM planning process is ensured.

1.4 Coordination

Water Management Project Coordination

The governance structure provides the basis for coordination of water management projects and activities of participating local agencies and stakeholders in the Westside-San Joaquin Region. The purpose of the Plan is to identify shared conflicts and issues, and develop solutions – typically, projects – that can be implemented to address the conflicts. Additionally, by coordinating on various water resources planning efforts, efficiencies can be taken advantage of and the IRWM planning processes and governance structure can be used to avoid and solve conflicts.

Coordination with Neighboring IRWM Regions

The Westside-San Joaquin Region is bordered by four other IRWM regions. To the east of the Westside-San Joaquin IRWM Region are the East Stanislaus, Merced, Madera, and the Upper Kings IRWM Regions. There are no adjacent regions to the north, south, or west of the Region.

Coordination among these neighboring regions is not formalized, but SLDMWA Member Agency representatives effectively communicate with the bordering IRWM regions and representatives of those regions for IRWM planning and other local planning efforts. The Westside-San Joaquin and Madera IRWM Regions are considering a draft Memorandum of Understanding (MOU) to formalize coordination and collaboration on shared IRWM planning issues.

The Westside-San Joaquin Region has coordinated with the Upper Kings Region in the past. The Westside-San Joaquin Region provided a letter to the Upper Kings Region in 2012 demonstrating support of the Draft Kings Basin IRWMP. The Kings Basin Water Authority included the SLDMWA on the mailing list for its IWRP update effort and SLDMWA kept Kings Basin Water Authority informed of Westside-San Joaquin IRWM planning progress. Four SLDMWA members – Tranquility Irrigation District, James Irrigation District, Fresno Slough Water District, and Reclamation District 1606 – were included in the Upper Kings IRWM Region which was agreed upon by both regions as these agencies overlie the Kings sub-basin of the San Joaquin Valley Groundwater Basin and therefore, there inclusion in the Upper Kings Region provides for a cohesive hydrologic region. The SLDMWA agencies within the Upper Kings Region and shared issues (such as groundwater overdraft) create the opportunity for ongoing inter-regional coordination among these two Regions. The Westside-San Joaquin Region has suggested to the Upper Kings Region the two RWMG entities execute a Letter of Agreement on Communication similar to the Madera and Upper Kings Regions. This agreement is pending.

Additionally, the Westside-San Joaquin and East Stanislaus Region have a well-established relationship and have been coordinating for years through ongoing communication. Members of the East Stanislaus RWMG have participated in meetings of the Westside-San Joaquin Region and vice versa. Representatives from the City of Patterson (Mike Willet, formerly Public Works Director of the City of Newman) and the City of Turlock (Garner Reynolds, formerly Public Works Director for the City of Patterson), participated in both the Westside-San Joaquin and East Stanislaus IRWM planning process. These representatives contributed to the development and implementation of the project solicitation and prioritization process for the Regions, among other tasks. Additionally, the two Regions coordinate regarding an inter-regional project – the North Valley Regional Recycled Water Project, a recycled water project that will deliver recycled water from the Cities of Modesto and Turlock in the East Stanislaus Region to the Del Puerto Water District in the Westside-San Joaquin Region.

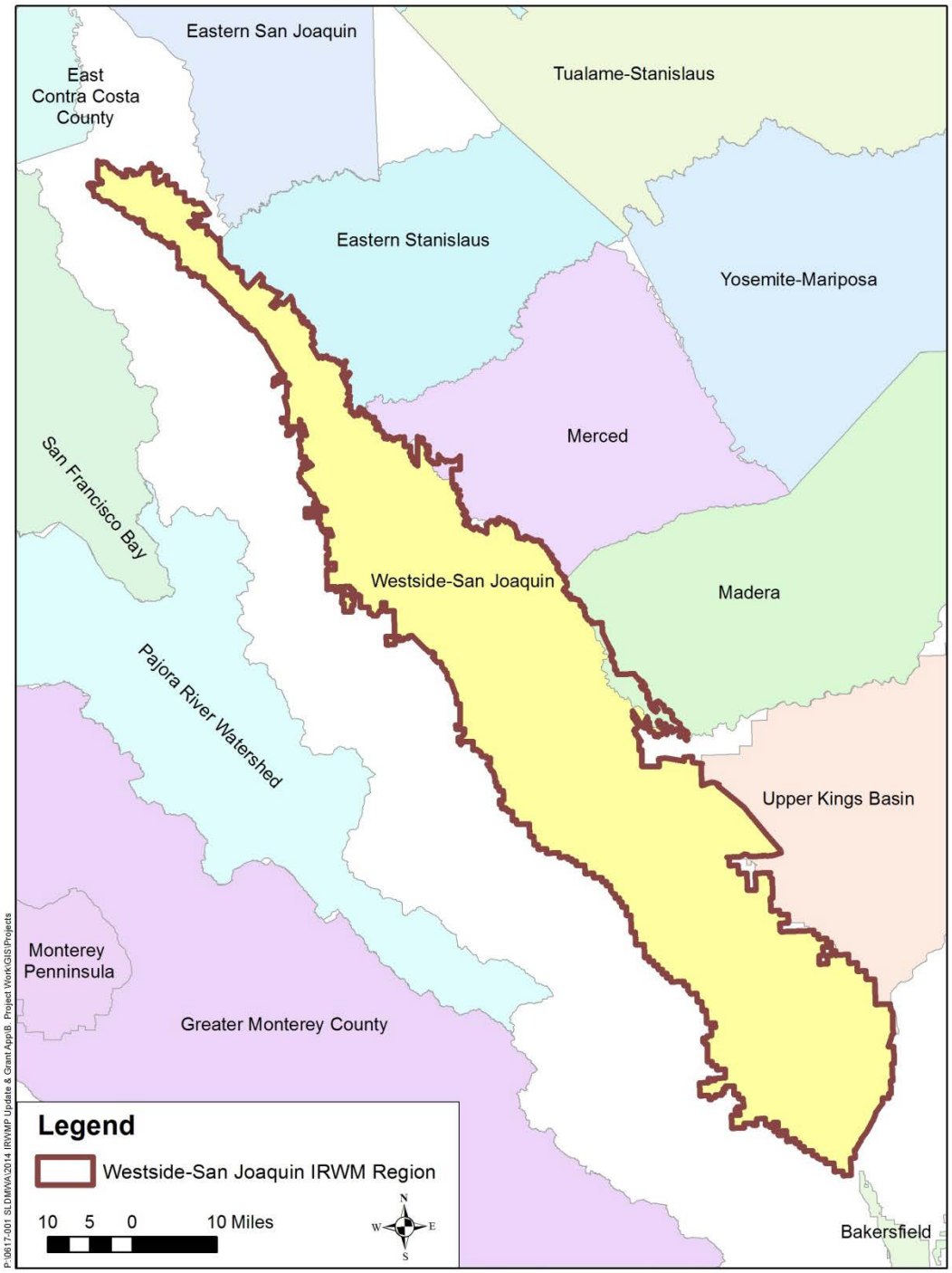


Figure 3: Neighboring IRWM Regions

There are no water management conflicts with the adjacent IRWM efforts, but rather shared issues and conflicts as they both lie within the Central Valley and are seeing diminished surface water supplies due to State and federal regulatory restrictions, resultant declining groundwater levels, and water supply impacts as a result of climate change and drought. The regions also share groundwater quality issues. These shared issues result in great opportunities to identify efficiencies, joint projects, and collaborative efforts in the future.

Coordination with State and Federal Agencies

The Water Authority has a long history of collaborative participation with State and Federal agencies in working through statewide and Regional water resource management issues. The Water Authority was a leader in the development of the Bay-Delta Accord, to which it was a signatory, as well as the Framework for Action, ROD, and creation of the Bay-Delta Authority. The Water Authority is also a founding participant in the development of the Bay Delta Conservation Plan.

Beyond being a participant in shaping the vision of resource management in the State, the Water Authority has worked cooperatively with federal and State regulatory agencies to develop policies, standards, and implementation guidelines on a myriad of legislated and regulated actions. These efforts have required collaboration with the Department of Interior (DOI), USBR, U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), DWR, the California Department of Fish and Wildlife (CDFW), the State Water Resources Control Board (SWRCB), the San Joaquin Valley Regional Water Quality Control Board (SJVRWQCB), among others.

As projects in the 2014 WIWRP are implemented, all of the agencies previously mentioned, as well as others, will likely play some role through one or all of the stages of development including feasibility studies, design, environmental review, funding, construction, and operation. The level of participation will be project-specific; however, a high degree of cooperation is generally necessary in order to ensure the success of any given effort. As projects develop, project proponents and the Water Authority will seek input from and respond to the queries of governmental agencies relative to the effort.

The Water Authority recognizes the importance of coordinating with State and Federal agencies and plans to continue ongoing communication and coordination to successfully manage water resources and implement projects in the Westside-San Joaquin IRWM Region.

1.5 IRWMP Adoption, Interim Changes, and Future Updates

The 2014 Westside-San Joaquin IRWMP was finalized in July of 2014. Upon completion, the Water Authority published a notice of intent to adopt the Plan at its September 4, 2014 Board meeting in accordance with Section 6066 of the Government Code. The SLDMWA and all SLDMWA Member Agencies adopted the Plan at public meetings of their respective governing boards. Additionally, the following project proponents and/or stakeholders will adopt the Plan in August of 2014.

- Patterson Irrigation District
- City of Patterson
- Del Puerto Water District
- Central California Irrigation District
- San Luis Water District

The SLDMWA plans to update the Westside-San Joaquin IWRP approximately every five years to ensure the Plan addresses current day conditions and issues. Interim changes to the WIWRP will typically involve project updates and will be made when agreed upon by the RWMG. As has repeatedly been the case, coordinating with stakeholders will occur and, depending upon the complexity or duration of a particular issue, it is possible a Steering Committee or Ad-hoc Working Group will be involved. If and when the Region updates the project list prior to a full Plan update, the list will be appended to the most recent version of the adopted WIWRP. This will not require the Water Authority or Member Agencies to adopt the project list or WIWRP again, so long as the projects are vetted by the RWMG.

Chapter 2 Region Description

2.1 IRWM Regional Boundary

The Westside-San Joaquin IRWM planning region is generally defined as the sum of the areas served by the Water Authority's 29 Member Agencies and lying within the San Joaquin Valley (see Figure 1). The Region is bounded to the east by the San Joaquin River and to the west by the Coast Range. The region, which encompasses approximately 2,000 square miles of land on the western side of the San Joaquin Valley, serves a multitude of interests through agricultural, municipal, industrial, and habitat management endeavors. The 29 Member Agencies (listed in Table 1 in Chapter 1) represent federal contractors, including Exchange Contractors, within the western San Joaquin Valley from the City of Tracy in the north to Kettleman City in the south. When full water deliveries are available, the San Luis and Delta-Mendota Water Authority (SLDMWA or Water Authority) is responsible for the delivery of approximately 3.3 million acre-feet (MAF) of water to the Member Agencies. SLDMWA is responsible for the operations and maintenance of certain South-of-Delta facilities, including the Delta-Mendota Canal, the C.W. Bill Jones Pumping Plant, O'Neill Pumping and Generating Plant, Tracy O&M Facilities, the San Luis Drain, the Tracy Fish Facility, Delta Cross Channel, Mendota Pool, Kesterson Reservoir, and fish release sites. The SLDMWA Board also directs the Grassland Basin Drainage Management Activity Agreement. Two Member Agencies, San Benito County Water District (SBCWD) and Santa Clara Valley Water District (SCVWD), lie outside of the Westside-San Joaquin Region and participate in the Pajaro Valley IRWM planning effort, in addition to the Westside-San Joaquin planning effort. Two other Member Agencies, Pleasant Valley Water District (in Fresno County) and Turner Island Water District (in Merced County), also lie outside, but adjacent to, the official Region boundaries.

Great diversity exists in the Westside-San Joaquin Region through a spectrum of issues ranging from resource management responsibilities and the problems that arise from resource usage to socio-economic status, cultural background, ethnicity, and development. While this diversity poses challenges, it also creates opportunities for the integration of water management. Of the many features shared by the Region, perhaps none is more important than the desire to venture for improvement and mutual benefit of overall water resources planning and management. The Region has a long history of collaborating on local, regional, state, and federal matters. This willingness to work cooperatively to solve local problems with regional solutions resulted in the development of the Westside-San Joaquin IRWM Region and provides it with a unique foundation from which to develop and implement plans and projects that generate broad benefit. In addition to shared water management objectives, the Region also has common issues such as chronic water supply shortages, unreliable conveyance capability, and reliance upon imported water to meet the majority of their water supply demands. Generally, the shared issues and conflicts of the Region include:

- Water supply reliability
- Water quality (drinking water, groundwater and surface water quality/TMDLs)

- Surface and groundwater quality protection
- Groundwater overdraft
- Land management relative to water resources (i.e. Irrigated Lands Regulatory Program)
- Protection and enhancement of aquatic, riparian, and watershed resources
- Water-related needs for disadvantaged communities
- Need for recreational space and enhancement of liveability
- Flood protection
- Climate change impacts that may exacerbate many of the issues listed above

These shared issues, and the associated Regional Objectives, creates the potential for meeting the Region's needs through a series of integrated solutions. These issues, and the associated Region Objectives, are described in Chapter 3 Goals and Objectives. The following sections describe the Westside-San Joaquin Region and help to describe why it is successful as an IRWM planning region.

Internal and External Boundaries

Counties

The Westside-San Joaquin Region stretches from the City of Tracy in San Joaquin County at the north, to Highway 41 and Kettleman City in Kings County to the south. The Region includes portions of San Joaquin, Stanislaus, Merced, Madera, Fresno, and Kings County, as shown in Figure 4.

Neighboring IRWM Regions

To the east of the Westside-San Joaquin IRWM Region are the East Stanislaus, Merced, Madera, and the Upper Kings IRWM Regions. There are no adjacent regions to the north, south, or west of the Region. Coordination among these neighboring regions is described in Chapter 1.4.

Member Agencies and Central Valley Project (CVP) Divisions

A list of SLDMWA Member Agencies, segregated by Water Authority Divisions, is provided in Appendix B. Minor differences exist; for example, Pacheco Water District is viewed by SLDMWA as a Lower DMC Division agency while U.S. Bureau of Reclamation (USBR) designates them as San Luis Unit. Pleasant Valley Water District is categorized as a SLC Division agency by SLDMWA, but is not listed by USBR as they currently have no CVP water supply. Additionally, the Delta Division, which includes the Coelho Family Trust, is not a member of the SLDMWA, while the SLDMWA includes the Turner Island Water District, which is not a CVP contractor.

The CVP, central to planning efforts within the Westside-San Joaquin Region, was conceived, designed and constructed to create greater economic development in California. The first legislation authorizing development of the CVP was passed in 1935, and at least 15 acts of Congress have authorized additional development. Initial project features included Shasta Dam for flood control, navigation and water storage, and a canal system to deliver water from Lake Shasta and the Delta to the northern San Joaquin Valley.

Under the parent program of the CVP are the Delta Division Project and the San Luis Unit Project, both of which are located in western San Joaquin Valley. The Delta Division includes portions of San Joaquin, Stanislaus, Merced, and Fresno Counties and the service areas of the 20 DMC CVP contractors. The Delta Division transports water through the central portion of the Central Valley with the Delta Cross Channel, Contra Costa Canal, C.W. Bill Jones Pumping Plant, Tracy Fish Collection Facility, and DMC.

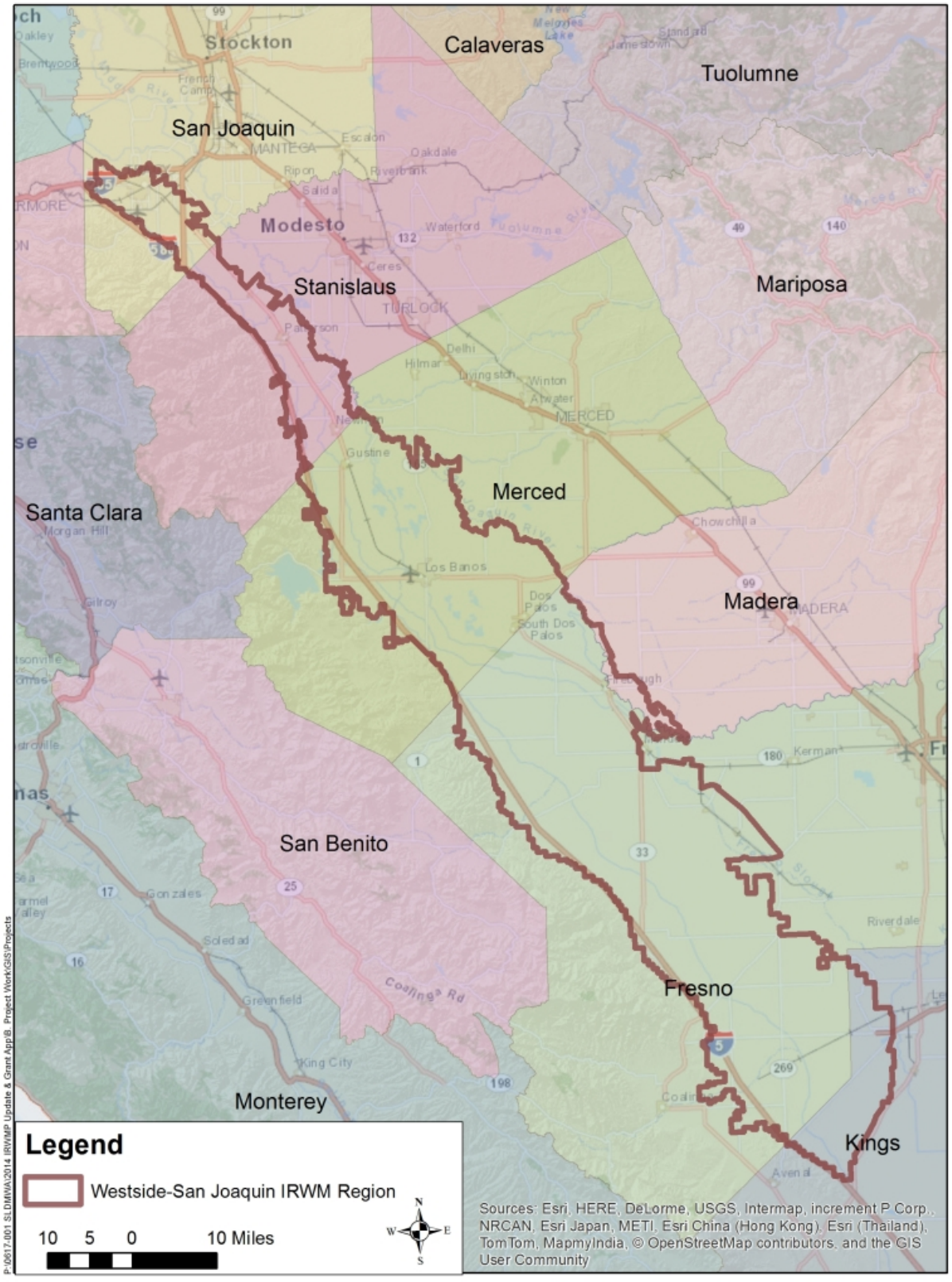


Figure 4: Westside-San Joaquin IRWM Region Counties

The San Luis Unit includes the western portions of Fresno, Kings and Merced Counties. The San Luis Unit is part of the CVP and also part of the State of California Water Plan, so it is operated jointly by USBR and the State of California. The federal portion of the facilities furnishes approximately 1.25 million AF of water as supplemental irrigation supply to approximately 600,000 acres in the western portions of Fresno, Kings, and Merced Counties. The joint federal-state facilities include O'Neill Dam and Forebay, San Luis Dam and Reservoir, William R. Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, Los Banos and Little Panoche Reservoirs, and the San Luis Canal from O'Neill Forebay to Kettleman City. The federal-only portion of the San Luis Unit includes the O'Neill Pumping Plant and Intake Canal, Coalinga Canal, Pleasant Valley Pumping Plant, and the San Luis Drain.

Facilities within the Westside-San Joaquin Region are described in greater detail in the following sections.

Watersheds

The Westside-San Joaquin Region lies in the Middle San Joaquin-Lower Merced Lower Stanislaus watershed, the Middle San Joaquin-Lower Chowchilla watershed, and the Tulare-Buena Vista Lakes Watershed (see Figure 5). Historically, the San Joaquin River basin was a large floodplain of the San Joaquin River that supported vast expanses of permanent and seasonal marshes, lakes, and riparian areas. Almost 70 percent of the basin has been converted to irrigated agriculture, with wetland acreage estimated to have been reduced to approximately 120,300 acres. In combination with the adjacent uplands, the wetland complex is referred to as "the Grasslands" and consists of approximately 160,000 acres of private and public lands. Approximately 53,300 acres of the Grasslands are permanently protected in state or federal wildlife refuges or in federal conservation easements.

The San Joaquin Valley is part of a large, northwest-to-southeast-trending asymmetric trough of the Central Valley, which has been filled with up to six vertical miles of sediment. This sediment includes both marine and continental deposits ranging in age from Jurassic to Holocene. The San Joaquin Valley lies between the Coast Range Mountains on the west and the Sierra Nevada on the east, and extends northwestward from the San Emigdo and Tehachapi Mountains to the Sacramento-San Joaquin Delta near the City of Stockton. The San Joaquin Valley is 250 miles long and 50 to 60 miles wide. The relatively flat alluvial floor is interrupted occasionally by low hills. Foothills adjacent on the west are composed of folded and faulted beds of mainly marine shale in the north and sandstone and shale in the south.

The San Joaquin Valley floor is divided into several geomorphic land types, including dissected uplands, low alluvial fans and plains, river floodplains and channels, and overflow lands and lake bottoms. Alluvial plains cover most of the valley floor and comprise some of the most intensely developed agricultural lands in the San Joaquin Valley. In general, alluvial sediments of the western and southern parts of the San Joaquin Valley tend to have lower permeability than east side deposits.

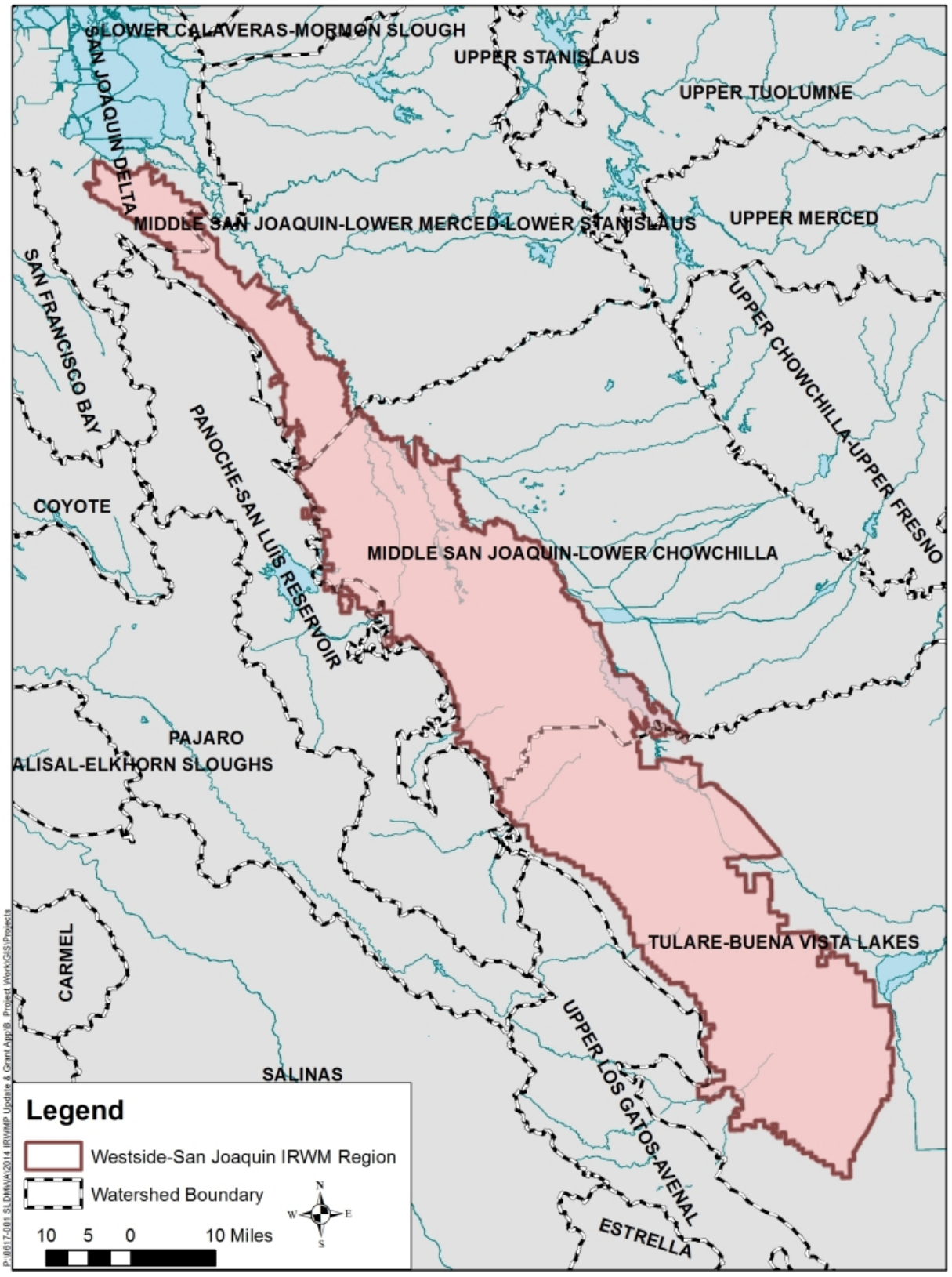


Figure 5: Regional Watersheds

Major Water Related Infrastructure

Within the Westside-San Joaquin Region lies an extensive series of water systems relied upon by multiple water agencies, cities, and water users. The SLDMWA consists of water agencies representing approximately 2.1 million acres of 29 federal and exchange water service contractors. The major water related infrastructure in the Region includes the facilities required to deliver the CVP supplies to the Member Agencies. The SLDMWA operates and maintains the Delta Cross Channel, the C.W. Bill Jones Pumping Plant, the DMC, O'Neill Pumping-Generating Plant, San Luis Drain, and the Tracy Fish Collection Facility

Delta Cross Channel

The Delta Cross Channel, located near Walnut Grove, diverts water from the Sacramento River into Snodgrass Slough, and is critical in controlling salinity as part of the CVP, Delta Division. From the Slough, the water flows through natural channels for about 50 miles to the vicinity of the C.W. Bill Jones Pumping Plant. The section is designed to divert approximately 3,500 cubic feet per second (cfs) of water.

C.W. Bill Jones Pumping Plan

The Westside-San Joaquin Region receives water pumped from the Delta by the C.W. Bill Jones Pumping Plant and conveyed in the DMC by gravity. The pumping plant is located about 12 miles northwest of Tracy, and is essential to agricultural, urban, and wildlife water deliveries to parts of the Delta and the San Luis and San Felipe Units of the CVP. Six pumps, each powered by a 22,500 horsepower electric motor, lifts the Delta water about 200 feet from the intake through discharge pipes about one mile to the DMC. Power to operate the pumps is generated by CVP facilities. Total capacity of the plan is approximately 5,200 cfs, with each unit have a pumping capacity between 850 cfs and 1,050 cfs.

Delta-Mendota Canal (DMC)

The DMC, a 116.6 mile long canal completed in 1951, carries water southeasterly from the C.W. Bill Jones Pumping Plant to the Mendota Pool in the San Joaquin River (30 miles west of Fresno) to be used for irrigation of land along the west side of the San Joaquin Valley and to replace San Joaquin River water stored at Friant Dam. Initially, the conveyance capacity was 4,600 cfs, decreasing to 3,211 cfs at the terminus. Water delivery facilities providing irrigation service to lands in the San Luis Unit were not completed until the 1980s. Today, the DMC and associated facilities are essential to provide irrigation supply as part of the San Luis Unit and the CVP Delta Division.

DMC/California Aqueduct Intertie

The Intertie connects the DMC and the California Aqueduct via two 108-inch diameter pipes with a pumping capacity of 467 cubic feet per second. The connection is approximately 500 feet long and helps to address DMC conveyance conditions that had restricted use of the C.W. Bill Jones pumping Plant to less than its design capacity, restoring as much as 35,000 AF of average annual deliveries to the CVP. The intertie also provides redundancy in the CVP distribution system.

O'Neill Pumping-Generating Plant

The O'Neill Pumping Plant, located at Mile 70, about 12 miles west of Los Banos, lifts water between 45 and 53 feet from the DMC into the O'Neill Forebay. This plant is essential in delivering water to the O'Neill Forebay, San Luis, and San Felipe Units of the CVP. The Plant was completed in 1968 and consists of an intake channel leading off the DMC and six pumping-generating units, each of which can discharge about 650 cfs and has a rating of 6,000 horsepower. When operating as turbines/generators, each unit can generate about 4,000 kilowatts.

San Luis Drain

The San Luis Drain, partially completed in 1974, was designed to convey and dispose of subsurface irrigation return flows from the San Luis service area in an attempt to keep contaminated irrigation drainage water out of the San Joaquin River. It is part of the San Luis Unit, West San Joaquin Division of the CVP. It is a concrete lined channel with a design capacity of 300 cfs.

Tracy Fish Collection Facility

The Tracy Fish Collection Facility, located approximately 2.5 miles upstream of the C.W. Bill Jones Pumping Plant, intercepts fish from the Old River and the pumping plant, which is vital to the preservation of various Delta species by allowing them to return to the main delta channel and resume their journey to the ocean. This facility is part of the CVP, Delta Division. The USBR continues O&M of this facility, while SLDMWA has a service contract to provide emergency assistance upon request.

Flood Management

In general, the Region slopes toward the San Joaquin River, with steeper slopes along the western boundary (near the Coastal Mountain Range), tapering off closer to the San Joaquin River. There has not been significant flooding in recent years, although severe rain events in 1997/98 and in 2005 threatened to flood some of the communities adjacent to the San Joaquin River (specifically the City of Firebaugh) and produced some localized flooding of farmland caused by runoff impoundment by elevated canal banks. Based on the recent historical events, the primary threat of flooding to urban areas will be for those along (and immediately adjacent to) the San Joaquin River. Areas within the 100-year floodplain within the Westside-San Joaquin are relatively minimal, as shown in Figure 6.

The flood management system in the San Joaquin Valley includes reservoirs to regulate snowmelt from elevations greater than 5,000 feet, bypasses at lower elevations, and levees that line major rivers.

Major Land Use Divisions

The Westside-San Joaquin Region consists mostly of agricultural land use types (see Figure 7). Typical land uses in the Region are described in the following sections. The primary land use planning entities in the Region include the Counties, as well as the Cities of Tracy, Patterson, Los Banos, Firebaugh, Newman, Gustine, and Dos Palos, as shown in Figure 8.

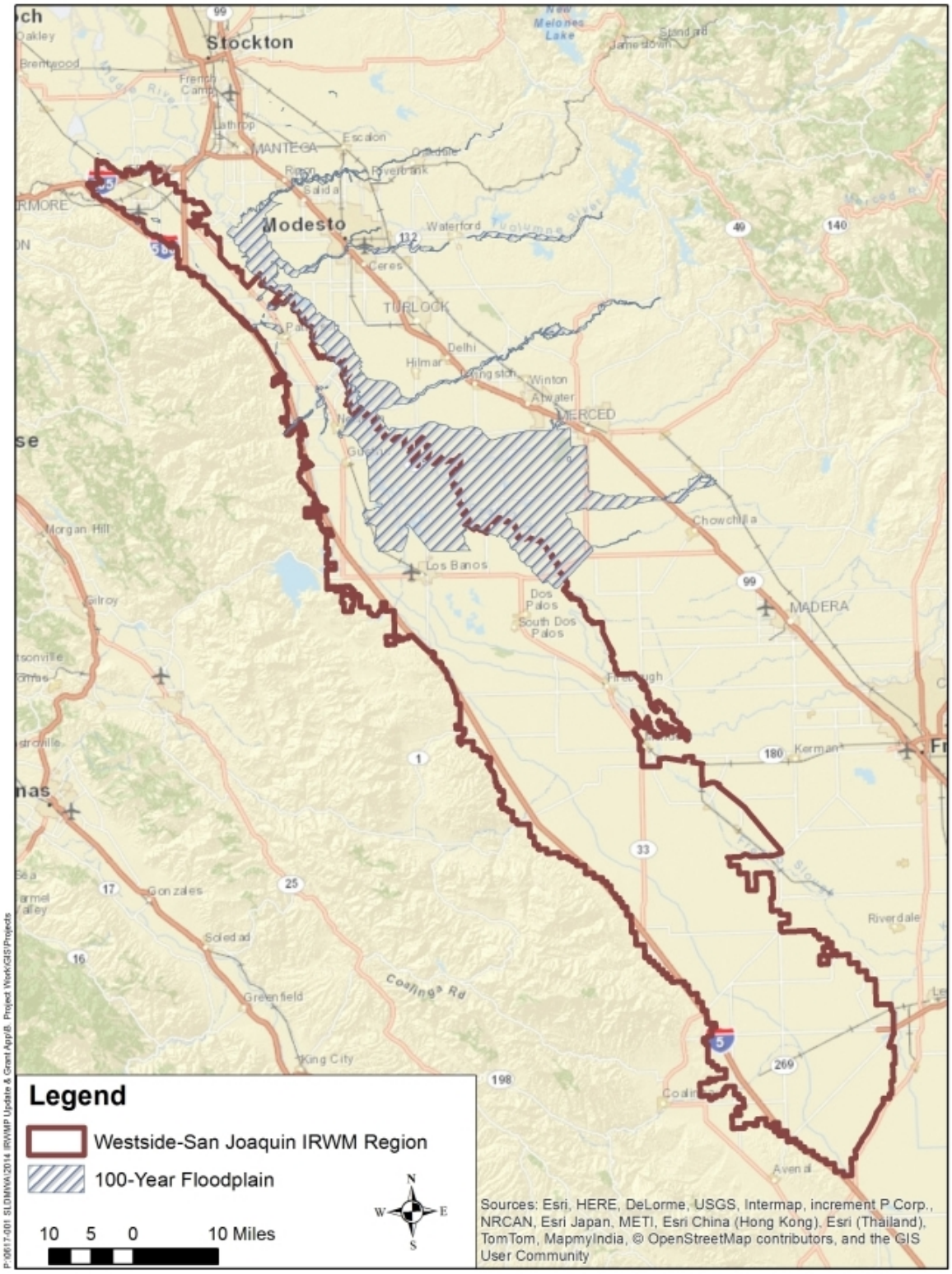


Figure 6: 100-Year Floodplain

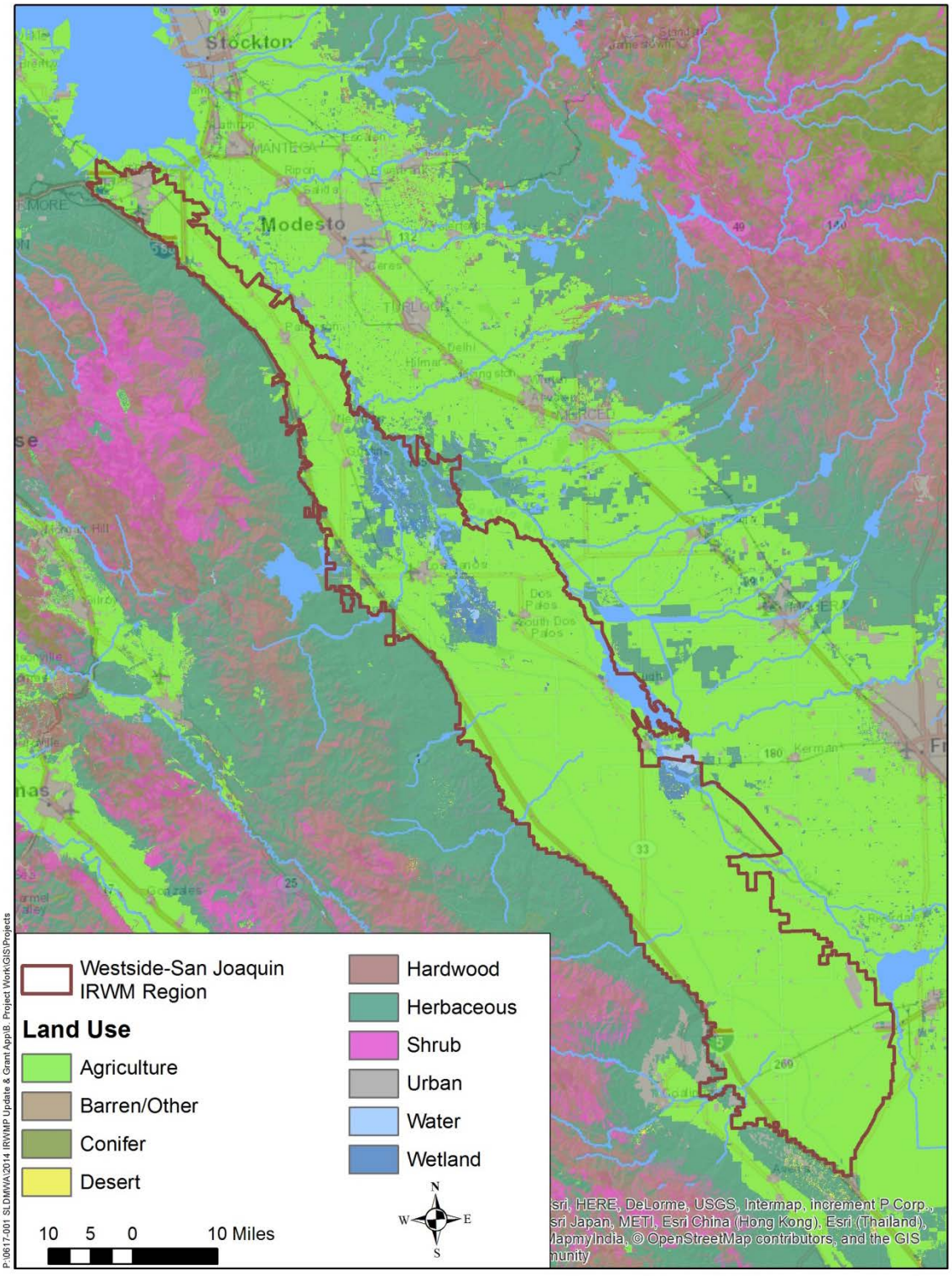


Figure 7: Land Cover

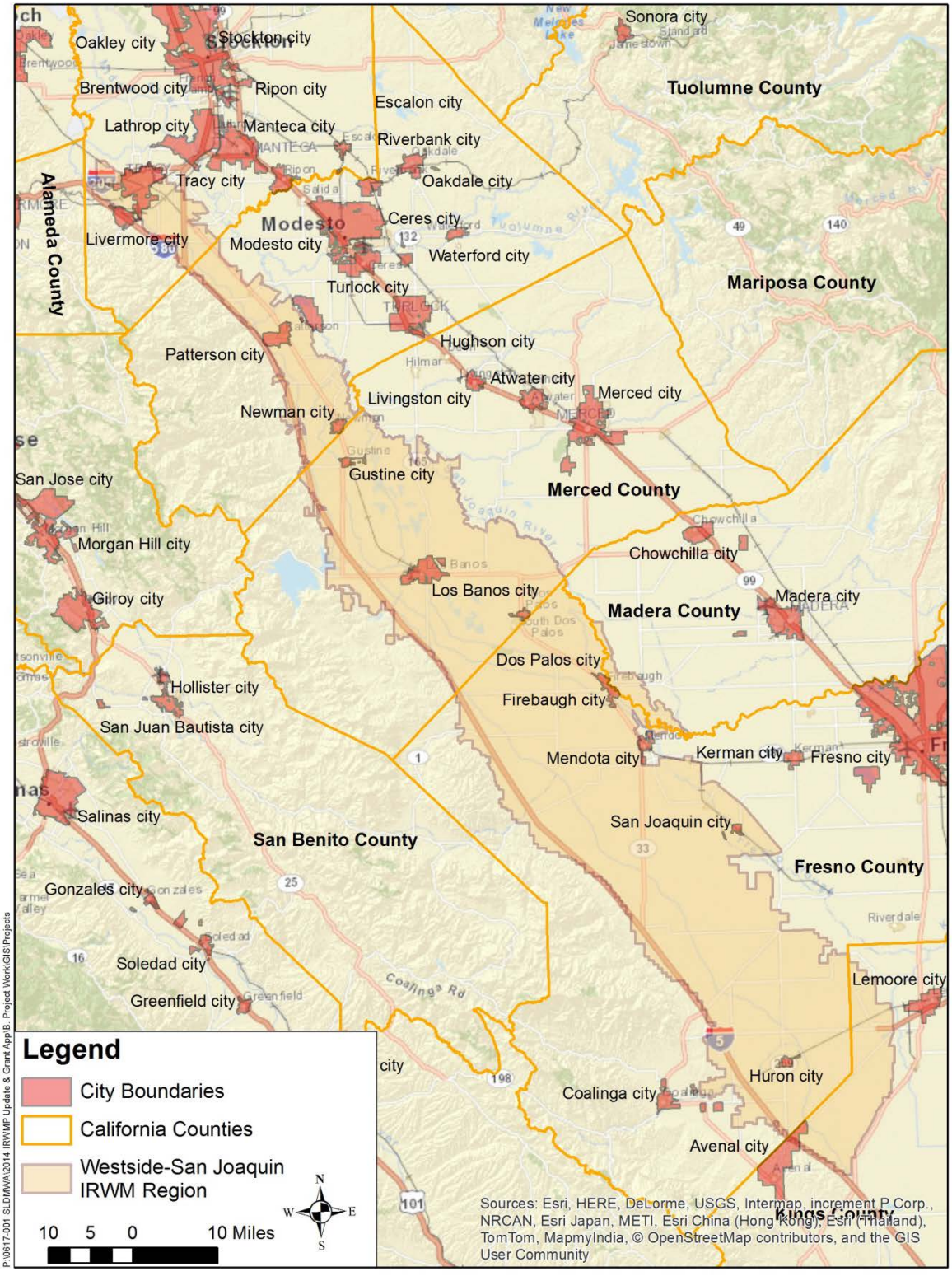


Figure 8: Land Use Planning Entities

Grassland and Unknown Rangeland

Grasslands in the Central Valley were originally dominated by native perennial grasses such as needlegrass and alkali sacaton. Currently, grassland vegetation is characterized by a predominance of annual or perennial grasses in an area with few or no trees and shrubs. Annual grasses found in grassland vegetation include wild oats, soft chess, ripgut grass, medusa head, wild barley, red brome, and slender fescue. Perennial grasses found in grassland vegetation are purple needlegrass, Idaho fescue, and California oatgrass. Forbs commonly encountered in grassland vegetation include long-beaked filaree, redstem filaree, dove weed, clovers, Mariposa lilies, popcornflower, and California poppy. Vernal pools found in small depressions with an underlying impermeable layer are isolated wetlands within grassland vegetation.

Rangeland communities are composed of similar grasses, grass-like plants, forbs, or shrubs, which are grazed by livestock. Forbs commonly encountered in grassland vegetation include long-beaked filaree, redstem filaree, dove weed, clovers, Mariposa lily, popcornflower, and California poppy. Most of the grasslands in California are dominated by naturalized annual grasses with perennial grasses existing in relict prairie communities or on sites with soil or water conditions unfavorable for annual grasses, such as on serpentine. Grassland vegetation occurs from sea level to about 3,900 feet in elevation. Grassland communities as a whole have relatively high species diversity when compared to other California plant communities.

Grassland habitats are important foraging areas for black-shouldered kite, red-tailed hawk, Swainson's hawk, northern harrier, American kestrel, yellow-billed magpie, loggerhead shrike, savannah sparrow, American pipit, mourning dove, Brewer's blackbird, red-winged blackbird, and a variety of swallows. Birds such as killdeer, ring-necked pheasant, western kingbird, western meadowlark, and horned lark nest in grassland habitats. Grasslands also provide important foraging habitat for the coyote and badger because this habitat supports large populations of small prey species, such as the deer mouse, California vole, pocket gopher, and California ground squirrel. Common reptiles and amphibians of grassland habitats include western fence lizard, common kingsnake, western rattlesnake, gopher snake, common garter snake, western toad, and western spadefoot toad.

Shrub and Brush and Mixed Rangeland

Most of the rangelands in the United States are west of an irregular north-south line that runs from the Dakotas through Oklahoma and Texas. Rangelands are classified into three basic types: shrub and brush rangeland, mixed rangeland and herbaceous rangeland.

The shrub and brush rangeland is dominated by woody vegetation and is typically found in arid and semiarid regions such as the San Luis Unit. Mixed rangelands are ecosystems where more than one-third of the land supports a mixture of herbaceous species and shrub or brush rangeland species.

Herbaceous rangelands are dominated by naturally occurring grasses and forbs as well as some areas that have been modified to include grasses and forbs as their principal cover. Rangelands are, by definition, areas where a variety of commercial livestock are actively maintained. Within the rangeland community, a number of herbivorous animals such as grasshoppers, jackrabbits, and kangaroo rats compete with livestock for forage.

Agricultural Habitat

Although natural communities provide the highest value for wildlife, many of these historic natural habitats have been largely replaced by agricultural habitats with varying degrees of benefits to wildlife. Two agricultural types occur in the area: cropland and pasture and orchards and vineyards. The

intensive management of agricultural lands, including soil preparation activities, crop rotation, grazing, and the use of chemicals, effectively reduces the value of these habitats for wildlife. However, many wildlife species have adapted, to some degree, to particular crop types and now use them for foraging and nesting. Orchards, vineyards, and cotton fields generally provide relatively low-quality wildlife habitat because the frequent disturbance results in limited foraging opportunities and a general lack of cover. Pasture and row crops provide a moderate-quality habitat with some limited cover and foraging opportunities.

Cropland and Pasture

Pasture habitat can consist of both irrigated and unirrigated lands dominated by perennial grasses and various legumes. The composition and height of the vegetation, which varies with management practices, also affects the wildlife species composition and relative abundance. In Southern California, Bermuda grass is the dominant plant species seeded in pastures, while in Northern California, ryegrasses, fescues, clovers, and trefoils are preferred.

Irrigated pastures may offer some species habitats that are similar to those of both seasonal wetlands and unirrigated pastures. The use of these pastures for grazing, however, reduces the overall habitat quality for ground-nesting wildlife and effectively reduces the value of the habitat. Irrigated pastures provide both foraging and roosting opportunities for many shorebirds and wading birds, including black-bellied plover, killdeer, long-billed curlew, and white-faced ibis. Unirrigated pastures, if lightly grazed, can provide forage for seed-eating birds and small mammals. Ground-nesting birds, such as ring-necked pheasant, waterfowl, and western meadowlark, can nest in pastures if adequate vegetation is present. Small mammals occupying pasture habitat include California voles, Botta's pocket gophers, and California ground squirrels. Raptors including red-tailed hawks, white-tailed kites, and prairie falcons prey upon the available rodents. In areas where alfalfa or wild oats have been recently harvested, the large rodent populations can provide high-quality foraging habitat for raptors.

The habitat value in cropland is essentially regulated by the crop production cycle. Most crops in California are annual species and are managed with a crop rotation system. During the year, several different crops may be produced on a given parcel of land. Many species of rodents and birds have adapted to croplands, which often requires that the species be controlled to prevent extensive crop losses. This may require intensive management and often the use of various pesticides. Rodent species that are known to forage in row crops include the California vole, deer mouse, and the California ground squirrel. These rodent populations are preyed upon by Swainson's hawks, red-tailed hawks, and black-shouldered kites.

Orchards and Vineyards

Orchard-vineyard habitat consists of cultivated fruit or nut-bearing trees or grapevines. Orchards are typically open, single-species, tree-dominated habitats and are planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse; however, in some areas, grasses or forbs are allowed to grow between vineyard and orchard rows to reduce erosion. In vineyards, the rows under the vines are often sprayed with herbicides to prevent the growth of herbaceous plants.

Wildlife species associated with vineyards include the deer mouse, California quail, opossum, raccoon, mourning dove, and black-tailed hare. Nut crops provide food for American crows, scrub jay, northern flicker, Lewis' woodpecker, and California ground squirrel. Fruit crops provide additional food supplies for yellow-billed magpies, American robin, northern mockingbird, black-headed grosbeak, California

quail, gray squirrel, raccoon, and mule deer. Loss of fruit to grazers often results in species management programs designed to force these species away from the orchards.

Row Crops

Row crops include tomatoes, sugar beets, and melons, among many others. Intensive management and pesticide use limit the use of row crops by wildlife. Rodent species that forage in row crops include the California vole, deer mouse, and California ground squirrel. These rodent populations are preyed upon by Swainson's hawks, red-tailed hawks, and white-tailed kites.

Grain Crops

Grain crops include barley, wheat, corn, and oats. Many grain crops are planted in fall and harvested in spring. They are intensively managed, and chemicals are often used to control pests and diseases. This management strategy reduces the value of these crops to wildlife. However, the young green shoots of these crops provide important foraging opportunities for such species as greater white-fronted geese, tundra swans, wild pigs, and tule elk. Other species, including red-winged blackbirds, Brewer's blackbirds, ring-necked pheasants, waterfowl, and western harvest mice, feed on the seeds produced by these crops.

Rice

Cultivated rice in the Central Valley has some of the attributes found in seasonal wetlands. However, the intensive management of this habitat reduces many of the benefits found in natural wetlands. Flooded rice fields provide nesting and foraging habitat for waterfowl and shorebirds. Rice provides important forage for many wildlife species. After harvest, waterfowl (e.g., mallards and Canada geese), sandhill cranes, California voles, and deer mice feed upon the waste grain. Raptors, including northern harrier, white-tailed kite, and ferruginous hawk, feed upon rodents in this habitat. Irrigation ditches used to flood rice fields often contain dense cattail vegetation and provide habitat for wildlife species, such as the Virginia rail, American bittern, snowy egret, marsh wren, common yellowthroat, and song sparrow.

Cotton

Cotton is of limited value to wildlife because of the intensive management of this crop and the use of chemicals to control pests and disease. Mourning doves and house mice are found in this crop type. During irrigation, when vegetation is short and sparse, additional wildlife, including killdeer, American pipit, and horned lark, may be attracted.

Deciduous Forest

Deciduous forests are composed of trees that lose their leaves in the winter. These include species such as the various California oaks and California buckeye; the interior live oak, which is not deciduous, is also found in deciduous forests. Valley oak woodlands are found in the Sacramento and San Joaquin Valleys and usually occur below elevations of 2,000 feet. The deciduous forest plant species often provide a substantial amount of food to associated animals. The forest itself also provides a large amount of three-dimensional habitat. Wildlife associated with deciduous forests includes a wide variety of birds, small rodents, deer, raccoons, various insects, foxes, bobcats, black bears, or even wolves.

Idle or Retired Farmland

Lands of this category are similar to abandoned farmlands in the ruderal or unknown rangeland category, but with less time out of agricultural production. Similarly, the habitat value of these lands may vary with land management practices.

2.2 Quality and Quantity of Water Resources

Water supplies within the Westside-San Joaquin Region include CVP water, groundwater, and local surface water. These are described in the following sections.

CVP Supplies

Three of the four San Luis Unit member agencies (excluding Pleasant Valley Water District), each of the Delta Division contractors, and several Significant Natural Areas in the proximity of the DMC use CVP water; it is the primary source of water for the Westside-San Joaquin Region. Pleasant Valley Water District (a member of the San Luis Unit), as well as four natural areas in the vicinity that are managed as uplands, do not receive CVP water (USBR, 2005). These areas include the Little Panoche, Lower Cottonwood Creek, O'Neill Forebay, and Upper Cottonwood Creek Wildlife Management Areas. The Upper and Lower Cottonwood Creek Wildlife Management Areas are located adjacent to San Luis Reservoir. The O'Neill Forebay Wildlife Management Area is located adjacent to its namesake. The Little Panoche Wildlife Management Area is located on Little Panoche Creek in the hills approximately 10 miles southwest of the Eagle Field Water District.

While water quality is generally not an issue with CVP water supplies, periodically, there are taste and odor problems resulting from algae blooms in the Delta (EKI, 2011). Significant water quality problems could result if there are water quality issues in the Delta that could be a result of levee failures, toxic spills, and/or salinity issues.

Since 1989, CVP water supply to the Region has decreased significantly primarily due to:

- State Water Resources Control Board water quality standards for the Bay-Delta; Decision-1485 and Decision-1641;
- State and Federal Endangered Species Act provisions and related court decisions;
- Central Valley Project Improvement Act (P.L. 102-575) implementation.

Water Quality Control Plan and D-1485

In 1978, the SWRCB released Water Rights Decision 1485. The decision set flow and water quality standards for the protection of beneficial uses in and from the Delta and required the State Water Project (SWP) and CVP to meet those standards as water rights conditions for the projects. The standards were based on the premise that beneficial uses would be protected at a level equal to the protection received had the CVP and SWP never been constructed.

In 1986, the California Court of Appeal issued a decision authorizing the State Water Resources Control Board (SWRCB) to modify water right permits to implement Delta water quality standards and to develop standards to protect fish and wildlife. These standards, however, could not be established solely to protect Delta water users from the impacts of the SWP and CVP. Consequently, in 1987, the SWRCB began a formal proceeding to reconsider the D-1485 standards, establish new standards if needed, and develop a program of implementation.

In the same year as the Court of Appeal decision, USBR and the State of California entered into a Coordinated Operations Agreement (COA) that sets the responsibility of the CVP and SWP for applicable Delta water quality standards. The COA provides the basis for CVP and SWP operations to ensure an equitable share of water supply for each project, while guaranteeing that the systems operate more efficiently during droughts than if they were to operate independently.

Water Quality Control Plan and D-1641

After a great deal of controversy between the U.S. Environmental Protection Agency (USEPA) and the State of California in the early 1990's, the historic Bay-Delta Accord was signed in 1994. The following year, the SWRCB adopted a new Water Quality Control Plan (WQCP) based on the Accord.

In December 1999, the SWRCB issued D-1641. That decision assigned interim responsibility to the CVP and SWP to meet the flow and water quality objectives in the WQCP. The decision also approved certain agreements involving the responsibility of the CVP and SWP towards certain other water right holders for meeting those objectives. Phase 8 of the Bay-Delta water right hearings was intended to address the responsibilities of remaining water-right holders in meeting the objectives in the 1995 WQCP. The CVP, SWP, and the remaining upstream water right holders reached an agreement on Phase 8 in late December 2002 to stay the SWRCB's Phase 8 proceedings. To meet the CVP's obligation assigned under D-1641, more CVP water is needed than the amounts of water previously required to meet the standards under D-1485.

Endangered Species Act

The Endangered Species Act (ESA) has reduced water supplies in the Westside-San Joaquin Region for both agricultural and municipal and industrial (M&I) water users. The 1989 listing of the Sacramento winter-run Chinook salmon as a "threatened" species was the first listing to affect the CVP. In 1994, this listing was upgraded to "endangered". Management actions intended to protect this species have required structural and operational changes to maintain flows and lower water temperatures below Shasta Dam. Because a supply of cold water must be maintained in Lake Shasta for downstream temperature control, less water is available for agricultural and M&I water supply. Additional ESA listings include the Delta Smelt in 1993, Central Valley Steelhead trout in 1998, and the spring run Chinook salmon in 1999.

In order to minimize take of listed species, the CVP and SWP diversions from the Delta at the federal C.W. Bill Jones Pumping Plant and the Banks Pumping Plant have been reduced and sometimes curtailed altogether, especially for Delta Smelt and winter run Chinook salmon. The 1994 Bay-Delta Accord and the CALFED ROD, discussed below, established principles for water management to minimize and eventually mitigate the effect of ESA provisions on water supply.

CVPIA Provisions Affecting CVP Water Supply

A number of key Central Valley Project Improvement Act (CVPIA) provisions directly affect water supply availability for agricultural and M&I water users in the Westside-San Joaquin Region including:

- Section 3404(a), which precludes the issuance of any new short term, temporary, or long term CVP contracts for any purpose other than fish and wildlife.
- Section 3406(b)(2), which authorizes and directs the dedication of up to 800 TAF of CVP water for environmental purposes.
- Section 3406(b)(23), which addresses restoration efforts for the Trinity River Division.

- Section 3406(d)(1), which requires firm CVP water supplies amounting to 480 TAF to be delivered to federal, state and some private wildlife refuges.

Section 3404(a) precludes the issuance of any new CVP contracts until after completion of the many and varied goals of the CVPIA. Pursuant to Section 3406(b)(2), Interior has been dedicating and managing CVP water since 1993, the first water year following passage of the CVPIA. Since enactment of the statute, Interior has pursued ways to utilize (b)(2) water in conjunction with modification of CVP operations and water acquisitions to meet the goals of the CVPIA.

Section 3406(b)(23) of the CVPIA requires Interior to complete a flow study and make recommendations regarding increased flows in the Trinity River to restore fisheries. Increased flow need was developed in the Trinity River Flow Evaluation Study and recommended in the Trinity River Mainstream Fishery Restoration Draft EIS/EIR. Interior adopted on December 19, 2000 the Trinity River Mainstream Fishery Restoration Program Record of Decision ("ROD"), which proposed implementation of the increased flow regime. CVP water and power users filed suit in January 2001 and a U.S. District Court issued a preliminary injunction in March 2001. On July 5, 2005, the U.S. District Court entered an amended final judgment, which resolved the legal challenges to ROD. Thus, Interior will be implementing a Program that seeks to increase Chinook salmon production primarily by making annual instream flow releases from the CVP's Trinity River Division ("TRD") that range from 369,000 acre-feet of water in critically dry years to 815,000 AF in extremely wet years. The increased flow releases from the TRD will reduce the amount of CVP water that can be diverted into the Sacramento River and thence from the Delta for irrigation deliveries to South-of-Delta agricultural contractors.

Section 3406(d)(1) of the CVPIA requires firm water supplies to be delivered to federal, state and some private wildlife refuges, as defined in the CVPIA. This supply is referred to as “Firm Level 2” as outlined in the Refuge Water Supply Report and the San Joaquin Basin Action Plan, and is greater than the amount of CVP water previously delivered to the refuges (USBR, 1989; USBR and California Department of Fish and Game, 1989). Historically, most of the refuges received irrigation tail water for much of their supply, but the CVPIA requires water sources of suitable quality and at a level of reliability greater than that for agricultural contractors. Because CVP water has been supplied to the refuges to meet Level 2 requirements, the ability of the CVP to deliver water to its agricultural and M&I contractors has declined.

The CVPIA also includes several provisions to increase agricultural and M&I water costs. Important provisions include restoration fees, tiered water pricing, conservation requirements and additional water acquisition for wildlife refuges for Level 4 requirements [CVPIA 3406(d)(2)].

Surface Water

While CVP supplies provide the majority of surface water supplies in the Westside-San Joaquin Region, some Member Agencies also have access to individual surface water supplies. For example, Patterson Irrigation District holds pre-1914 water rights for diversion from the San Joaquin River, while West Stanislaus Irrigation District holds junior rights for diversion of approximately 190,000 AFY from the river. Banta-Carbona Irrigation District (approximately 123,000 AFY), Grasslands Water District and Turner Island Water District (approximately 10,500 AFY) also hold rights for diversions from the San Joaquin River.

Surface water quality in the Region is variable, but is typically better than the quality within the DMC. Maintaining stormwater quality is key to maintaining surface water quality in nearby rivers. Waters at high elevations that originate as snowmelt typically are of excellent quality, but irrigation drainage and waste discharges that run into the San Joaquin River on the valley floor continuously degrade the water

quality. Dissolved salts and nutrients in agricultural return flows, as well as residual pesticides and herbicides, and seepage from percolation ponds can impact water quality in the river. Additionally, areas with agriculture and cattle grazing, water can have elevated levels of nutrients, pathogens, and sediment. Urban runoff from industrial sites and roadways carrying pollutants such as petroleum hydrocarbons, metals and sediment that can also impact surface water quality. Water quality and flow monitoring is conducted to track water quality and associated parameters (Michael Brandman Associates, 2012).

Groundwater

The Westside-San Joaquin Region primarily overlies three groundwater subbasins within the San Joaquin Valley Groundwater Basin. These include the southern portion of the Tracy Subbasin, and the majority of both the Delta-Mendota Subbasin and the Westside Subbasin (Figure 9).

Groundwater levels in the Region have been declining due to the long-term overdraft conditions caused by overpumping. To protect the long-term sustainability of groundwater resources, pumping has been significantly reduced in past years, allowing the groundwater subbasins to recover to some extent. Groundwater quality varies by subbasin and depth, also affecting water supply availability in the Region. In general, groundwater in the Region has high levels of TDS (or salts). Groundwater pumped by the City of Tracy meets California Primary Drinking Water Standards (i.e. Maximum Contaminant Levels [MCLs]), but specific conductance and sulfate have consistently been above the California Secondary Recommended MCLs. Additionally, quality-impacting constituents such as nitrate, arsenic, chromium, boron and chloride have elevated levels, but comply with MCLs (EKI, 2011). In the Patterson area, salt levels are high and could eventually reach concentrations that would require treatment. In response to the elevated salt concentrations and associated taste concerns, many customers have installed salt-regenerative water softeners, which have resulted in significant salt loading to the City's wastewater treatment plant. The City has begun installing deeper wells, below the Corcoran Clay, to provide protection from source water contaminants and capture water with lower salinity. The implementation of a non-potable water program would also help by matching quality to use, and should the City need to implement groundwater treatment facilities, less water would require treatment to meet potable demands (the H2O Group, 2011). Los Banos has had to remove one well from service due to uranium concentrations exceeding the Primary MCL and put another well on standby due to elevated arsenic concentrations (AECOM, 2011). Water quality and quantity within the sub-basins underlying the Westside-San Joaquin Region are described in more detail in the following sections.

Tracy Subbasin

Review of hydrographs for the Tracy Subbasin indicate that, except for seasonal variation resulting from recharge and pumping, the majority of water levels in wells have remained relatively stable over at least the last 10 years (DWR unpublished data; San Joaquin County Flood Control unpublished data). There are no published groundwater storage values for the entire basin; however, there are estimates that groundwater storage capacity for the Tracy-Patterson Storage Unit is 4,040,000 AF. This storage unit includes the southern portion of the Tracy Subbasin, from approximately one-mile north of Tracy to the San Joaquin-Stanislaus County line. Since the Tracy Subbasin comprises roughly one third of the Tracy-Patterson Storage Unit, it can be inferred that the approximate storage capacity of the southern portion of the Tracy Subbasin is on the order of 1,300,00 AF.

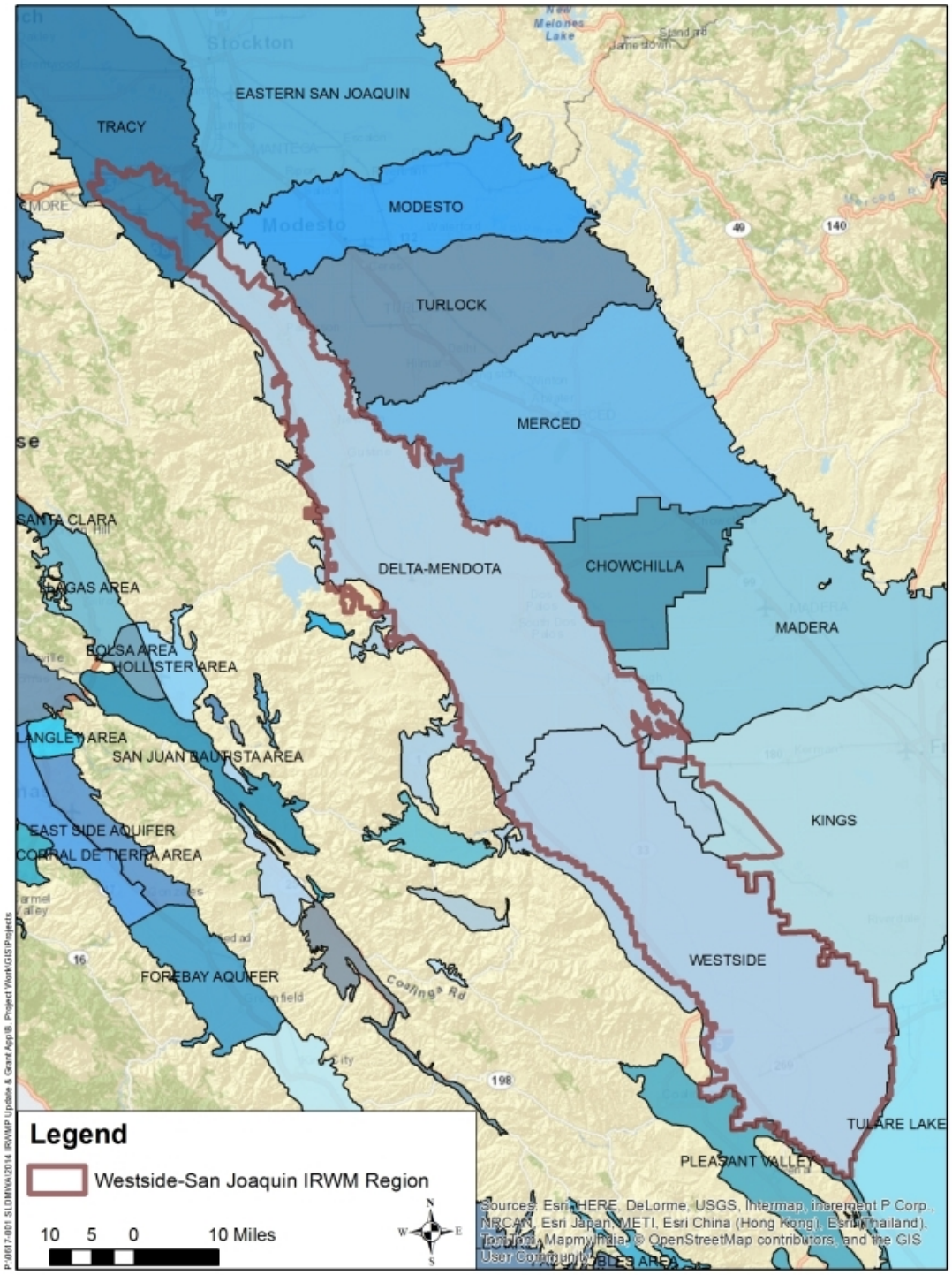


Figure 9: Groundwater Basins

Areas of poor water quality exist throughout the subbasin, including areas of elevated chloride along the western side of the subbasin, in the vicinity of the City of Tracy, and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the subbasin and in the vicinity of the City of Tracy. Areas of elevated boron occur over a large portion of the subbasin from south of Tracy and extending to the northwest side of the subbasin (DWR, 2006).

Delta-Mendota Subbasin

The Delta-Mendota Subbasin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges, and on the north by the Stanislaus/San Joaquin county line. The eastern boundary follows the San Joaquin River to Township 11 S, where it jogs eastward and follows the eastern boundary of Columbia Canal Company to the San Joaquin River, then follows the Chowchilla Bypass and the eastern border of Farmer's Water District. The subbasin trends southerly on the eastern side of Fresno Slough, then follows the Tranquility ID boundary to its southern extremity. Heading northward, it follows the eastern, northern, and northwestern boundary of San Joaquin Valley – Westside Groundwater Subbasin (corresponding with Westlands Water District boundaries). Average annual precipitation is nine to 11 inches, increasing northwards. Groundwater flow was historically northwestward, parallel to the San Joaquin River (Hotchkiss 1971). Recent data (DWR 2000), however, shows flows to the north and east, toward the San Joaquin River. Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin.

Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by quarter and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has increased by 2.2 feet from 1970 through 2000 with fluctuations over that time period. Estimations of the total storage capacity of the subbasin and the amount of water in storage as of 1995 were calculated using an estimated specific yield of 11.8 percent and water levels collected by DWR and cooperators. According to these calculations, the total storage capacity of this subbasin is estimated to be 30,400,000 AF to a depth of 300 feet and 81,800,000 AF to the base of fresh groundwater. These same calculations give an estimate of 26,600,000 AF of groundwater to a depth of 300 feet stored in this subbasin as of 1995.

The groundwater in this subbasin is characterized by mixed sulfate to bicarbonate types in the northern and central portion with areas of sodium chloride and sodium sulfate waters in the central and southern portion. Total dissolved solids (TDS) values range from 400 to 1,600 mg/L in the northern portion of the subbasin, and from 730 to 6,000 mg/L in the southern portion of the subbasin (Hotchkiss 1971). The California Department of Public Health (DPH), which monitors Title 22 water quality standards, reports TDS values in 44 public supply wells to range from 210 to 1,750 mg/L, with an average value of 770 mg/L. A typical range of water quality in wells is 700-1,000 mg/L. Shallow, saline groundwater occurs within about 10 feet of the ground surface over a large portion of the subbasin. There are also localized areas of high iron, fluoride, nitrate, and boron in the subbasin (DWR, 2006).

Westside Subbasin

The Westside Subbasin predominantly underlies the Westlands Water District service area. Located between the Coast Range foothills on the west and the San Joaquin River drainage and Fresno Slough on the east, the subbasin is bordered on the southwest by the Pleasant Valley Groundwater Subbasin and on the west by Tertiary marine sediments of the Coast Ranges, on the north and northeast by the Delta-Mendota Groundwater Subbasin, and on the east and southeast by the Kings and Tulare Lake Groundwater Subbasins. Average annual precipitation varies across the subbasin from 7 inches in the south to 9 inches in the north.

Groundwater levels were generally at their lowest levels in this subbasin in the late 1960s, prior to importation of surface water. When the CVP began delivering surface water to the San Luis Unit in 1967-68, groundwater levels gradually increased to a maximum elevation by around 1987-88, falling briefly during the 1976-77 drought. Water levels began dropping again during the 1987-92 drought with water levels showing the effects until 1994. Through a series of wet years, after the drought, 1998 water levels recovered nearly to 1987-88 levels.

Estimated groundwater storage capacity for this subbasin is 10,940,000 AF in the zone ranging from around 10 to 200 feet in the Mendota-Huron storage unit. This is over an area of 639,000 acres and assumes a specific yield varying from 8.0 to 9.6 percent. Most of this storage occurs in the upper aquifer. Using an average thickness of 675 feet (ground surface to top of Corcoran Clay) and a specific yield of 9 percent over an area of 600,000 acres, the estimated storage capacity of the upper aquifer is approximately 36,500,000 AF.

Groundwater in the upper aquifer is typically high in calcium and magnesium sulfate. Groundwater below 300 feet and above the Corcoran Clay shows a tendency of decreased dissolved solids with increased depth. Most of the groundwater of the lower aquifer is of the sodium-sulfate type. The difference in quality between the upper and lower aquifers is that the lower confined zone contains less dissolved solids. Groundwater in western Fresno County can have an upper TDS range between 2,000 and 3,000 mg/L; DPH data indicate an average TDS of 520 mg/L in the subbasin with a range from 220 mg/L to 1,300 mg/L based on the analyses of six Title 22 monitoring wells. Other studies indicated dissolved solids in shallow groundwater can be greater than 10,000 mg/L at some locations in the lower fan areas. One sample had a TDS of 35,000 mg/L.

High TDS is a key groundwater impairment in this subbasin. Additionally, groundwater in certain areas contains selenium and boron that may affect usability (DWR, 2006).

Reclaimed Water

The Westside-San Joaquin Region and the participating IRWM planning agencies recognize the value of recycled water and plan to maximize the use of this resource. The wastewater facilities within the Region include the Santa Nella Water District Eastside Wastewater Treatment Plant, Coalinga Wastewater Treatment Plant, and the Cities of Patterson and Tracy Wastewater Treatment Plants. While generally not producing recycled water at this time, these facilities may be capable of producing tertiary-treated Title 22 recycled water for beneficial use throughout the Region.

Currently, Merced County is working on increasing its use of reclaimed water, especially for agricultural uses. Farmers are encouraged to efficiently use water and to adopt recycled water methods. It is also targeting production facilities with high water use and prohibiting them from overusing water unless they adopt the use of recycled water. Fresno County has drafted a recycled water master plan that fits into its UWMP which calls for the installation of recycled water infrastructure throughout the county. It does so with the objectives of conserving potable water and improving groundwater quality, through the increase of urban reuse, groundwater recharge, and agricultural reuse.

To address this under-utilized source of water, multiple recycled and reclaimed water projects have been included in this WIWRP. In particular, the North Valley Regional Recycled Water Project, being implemented by Del Puerto Water District (DPWD) and the Cities of Modesto and Turlock (located in the East Stanislaus IRWM Region), will deliver up to 59,000 AFY of recycled water to DPWD agricultural users. Additionally, both Patterson Irrigation District and San Luis Water District have put forth projects to capture and recirculate agricultural tail water back into the irrigation systems, and the City of Patterson has proposed expanding its non-potable water irrigation system, matching water quality to

water demand needs and reducing demands on potable supplies. The recycled and reclaimed water produced by these projects will augment the currently unreliable CVP supplies in the area.

2.3 Water Supplies and Demands

The information in this section is based on the Westside Water Supply Gap Analysis, completed for and presented in the *2003 Westside Integrated Resources Management Plan* (SLDMWA, 2003).

Stoddard & Associates developed the Westside Water Supply Gap Analysis in 1999 using USBR guidelines. The analysis calculated potential water use and projected water supply for 1999 and 2025. Agricultural water use assumptions included 14,000 acres of land retirement in the Westlands Water District service area by 2025, crop consumptive use of 2.25 AF/acre, on-farm efficiency increasing from 77% in 1999 to 85% in 2025, and conveyance losses of 3.5% of total potential use (other assumptions are provided in Table B-2). Total potential agricultural water use was estimated at 2.64 MAF for 1999 and 2.36 MAF in 2025, a decrease of 283 TAF. The decrease in potential agricultural water use is primarily from the increase in on-farm water use efficiency. Municipal use of CVP agricultural water is projected to increase, from 6,176 AF in 1999 to 12,672 AF over that same period of time.

The water supply gap analysis has not been updated since completion of the 2003 Plan. The information presented herein is the most up to date, comprehensive analysis available and provides a valuable representation of water supplies and demands in the Region. However, the Region recognizes that since many years have passed since the analysis, it would be beneficial to update the water supply gap analysis for inclusion in a future WIWRP update. This has been noted in the Data Management section as well in Chapter 8.1, Data Needs.

Study Area

The Westside-San Joaquin Region is generally defined as those lands receiving CVP water pumped from the Delta through the C.W. Bill Jones Pumping Plant and conveyed via the DMC and SLC to serve agricultural, municipal, industrial, and environmental purposes. Included for purposes of the water supply gap analysis are the north Central Coast and South Bay areas, both served by the CVP's San Felipe Unit, though these areas are not included in the Westside-San Joaquin IRWM Region.

The Water Supply Gap analysis focused on CVP export contractors who have had their water supplies adversely affected by the ESA, CVPIA, D-1641, and other state and federal regulations. The water supply needs of the San Joaquin River Exchange Contractors and local refuges were not included in this report because their water supplies have not been impacted by the CVPIA or other regulatory actions cited in this Plan. Lands addressed in the analysis were within three areas of the CVP: the Delta Division, San Luis Unit and San Felipe Division of the CVP. These lands receive surface water from the federal CVP under several varying types of contracts and agreements with the Department of Interior, including CVP water service contracts for irrigation and M&I water, water rights settlement contracts, exchange contracts, and refuge water supply settlement agreements and contracts. These lands are also served partially with water from local supplies and local groundwater.

Table 2 lists the agricultural and M&I water users included in the Westside water supply gap analysis. The Water Supply Gap Analysis estimated water supply, potential water use and shortages ("the gap") under 1999 and 2025 conditions. Potential water use was based on expected land use, application rates, population and existing economic factors and assumed that supply does not limit potential use. Potential water use did not consider any change in demand caused by future economic factors. The agricultural and M&I gap analyses were based on USBR's *Water Needs Analysis* and public water user planning documents.

Westside Water Use Characterization

Water use in the Westside-San Joaquin Region is dependent upon land use, characterized as agricultural and M&I for purposes of this analysis. Presently, agricultural water use occurs on about 850,000 irrigated acres in the region. Today, the M&I water supply provides a portion of the water needs for 1.9 million people in Santa Clara and San Benito Counties, as well as the San Joaquin Valley. While the focus of this water supply analysis is on Westside water use, it is important to note lands outside of the Westside-San Joaquin Region are supported by activities associated with land and water use within the Westside-San Joaquin Region. For example, there are areas in Fresno County that are not in the CVP Westside-San Joaquin Region that experience significant economic activity due to regional agricultural activity generated by CVP water supplies.

Table 2: Water Users Included in the Westside Water Supply Gap Analysis

San Luis Unit	**Northern DMC – Delta Division**
Westlands Water District	Banta-Carbona Irrigation District
San Luis Water District	Centinella Water District
Panoche Water District	Del Puerto Water District
Pacheco Water District	Patterson Irrigation District
Southern DMC – Delta Division	Byron Bethany Irrigation District (CVP)
Fresno Slough Water District	Westside Irrigation District
James Irrigation District	West Stanislaus Irrigation District
Reclamation District 1606	
Tranquility Irrigation District	
Widren Water District	
Oro Loma Water District	
Mercy Springs Water District	
Eagle Field Water District	
Laguna Water District	
Broadview Water District	
Coelho Family Trust	

Agricultural Gap

The gap analysis evaluated agricultural water needs at the 1999 and 2025 levels of development. Total water supply available for agricultural use comprises CVP water, groundwater and other local supplies. The gap is the difference between potential water use and supplies under a range of CVP water supply allocations. The analysis did not consider willingness or ability to pay for supplies to eliminate the water supply gap, but instead evaluated data for four determinants of agricultural water use and supply.

- The amount of irrigated acreage and types of crops served
- Potential uses of agricultural water
- The amount of non-CVP water supplies available to serve the acreage
- The amount of CVP water supply

Agricultural Data and Water Requirements

Irrigated acreage data for 1999 were obtained from irrigation district records. Data analyzed included harvested acreage, including acres harvested more than once (multiple-cropped acres) in 1999. For example, if an acre of lettuce was harvested in the spring and the same acre was replanted to grains and harvested in the fall, two irrigated acres were counted. Therefore, the amount of harvested acres typically exceeded the amount of land irrigated to produce those harvests.

The 1999 harvested acreage data did not include acreage that was not harvested because of a water shortage in 1999. The shortage, reflecting a CVP allocation 30 percent below full contract entitlement, is representative of the chronic shortages experienced by the region. The Westside districts estimated 49,709 acres were fallowed in 1999 as a result of that shortage. This acreage was added into the total 1999 acreage to obtain an estimate of potential irrigated acreage if water supply had not been a limiting factor.

Irrigated pasture is not actually harvested but was included as irrigated acreage in the analysis. However, the 1999 harvested acreage data did not include other irrigated acreage that was not harvested. This acreage was primarily immature, non-bearing fruit trees and vines that did not produce a crop in that year. Westside water users estimated an additional 30,000 acres for this irrigated land in 1999.

The acreage data also allowed for 14,000 acres of land retired under the Westlands WD land acquisition program. The acreage was not included in the 1999 total. Acreage totals are shown by district in Appendix C; Table C-1 for Service Contractors; Table C-2 for Water Rights Settlement Contractors; Table C-3 for acreage totals by district and crop type.

Stoddard and Associates (1999) developed an acreage forecast for 2025 for the Water Needs Analysis conducted by the United States Bureau of Reclamation in 2000 and published in the *Public Draft, Central Valley Project, West San Joaquin Division, San Luis Unit, Long-Term Water Service Contract Renewal Environmental Impact Statement and Appendices* (USBR, 2005). The analysis measured all acreage that would be irrigated if water were available; therefore, an adjustment for fallowed or unharvested irrigated acreage was not required. The 2025 acreage forecast totals are shown in Tables C-1 and C-2 of Appendix C.

The agricultural potential water use calculation is shown in Table 3. Potential use is based on irrigated acreage and water use per irrigated acre. Water use per irrigated acre includes crop consumptive use (or crop evapotranspiration), water required for leaching salts from the root zone, and additional water for cultural practices such as cooling and frost control. On-farm potential use accounts for conveyance losses and on-farm irrigation efficiency.

Table 3: Irrigated Acreage and Water Potential Use in AF

	1999	2025
Irrigated Acres [1]	928,706	915,016
Crop Consumptive Use (Evapotranspiration, ET), AF/acre	x 2.25	x 2.25
Total ET, AF	2,089,589	2,058,786
Effective Precipitation (EP) @ 0.3 AF/acre	- 278,612	- 274,505
Leaching Requirement (LR) @ 0.108 AF/acre	+ 100,300	+ 98,822
Cultural Practices (CP)	+ 55,000	+ 55,000
Total Crop Water Need *(ET-EP+LR+CP)*	1,966,277	1,938,103
On-Farm Efficiency	÷ 77%	÷ 85%
Delivery Potential Use	2,553,606	2,280,121
Conveyance Losses @ 3.5% of Delivery Potential use	+ 89,376	+ 79,804
Total Agricultural Water Potential Use	**= 2,642,983**	**= 2,359,925**

[1] In 1999 49,709 acres were fallowed and 30,000 acres of irrigated land were not harvested (928,706 = 848,997 + 49,709 + 30,000).

Crop consumptive use accounts for most of the water demands. The Water Needs Analysis identified an average of 2.2 AF per acre of consumptive use was required; Stoddard and Associates estimated an average of 2.3 AF per acre – however both of these studies were completed in 1999 and do not account for the increase in orchard and vineyard crops in the Region, which use significantly more water per acre. The gap analysis used an average of the two findings (2.25 AF per acre). The analysis assumed a leaching requirement of 0.108 feet per acre and additional water for cultural practices of 55,000 AF in 1999 and 2025. Total farm agricultural delivery requirement excluded effective precipitation estimated to average 0.3 feet per acre, and farm delivery requirements included a current on-farm irrigation efficiency of 77 percent, increasing to 85 percent in 2025. Additionally, total water needed at the district level included in-district conveyance losses of 3.5 percent. Accounting for these losses, total water need at the district level was estimated to be about 2.64 MAF in 1999 and 2.36 MAF in 2025.

The CVP water supply contract amount for each Westside-San Joaquin agricultural water district is shown in Appendix C; other limited supplies include groundwater and local surface water (Westside districts provided these data on local supplies). Annual groundwater supplies for agricultural use on the Westside were assumed to equal average annual aquifer recharge, thus preventing long-term decline of groundwater levels. Groundwater safe yield estimates were also included in the Water Needs Analysis; the amount of local water supply and safe groundwater yield for each Westside agricultural contractor is shown in Appendix C. It is important to note that summing imported, local and groundwater supplies does not necessarily demonstrate total water availability as some districts utilize imported water for intentional groundwater recharge programs.

Municipal Use of Agricultural Service Contract Water

CVP agricultural water supplies are provided under contracts settling or exchanging water rights claims (non-project supplies) or agricultural service contracts (project supplies). Most contractors have either exchange or water service contracts; a few contractors have both. Within the Westside-San Joaquin Region, M&I use is also authorized in contracts for agricultural water service. This potential municipal use of water is included in the agricultural gap analysis to maintain a grouping of all CVP agricultural contract water.

Current municipal use of CVP agricultural water is shown in Table 4.

Table 4: Municipal Use of CVP Agricultural Water Contracts Included in Agricultural Gap Analysis

Contractor	CVP Delivered Recently	2025 Projected Use
Broadview WD	23[a]	20
Del Puerto WD	12	12
Dept Veterans Affairs	33	450
Pacheco WD – SLU	12	80
Panoche WD – DMC & SLU	52	100
Byron Bethany Irrigation District (CVP)	657	420
San Luis WD – DMC & SLU	616	580
State of CA	6	10
Westlands WD	4,765	11,000
Total (included in Agricultural Gap Analysis)	**6,176**	**12,672**

[a] Data source for Broadview WD was their Conservation Plan.

All other data obtained from USBR's *CVP 2001 M&I Water Rates*.

Summary of Agricultural Gap Analysis

The results of the agricultural gap analysis are shown in Table 5. The municipal gap was calculated separately from the agricultural service contract water that still serves agricultural uses.

The results presented indicate water supply gap estimates given a range of different water supply scenarios. 2000 CALSIM simulations estimated contractors will receive, on average, 59 percent of their CVP contract amount on average, and 25 percent to 27 percent of the contracted amount during an extended critical dry period. For the critical dry condition, 25 percent was assumed; however, the minimum supply allocation in a single critical dry year could be as low as 0 percent (as experienced in 2014). The total 1999 gap in an average year is 1,110,000 AF. In critical dry years, the gap increases to 1,733,000 AF. In 2025, the average gap is 832,000 AF with the gap increasing to 1,454,000 AF in critical dry years. While there is less irrigated acreage predicted for 2025, the main reason for the decrease in the agricultural water supply gap is the assumption that agricultural water users will increase on-farm efficiency to 85 percent.

For the purposes of the 2014 WIWRP update, it is believed that the water supply gap for a 20-year planning horizon (2014 – 2039) is similar to the gaps shown through 2025. It is likely that the gap is increasing as a result of increased regional water demands, a move towards permanent cropping, and more limited water supplies, particularly resulting from the 2008 and 2009 U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS) Biological Opinions (BOs). The BOs were released by

NMFS as a consequence of litigation addressing endangered species requirements and specifically focused on Delta smelt (in 2008) and salmon and steelhead (in 2009). The BOs resulted in substantial reductions in project water deliveries from the Delta, affecting the water supplies of many of the CVP contractors in the Westside-San Joaquin Region.

Table 5: Summary of CVP Agricultural Water Supply Gap at Various CVP Allocations, TAF

	100% Allocation		59% Allocation [1]		25% Allocation [1]	
	1999	2025	1999	2025	1999	2025
Surface Water	190	190	190	190	190	190
Groundwater	244	244	244	244	244	244
CVP [2]	1,835	1,829	1,100	1,096	479	478
Total Supply	**2,269**	**2,263**	**1,534**	**1,530**	**913**	**912**
Potential Use [3]	**2,643**	**2,360**	**2,643**	**2,360**	**2,643**	**2,360**
Agricultural Gap	374	97	1,109	830	1,730	1,448
Gap from the Municipal Use of Agricultural Water [4]	0	0	1	2	3	6
Total Agricultural Contract Gap	**374**	**97**	**1,110**	**832**	**1,733**	**1,454**

1. CALSIM simulations estimate that contractors will receive about 59 percent allocation on a long-term average and 25 percent to 27 percent during a multi-year critical dry period.
2. Included in the total CVP supply is water from Westside Water Rights Settlement Contracts totaling 40,813 AF as shown in Table C-2 Appendix C. This water is assumed to be reduced 25 percent when agricultural service contracts are reduced 55 percent or more.
3. Calculation shown in Table 3.
4. The gap resulting from the municipal use of agricultural water is calculated separately because shortage provisions are equal to M&I service contracts.

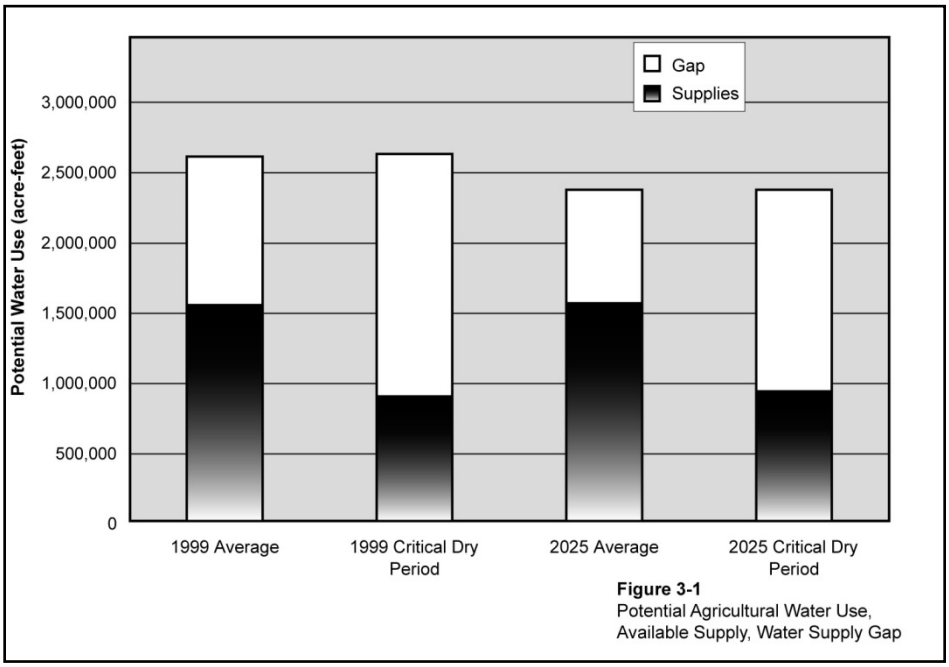


Figure 10: Potential Agricultural Water Use, Available Supply, Water Supply Gap

2.4 Social and Cultural Makeup

This section describes the social and cultural characteristics of the Westside-San Joaquin IRWM planning region.

Cultural Resources

The service areas of the Delta Division and San Luis Unit contractors include primarily valley and lower foothill lands located within the central and southern San Joaquin Valley, along the western margin of the valley, at the interface of the valley, and at the lower reaches of the Diablo and Temblor Ranges of the Central Coast Ranges. This area contains a variety, but limited number of water sources and resource zones. Prehistoric use and occupation focused on these features, particularly around the confluences of streams and within the ecotones created at the interface of foothill and valley lands. Drainages and associated natural levees and benches were moderately to intensively utilized, while uplands were visited for oak and other resources on a more seasonal basis.

Much of this area has been affected by ranching for over 100 years and by agriculture during the past 50 to 100 years. The most recent impacts derive primarily from the construction of water distribution facilities, major transportation routes (Interstate 5 in particular), and agricultural equipment and storage buildings.

Cultural History in the Region

Interior California was initially visited by Anglo-American fur trappers, Russian scientists, and Spanish-Mexican expeditions during the early part of the nineteenth century. These early explorations were followed by a rapid escalation of European-American activities, which culminated in the massive influx fostered by the discovery of gold at Coloma in 1848. The influx of miners and others during the Gold Rush set in motion a series of major changes to the natural and cultural landscape of California that would never be reversed.

Early Spanish expeditions arrived from Bay Area missions as early as 1804, penetrating the northwestern San Joaquin Valley (Cook, 1976). By the mid-1820s, hundreds of fur trappers were annually traversing the valley on behalf of the Hudson's Bay Company (Maloney, 1945). By the late 1830s and early 1840s, several small permanent European-American settlements had emerged in the Central Valley and adjacent foothill lands, including ranchos in the interior Coast Range.

With the discovery of gold in the Sierra Nevada, large numbers of European-Americans, Hispanics, and Chinese arrived in and traveled through the Central Valley. The mining communities' demand for hard commodities led quickly to the expansion of ranching and agriculture throughout the valley and logging within the foothill and higher elevation zones of the Sierra Nevada. Stable, larger populations arose and permanent communities slowly emerged in the Central Valley at this time, particularly along major transportation corridors. Of particular importance was the transformation brought about by construction of railroad lines.

The Southern Pacific and Central Pacific Railroads and a host of smaller interurban lines to the north around the City of Stockton began intensive projects in the late 1860s. By the turn of the century, nearly 3,000 miles of lines connected the cities of Modesto and Stockton with points south and north. Many cities in the Central Valley were laid out as isolated railroad towns in the 1870s and 1880s by the Southern Pacific Railroad, which not only built and settled, but also continued to nurture the infant cities until settlement was successful. The Southern Pacific main line proceeds through or adjacent to the service areas of the Delta Division, and traverses the Central Valley a short distance east of the service areas of the San Luis Unit.

Intensive agricultural development soon followed, since railroads provided the means for product to be transported to a much larger market. Agricultural land conversion began long before the development of water supply projects. By the end of the nineteenth century, a substantial portion of the valley was being intensively cultivated, with increasing mechanization through all of the twentieth century and substantial expansion of cultivated acreage with the arrival of water from the CVP.

Current Inventory of Cultural Resources

A total of 156 archaeological and historic sites are currently documented within the service areas of the Delta Division and San Luis Unit contractors. These include sites that contain exclusively prehistoric material, sites with only historic material, and sites with mixed prehistoric and historic components and structures. Prehistoric sites are represented by habitation areas (village sites) in which both habitation and special-use activity areas are represented; mortuary sites, usually associated with habitation sites; specialized food-procurement and food-processing sites including milling areas; and other site types representing a variety of specialized activities. Historic sites are represented by a range of types, including buildings and structures dating to the nineteenth through mid-twentieth centuries; historic transportation features; water distribution systems; occupation sites and homesteads with associated features such as refuse disposal sites, privy pits, barns, and sheds; historic disposal sites associated with historic communities; and ranch complexes. Some of these prehistoric and historic sites have been determined eligible for inclusion on the National Register of Historic Places (NRHP) through consultation between a federal agency and the State Historic Preservation Office. Others remain unevaluated in relation to NRHP eligibility criteria.

In addition to formally recorded sites, it is clear that a large number of both prehistoric and historic sites remain undiscovered within the Region simply because, for many areas, especially undeveloped ranch and farm lands, a formal archaeological inventory survey has never been undertaken.

Regional Economic Issues and Trends

The western San Joaquin Valley is a highly agricultural region. There are no large cities or industries in the Region to provide an alternative economic base. The economy of this region is predominately driven by agricultural production and therefore, the availability of CVP agricultural water is an essential element to the economic health of the region. Smaller amounts of CVP water are used for M&I purposes and refuge water supply.

Economic Characteristics of the Westside-San Joaquin Region

Depending on water supply conditions, about 800,000 acres are partially or solely irrigated with CVP water. Other economic base industries include travel on the Interstate-5 (I-5) corridor, some petroleum extraction and tourism. Wetlands benefit the local economies by attracting hunters, naturalists, and bird-watchers.

M&I water use, which is a small share of total water use in the region, occurs primarily within the cities. The largest M&I use areas based on 2013 population estimates from the U.S. Census Bureau are the cities of Tracy (population 84,691), Patterson (population 20,868), and Los Banos (population 36,822). Tracy has recently grown at a rapid pace, becoming a suburb for commuters to the Bay Area. .

Other towns within or adjacent to the Westside-San Joaquin Region have economies greatly dependent on agricultural production. These towns include San Joaquin, Tranquility, Mendota, Firebaugh, Dos Palos, Los Banos, Santa Nella, Newman, Gustine, Crows Landing, and Patterson. All of these communities are strongly affected by the reliability of CVP agricultural water. Some of them are

dependent upon agricultural water from the CVP for M&I use, and most have experienced dramatic rates of growth and urbanization over the last decade.

Disadvantaged Communities within the West San Joaquin Valley

A disadvantaged community (DAC), according to the Proposition 84 Guidelines (DWR, 2014), is a community with a Median Household Income (MHI) less than 80% of the California statewide MHI. DWR compiled U.S. Census Bureau's American Community Survey (ACS) data from 2006 to 2010. This data was used in GIS to identify DACs within the Westside-San Joaquin Region. A community with an MHI less than or equal to $48,706 is considered a DAC. Based on these criteria, the entire Westside-San Joaquin Region is considered disadvantaged, except for the very northern tip of the Region.

The Westside-San Joaquin Region is also home to a large Hispanic or Latino population, which is greatly dependent upon agricultural production as a source of employment. At the county level, the percentage of Hispanic population runs from a low of 30.5% in San Joaquin County to 45.3% in Merced County. However, Hispanic populations on the west side of the Valley are usually the majority in a given area and can run as high as nearly 94% of the population. Improving water supply reliability and quality, and otherwise enhancing the conditions for production agriculture in this Region, will expand source of employment opportunities for these disadvantaged populations.

Note that according to the US Department of the Interior Indian Affairs, as of March 2014 there are no listed federally recognized tribes within the region.

2.5 Dependency on the Sacramento-San Joaquin Delta

Due to the fact that the Westside-San Joaquin Region was formed based primarily on the SLDMWA Member Agency boundaries, the Region is heavily dependent upon the Delta for its water supplies through CVP and exchange contracts. A primary objective of the Region is to improve South-of-Delta water supply reliability in the Region. Due to shortages in CVP supplies and overall unreliability due to environmental factors, the drought, and potential climate change impacts, it will be imperative for the Region to reduce its dependence on the Delta through the diversification of water supplies, implementation of recycled water projects, and long-term water supply planning that considers reliability and climate change impacts.

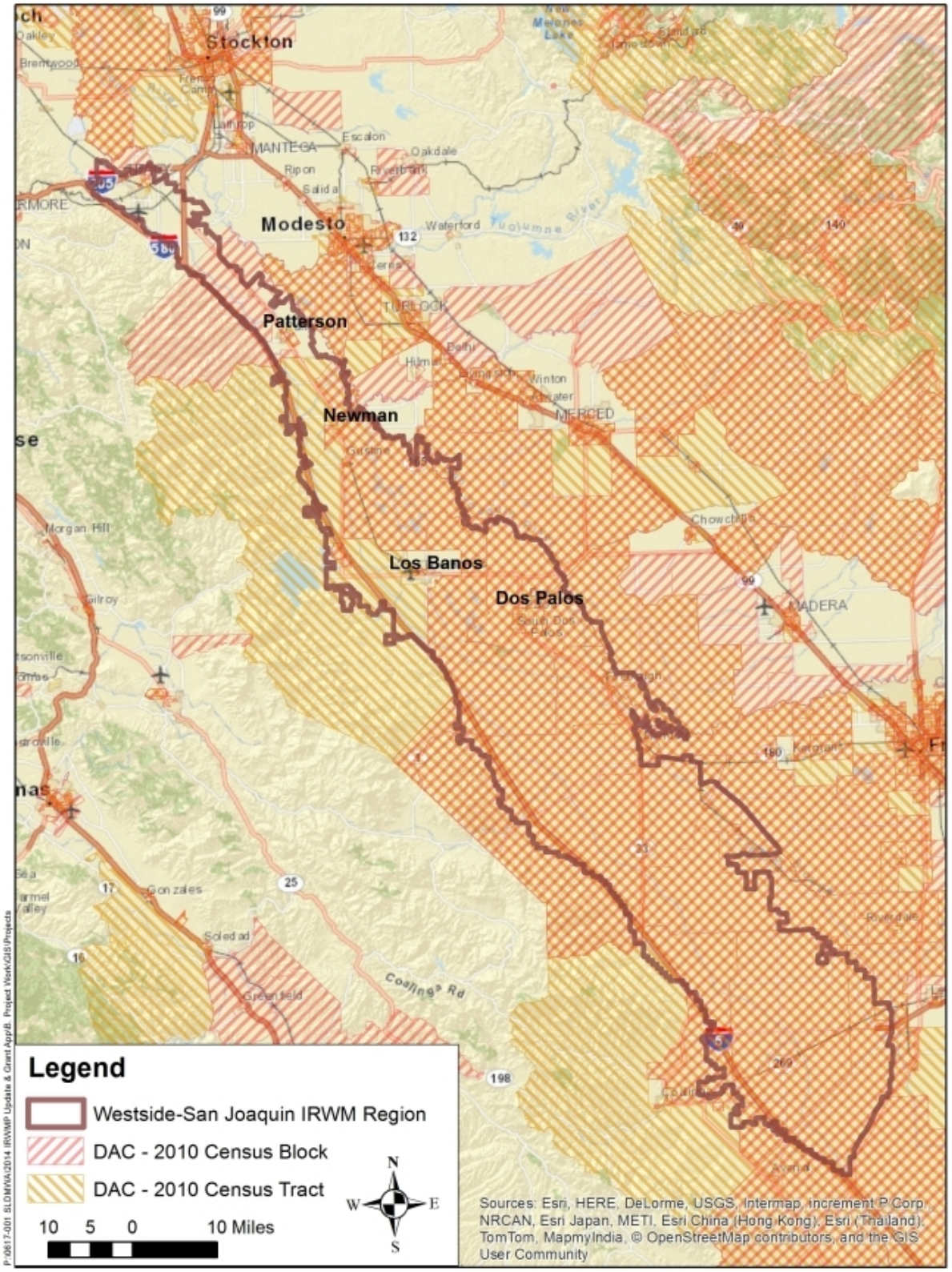


Figure 11: Disadvantaged Communities in the Region

Chapter 3 Goals and Objectives

The Westside-San Joaquin IWRP (WIWRP) serves as a blueprint that will guide water resource management in the context of solving regional issues and conflicts. Since the first regional planning effort in 2001, triggered by the need to respond to diminishing supplies from the Central Valley Project (CVP) due to implementation of the Endangered Species Act, Clean Water Act, and Central Valley Project Improvement Act (CVPIA), issues and conflicts within the Westside-San Joaquin Region have evolved and currently include:

- Water supply reliability
- Drinking water quality
- Surface and groundwater quality protection
- Groundwater overdraft
- Protection and enhancement of aquatic, riparian, and watershed resources
- Water-related needs for disadvantaged communities
- Need for recreational space and enhancement of liveability
- Flood protection
- Climate change impacts that may exacerbate many of the issues listed above

These issues are consistent with CWC 10540(c), also listed in the 2014 Prop 84 Guidelines on page 38. Any Plan attempting to address these issues needs to be flexible and capable of reacting to the ever-changing regulatory climate. Recent and ongoing issues to be considered include implementation of the CVPIA, water quality regulations and 'fixes' in the Sacramento- San Joaquin Delta (Delta), and ESA provisions, all of which have significantly reduced CVP water supply and reliability in the Region. This Plan needs to remain responsive to the progressive needs and imaginations of the local and regional stakeholders.

The San Luis & Delta-Mendota Water Authority (Water Authority), serving in its leadership role for the region and acting as the RWMG, has coordinated the evolution of planning documents and the regional objectives since 2001. That evolution has been iterative and driven by stakeholder participation, and has resulted in this Plan's **overarching goal** of:

> *Minimize Regional conflicts by addressing the most problematic sources of tension affecting the Region's agricultural, municipal, and environmental water use, namely water supply reliability, drainage, and water quality.*

3.1 Region's Objectives

All of the projects incorporated in this Plan began locally and, through the open participation forums sponsored by the Water Authority and other organizations, these projects often evolve into Regional solutions. This approach to problem solving is typical within the Region.

Regional objectives have been developed in much the same way as these regional solutions. Often, while Water Authority working groups or committees are considering a matter at hand, divisional representatives share local experiences and ideas resulting in a collaborative process. In hearing local perspectives, dialogues begin to coalesce around common problems and/or conflicts, divisional

representatives begin contemplating how a project in San Joaquin County may alleviate a problem in Kings County; and so a solution is born. As a project evolves, the dialog passes from the informal committees to formal Water Agency Committees and ultimately the Board. If an action is adopted, then the discourse expands to other Regional and non-regional entities as appropriate. The inverse is also true, wherein the flow of ideas may emanate from outside the Water Authority through various conduits of communication, and which may result in the adoption of projects or objectives of external genesis. In this fashion, self-identified regional conflicts and challenges are identified and used as the platform from which the Regional objectives have been developed. Regional objectives are assessed frequently and iteratively by the SLDMWA and stakeholders, which fosters robust projects capable of adjusting as Regional priorities change. As a result, the Plan reflects a diverse knit of mutually beneficial solutions.

As previously noted, the region's issues and conflicts play a critical role in the process of developing a comprehensive list of objectives. The needs of the region have resulted in the development of the following objectives:

Objective A:	Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation
Objective B:	Develop Regional solutions that protect environmental and habitat concerns and provide potential for improvement
Objective C:	Improve South-of-Delta water supply reliability by an average of 25%
Objective D:	Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially
Objective E:	Maximize utility of Regional aquifers while reducing potential for overdraft
Objective F:	Consider recreational potential in project development
Objective G:	Capture stormwater for higher beneficial use whenever practicable
Objective H:	Always promote and enhance water conservation
Objective I:	Develop Regional solutions that provide opportunity for water quality improvement
Objective J:	Always promote and enhance water recycling
Objective K:	When possible, align projects to complement existing wetland

These regional objectives will be accomplished by implementing resource management strategies and are well aligned with Statewide priorities, as demonstrated in Table 6. Most of the objectives directly support one of the Statewide priorities, while some also indirectly support them. In the case of climate change response actions, many of the objectives (as indicated in Table 22) will drive the implementation of resource management strategies that will help the Region adapt to climate change, addressing specific areas of vulnerability and providing for water supply resiliency.

While the overall goal of the region is an overarching statement, the plan objectives include clear specificity, allowing the Region to establish targets to meet during implementation and metrics by which to measure the degree of accomplishment of the multiple objectives. Table 7 includes some potential metrics for each of the objectives. The metrics will be used not only to monitor the Region's progress after projects are implemented, but also to evaluate alternative projects in terms of their forecasted performance before investments are made.

Table 6: Alignment of Plan Objectives with Statewide Priorities

Plan Objective	Related Statewide Priority
Objective A: Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation	Expand Environmental Stewardship; Protect Surface Water and Groundwater Quality
Objective B: Develop Regional solutions that protect environmental and habitat concerns and provide potential for improvement	Expand Environmental Stewardship; Protect Surface Water and Groundwater Quality
Objective C: Improve South-of-Delta water supply reliability by an average of 25%	Drought Preparedness; Use and Reuse Water More Efficiently; Ensure Equitable Distribution of Benefits; Climate Change Response Actions
Objective D: Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially	Practice Integrated Flood Management; Ensure Equitable Distribution of Benefits; Climate Change Response Actions
Objective E: Maximize utility of Regional aquifers while reducing potential for overdraft	Use and Reuse Water More Efficiently; Protect Surface Water and Groundwater Quality; Ensure Equitable Distribution of Benefits
Objective F: Consider recreational potential in project development	Practice Integrated Flood Management; Ensure Equitable Distribution of Benefits
Objective G: Capture stormwater for higher beneficial use whenever practicable	Drought Preparedness; Use and Reuse Water More Efficiently; Practice Integrated Flood Management; Climate Change Response Actions; Protect Surface Water and Groundwater Quality
Objective H: Always promote and enhance water conservation	Drought Preparedness; Use and Reuse Water More Efficiently; Climate Change Response Actions
Objective I: Develop Regional solutions that provide opportunity for water quality improvement	Protect Surface Water and Groundwater Quality
Objective J: Always promote and enhance water recycling	Drought Preparedness; Use and Reuse Water More Efficiently; Climate Change Response Actions
Objective K: When possible, align projects to complement existing wetlands	Expand Environmental Stewardship; Protect Surface Water and Groundwater Quality

Note: There are no Native American communities in the Westside-San Joaquin Region, therefore the Statewide Priority of "Improve Tribal Water and Natural Resources" does not apply to this region.

Table 7: Potential Metrics for Plan Objectives

Plan Objective	Related Statewide Priority
Objective A: Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation	Acreage of restored habitat; number of species potentially benefited by restoration measures
Objective B: Develop Regional solutions that protect environmental and habitat concerns and provide potential for improvement	Acreage of restored habitat; Acreage of protected habitat; number of species potentially benefited by restoration and protection measures
Objective C: Improve South-of-Delta water supply reliability by an average of 25%	Size and frequency of shortages
Objective D: Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially	Number of flood events with impacts to infrastructure; Number of flood events with economic disruption; Loss of life due to flood events
Objective E: Maximize utility of Regional aquifers while reducing potential for overdraft	Groundwater levels; running average of annual groundwater use compared to use targets from basin management
Objective F: Consider recreational potential in project development	Number of sites with multi-purpose and recreational projects; total area with recreational space from project implementation
Objective G: Capture stormwater for higher beneficial use whenever practicable	Pollutant loading to receiving waters; annual volume of beneficially used stormwater
Objective H: Always promote and enhance water conservation	Ag demand reduction; Urban demand reduction
Objective I: Develop Regional solutions that provide opportunity for water quality improvement	Pollutant loading to receiving waters; Number of regional projects with direct or indirect water quality objectives
Objective J: Always promote and enhance water recycling	Average day (or annual) recycled water supply
Objective K: When possible, align projects to complement existing wetlands	Acreage of wetlands beneficially impacted by projects

3.2 Regional Priorities

The Region considers all objectives of equal priority, so no prioritization was conducted. The Region believes that projects that are effective in targeting any of the objectives established will be beneficial and therefore important to accomplishing the overall regional goal.

Chapter 4 Resource Management Strategies

Resource Management Strategies (RMSs) is the term used in the 2009 and 2013 California Water Plan (CWP) Updates to refer to a diverse set of strategies (projects, programs and policies) to meet the water-related resource management needs of local agencies and governments throughout California. The Westside-San Joaquin Region has considered all of these RMSs, many of which are already applied in the Region, as tools to meet the regional objectives described in Chapter 3. The RMSs that are relevant to the Region in terms of its hydrologic, geologic, topographic and climatic characteristics, as well as its economic activities and water uses, are more likely to help the Region meet its overarching goal and specific objectives. These RMSs have been included in this IWRP and are listed in Table 8.

The following sections present a summary of the RMSs and their applicability to achieving the Region's objectives, along with specific references to projects, policies or programs that are already in place in the region or that are being considered as part of this Plan. The sections also include climate change considerations associated with each strategy. Many of the RMS have the potential to help the Region implement climate change adaptation strategies and mitigate climate change impacts. The Regional Objectives' relation to the RMSs is shown in Table 9.

Table 8: RMS Applicable to WIWRP

RMS	Considered in the WIWRP	RMS	Considered in the WIWRP
Agricultural Water Use Efficiency	●	Matching Quality to Use	●
Urban Water Use Efficiency	●	Pollution Prevention	●
Conveyance – Delta	●	Salt and Salinity Management	●
Conveyance – Regional/Local	●	Urban Runoff Management	●
System Reoperation	●	Agricultural Lands Stewardship	●
Water Transfers	●	Economic Incentives (Loans, Grants, and Water Pricing)	●
Conjunctive Management and Groundwater Storage	●	Ecosystem Restoration	●
Desalination	●	Forest Management	
Precipitation Enhancement	●	Land Use Planning and Management	●
Recycled Municipal Water	●	Recharge Area Protection	
Surface Storage – CALFED		Water-Dependent Recreation	
Surface Storage – Regional/Local	●	Watershed Management	●
Drinking Water Treatment and Distribution	●	Flood Risk Management	
Groundwater Remediation / Aquifer Remediation	●	Outreach and Engagement	●
Sediment Management	●	Water and Culture	●

Table 9: Alignment of Plan Objectives with Resource Management Strategies

Plan Objective	RMS																													
	Ag Water Use Efficiency	Urban Water Use Efficiency	Conveyance - Delta	Conveyance – Regional/Local	System Reoperation	Water Transfers	Conjunctive management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Water	Surface Storage - CALFED	Surface Storage – Regional/Local	Drinking Water Treat and Distribute	Groundwater Remediation	Sediment Management	Matching Quality to Use	Pollution Prevention	Salinity Management	Urban Runoff Management	Ag Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Plan and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management	Flood Risk Management	Outreach	Water and Culture
Objective A: Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation															●		●	●	●	●		●	●	●			●		●	●
Objective B: Develop Regional solutions that protect environmental and habitat concerns and provide potential for improvement															●		●	●	●	●		●	●	●			●		●	●
Objective C: Improve South-of-Delta water supply reliability by an average of 25%	●	●	●	●	●	●	●			●	●	●				●					●									●
Objective D: Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially							●					●							●			●		●	●		●	●		
Objective E: Maximize utility of Regional aquifers while reducing potential for overdraft	●	●					●	●					●	●		●	●	●						●	●		●		●	●
Objective F: Consider recreational potential in project development																										●			●	●
Objective G: Capture stormwater for higher beneficial use whenever practicable							●		●			●			●	●	●		●		●	●	●	●	●		●	●		
Objective H: Always promote and enhance water conservation	●	●														●					●			●					●	●
Objective I: Develop Regional solutions that provide opportunity for water quality improvement								●		●				●	●	●	●	●	●	●		●	●	●	●		●		●	
Objective J: Always promote and enhance water recycling							●			●				●		●		●			●								●	●
Objective K: When possible, align projects to complement existing wetlands							●			●									●		●	●		●	●	●	●	●		

The WIWRP includes a collection of projects, aligned with the RMSs, intended to support progress toward achieving the objectives of the Region. The breadth of Regional objectives is such that they cannot be accomplished through implementation of a single strategy. A portfolio of strategies and projects has been considered in the planning process and is described in Chapter 6. The following description of RMSs in the context of the Westside-San Joaquin Region and this WIWRP includes references to some of the projects included in the plan and presented in Appendix D.

4.1 Climate Change Considerations for the Region

Chapter 13 presents a climate change vulnerability assessment of the Westside-San Joaquin Region and overall climate change considerations. In describing the RMSs and their applicability to projects identified to achieve the Region's objectives, climate change impacts and responses need to be considered on a RMS-specific basis. Projects that aligned with a specific RMS may be impacted in their ability to perform or respond under future conditions, as compared to current conditions, as a result of climate change. Some projects, programs and policies have the ability to help the Region mitigate climate change impacts and/or provide resiliency in the face of climate change through the application of multiple RMSs. These considerations will be listed in the following RMS sections.

The Westside-San Joaquin Region extends from the northern end of the San Joaquin Valley to the southern end, covering an extensive portion of the western side of the valley. Climate change effects are therefore, for the most part, dictated by impacts on many of the west-slope Sierra Nevada watersheds. These impacts vary by watersheds, but generally include:

- An increase in atmospheric temperature with potential increases in water demands.
- Vulnerable surface supply due to decreased snowpack in the Sierra Nevada and shifts in timing of seasonal runoff.
- Surface water quality impacts due to potential extended periods of low flows.
- Potential for more severe droughts.
- Flood management challenges due to earlier springtime runoff and potentially flashier storm events.
- Habitat vulnerability due to potentially more severe droughts, seasonal changes in flows, extended periods of low flows, increased water temperatures and potentially higher risk of fires.

These general vulnerability elements, described in more detail and specificity in the climate change section of this document, are discussed in the RMS sections below, as applicable.

4.2 Agricultural Water Use Efficiency

This strategy is based on applying efficient water management practices in the agricultural sector to obtain the same agricultural output for a reduced water input. Three categories of actions to achieve agricultural water use efficiency include hardware improvements (on-farm irrigation systems and water supply delivery systems), water management to reduce evapotranspiration and optimize water irrigation, and delivery and agricultural technology such as breeding, fertilizers and genetically modified crops.

This RMS is highly applicable to the Westside-San Joaquin Region since a significant amount of water use in the region is for agricultural uses and given requirements established under the CVPIA and in the Bill

SBx7-7 as part of the Agricultural Water Management Planning Act. Agricultural water use efficiency is currently applied and will be further applied where consistent with water use goals.

Some of the projects currently considered include this strategy. For example the Water Authority and the San Joaquin River Exchange Contractors Water Authority (SJRECWA) Water Transfer Program exists to potentially provide water for wildlife refuges, transfers and exchanges of CVP water to other CVP contractors, and Environmental Water Account contracts that would benefit CVP operations. The program utilizes water conservation among other strategies to make water available for the uses outlined above. The Westside Regional Drainage Plan relies on efficient water management (among other strategies) to reduce and then eliminate high salinity subsurface irrigation drainage. Efficient water management techniques include replacement of furrow irrigation with micro-irrigation technology, and lining of earthen delivery canals.

An important consideration regarding the integration of strategies is that agricultural applied water is a source of recharge to the underlying groundwater basins in some areas (i.e. where irrigated lands overlie groundwater basin forebay areas). A reduction in applied irrigation may reduce groundwater recharge with potential implications on groundwater strategies; however, the nature and magnitude of these effects will be location-specific.

Related to climate change and relevant to this RMS is the fact that warmer temperatures and increased atmospheric concentrations of CO_2 increase evapotranspiration and crop water demand. Therefore, agricultural water efficiency is part of a group of potential adaptation measures, but the potential reductions in flow during peak growing months, coupled with the demand hardening resulting from water efficiency, may require adaptation measures related to storage. In terms of climate change mitigation, water use efficiency is generally correlated to a lower energy footprint, which can result in lower GHG emissions in areas where energy generation is based on fossil fuels.

4.3 Urban Water Use Efficiency

Urban Water Use Efficiency has contributed to significant progress in managing water demands in California and in the urban areas of the Westside-San Joaquin Region. This RMS is relevant in the WIWRP as a continuation to existing and past efforts related to outreach, implementation of Best Management Practices (BMPs), plumbing code requirements, implementation of new technologies, metering and other efforts that result in more efficient water use for residential, commercial, industrial and institutional uses in urban areas.

This RMS is being applied throughout the Region. An example of a specific project included in this plan relying on this strategy is the turf removal program for the City of Patterson. The RMS scope of implementation is significant and will help the region's water providers to achieve goals established in SBx7-7 and will contribute to drought preparedness and reduce energy use and associated GHG emissions. Water conservation through agricultural and urban water use efficiency is a valuable climate change adaptation strategy when dealing with impacts related to potentially extended droughts, and reduced and more uncertain supplies.

4.4 Conveyance – Delta

Surface water conveyance in California consists of natural water courses (e.g. rivers and streams) and facilities (e.g. ditches, canals, and pipelines). The Sacramento-San Joaquin River Delta (Delta) is primarily a natural feature that serves a critical role in water conveyance for the San Francisco Bay Area, Central Valley, and Southern California. In addition to its natural features, it includes artificial channels and constructed islands protected by levees that convey water by gravity. Many conveyance facilities are

associated with the Delta, including pump stations, pipelines, and canals to pump the water to the various urban and agricultural users throughout California. Important facilities of the State Water Project (SWP) and the federal Central Valley Project (CVP) that move water from the Delta throughout the state run through the Westside-San Joaquin Region.

Conveyance-Delta strategies identified in the 2009 CWP include:

- Establishing performance metrics that record quantities of water deliveries for agricultural and urban users.
- Utilizing Delta Vision Task Force and Bay-Delta Conservation Plan recommendations to increase operational flexibility and conveyance reliability to benefit water supply and aquatic ecosystems.
- Developing strategies that maintain channel capacity in the Delta.

One of the primary purposes of creating the San Luis & Delta-Mendota Water Authority (SLDMWA or Water Authority) was to establish an entity responsible for operation and maintenance (O&M) of certain CVP facilities. The Water Authority also serves the information and representation needs of its member agencies by developing, providing and disseminating information to multiple parties (including legislative, administrative, and judicial bodes) related to Delta exports, water supply, water quality, water development, surface water management and more. The Water Authority is applying the Conveyance-Delta RMS simply through everyday operations, management, and coordination. Through a series of agreements with the USBR, SLDMWA is responsible for O&M of:

- Certain portions of the Delta, San Luis Unit, and West San Joaquin Divisions of the CVP
- C.W. “Bill” Jones Pumping Plan (formerly Tracy Pumping Plant), O’Neill Pumping/Generating Plant, Tracy O&M Facilities, and the San Luis Drain, as well as the DMC Intertie
- Delta Cross Channel and gates, two fish release sites on the Delta, and the Tracy Water Management System (TOWMS) including its SCADA system

The SLDMWA will continue its responsibility of managing, operating, maintaining, and repairing these CVP facilities. In addition, some projects included in the WIWRP apply this RMS. An example of a project included in the plan specifically applying this RMS includes the Banta-Carbona Irrigation District Lift Canal Replacement Project (LCRP), which is designed to replace the District’s 87-year old lift canal system. Additional projects in the WIWRP relying on conveyance include the Del Puerto Water District wet weather diversion and Patterson Irrigation District’s agricultural drainage capture and recirculation and intertie projects. Applying the Conveyance – Delta RMS can help the Region mitigate and adapt to climate change in the future.

4.5 Conveyance – Regional/Local

In addition to the Delta-related conveyance facilities previously described, the Westside-San Joaquin Region relies on several local and regional conveyance features, making this RMS relevant. Some entities within the Region rely on groundwater and use conveyance systems (i.e. pipelines or canals) to deliver water to their users. This RMS provides the clear benefit of connecting supply sources to demands, but it can also provide benefits related to flood management and consumptive and non-consumptive environmental uses. Additionally, conveyance facilities can be operated to provide water quality improvements, recreation, and flexibility in operations. Water agencies and irrigation districts in the

Westside-San Joaquin Region rely on local conveyance. The Region will continue to rely on this RMS in the future.

Climate change impacts in the region can significantly impact existing conveyance operations in the Region due to changes in flow timing, altered precipitation patterns, and potential increased flooding. The implementation of projects related to this RMS will need to take into account, to the extent that is practical, the system-wide implications of climate change impacts in the Region's hydrology.

In terms of climate change mitigation, the benefits of this RMS need to be assessed on a project-by-project basis, but generally speaking, projects that result in more efficient conveyance from source to demands and reduce the energy footprint of the system have the potential to mitigate climate change.

4.6 System Reoperation

System reoperation relies on the modification of management and operation of facilities for water conveyance and supply in order to achieve specific benefits. System reoperation is typically triggered by the need to solve a specific issue. In some cases, system reoperation does not require any additional infrastructure, but in some other cases, some relatively minor investments are required to allow for the reoperation to take place.

The Westside-San Joaquin Region is likely to benefit from this RMS particularly in light of climate change impacts that can alter hydrology and timing of flows. An example of a project included in this Plan that would utilize an element of this RMS could be the San Luis Low Point Improvement Project, which would enable a greater operational range for San Luis Reservoir.

4.7 Water Transfers

Water transfers are a market-based approach to water rights, where temporary or long-term change in the point of diversion, place of use, or purpose of use of water takes place. Transfers provide a means to obtain or store water with the purpose, in most cases, of improving supply reliability. There are generally five main methods for water transfers:

1. Transfer water from storage that would otherwise have been carried over, expecting that the reservoir will refill in subsequent years.
2. Groundwater substitution (pumping groundwater instead of using surface water).
3. Transfer previously-banked groundwater by directly pumping and transferring that water or by pumping the banked groundwater for local use and transferring surface water that would have been used locally.
4. Make water available, and transfer it by through crop idling or crop shifting.
5. Prevent deep seepage from conveyance canals and implement other water conservation/reuse efforts.

This RMS is included in the WIWRP and considered both now, and in the future, to meet demands. Examples of projects using this RMS include the Water Authority & SJRECWA Water Transfer Program and the Banta-Carbona Irrigation District Lift Canal Replacement Project, which is planned to be used for wheeling water transfers.

Climate change considerations with transfers are significant in that, for the receiver of a transfer, the transferred water can improve reliability during extended droughts or low flow periods. The ability to transfer water, however, can be vulnerable to climate change also. The mechanisms by which the water

is made available for transfer (five strategies above) needs to be assessed in light of climate change impacts in the Region. Additionally, as climate change impacts are realized, water transfers may become less reliable and more costly.

4.8 Conjunctive Management and Groundwater Storage

Conjunctive management, also referred to as conjunctive use, relies on the coordinated management of surface and groundwater resources in a region, applying a systems approach to water as a resource and increasing the reliability of water supplies as a whole. Groundwater storage must be available for conjunctive management to be applicable since aquifers serve as the storage element that will optimize the resource over time. Surface water is recharged into groundwater storage, and groundwater is later withdrawn through wells or discharged naturally into streamflow.

Conjunctive management is already relied upon by water managers in the Region and will continue to be an important RMS with projects such as the Arroyo Pasajero, Pleasant Valley Groundwater Bank, and Del Puerto Water District's wet weather diversion for recharge. The Westside Regional Drainage Plan also includes groundwater components relying on conjunctive use.

Conjunctive management can become an effective climate change adaptation strategy given the forecasted reduction in snowpack and the change in the timing of streamflows. Conjunctive use can be applied to increase storage and therefore resiliency in the system. At the same time, existing conjunctive use operations need to consider climate change impacts in hydrology as they may be vulnerable without critical modifications in operation. The availability of surface flows for conjunctive management may be impacted requiring reoperation or new facilities.

In terms of climate change mitigation, conjunctive management needs to be assessed on a project-by-project basis based on the system-wide energy footprint of the conjunctive use operation, as compared to alternatives without conjunctive management.

4.9 Desalination

Desalination has the potential to augment supply by removing salt from seawater or brackish groundwater. It is one of the few RMSs that can "create" new supply and it needs to be considered by the Region as an option to achieve the reliability objectives, assessing the benefits against the tradeoffs related to capital investment, energy requirements, technology requirements and waste brine management and disposal. In addition to development of new supply, desalination can be an effective way to address salt management issues. An example of a project including desalination of some flows is the Westside Regional Drainage Plan. While desalination for new supply development is currently not considered as a strategy for the Westside-San Joaquin Region at this time, it may be in the future, as conditions change and climate change impacts occur.

In terms of climate change, desalination is an attractive adaptation strategy for coastal regions where ocean water can be desalted. For the Westside-San Joaquin Region, brackish groundwater desalination could be considered in the future as climate change impacts intensify as longs as the source of the brackish water to be desalted can be characterized as independent of flows that are forecasted to be impacted by climate change.

In terms of climate change mitigation, desalination tends to be a less attractive alternative since current technologies still have a high energy footprint, likely higher than groundwater pumping and energy related to conveyance and treatment of surface and wastewater for non-potable recycling.

4.10 Precipitation Enhancement

Precipitation enhancement is commonly called “cloud seeding” and it relies on the injection of artificial substances (such as silver iodide or liquid propane) into clouds to enable snowflakes and raindrops to form more easily. There are State and Federal reporting requirements involved in the practice of cloud seeding (to California DWR and NOAA), and several implementation considerations and concerns over potential impacts do exist. A detailed description of weather modification capabilities, position statements, and the status of the discipline can be found on *Guidelines for Cloud Seeding to Augment Precipitation* (American Society of Civil Engineers 2006). The Westside-San Joaquin Region is not currently involved in any precipitation enhancement efforts. However, this RMS can be beneficial to the Region in the future if the State continues to support it as a valuable RMS, especially as climate change impacts occur, but no project is currently included in the WIWRP.

4.11 Recycled Municipal Water

Recycled water is an RMS commonly used in municipal areas to increase and firm water supplies. Recycled water requires a higher level of treatment for wastewater than would be required for disposal or discharge, but it represents an offset to potable water for demands where potable water is not critical. Typically, this RMS is used for serving large irrigation demands in urban areas on institutional, commercial and industrial land uses. Recycled water is part of the overall water supply portfolio in the Westside-San Joaquin Region, and is currently considered in this plan with the City of Patterson including a project for recycled water use for non-potable demands. Additionally, an inter-regional project between the Westside-San Joaquin and East Stanislaus IRWM Regions is underway; the North Valley Regional Recycled Water Project consists of conveying recycled water produced by the Cities of Turlock and Modesto (in the East Stanislaus Region) to Del Puerto Water District (DPWD) (in the Westside-San Joaquin Region) for irrigation use by agricultural growers. The recycled water will augment DPWD’s existing CVP supplies, providing benefits to DPWD’s growers, Stanislaus County, the IRWM Regions, and California as a whole.

In terms of climate change, recycled water represents an effective adaptation measure, providing firm supply where hydrology variability may be significant. It is particularly relevant as a strategy for mitigation when applied as part of conjunctive management strategies. Regarding climate change mitigation, the recycled water energy footprint needs to be assessed in comparison with alternative supplies for non-potable demands. In some cases, the use of recycled water may require less energy than other supply sources, contributing to climate change mitigation through the reduction of GHG emissions.

4.12 Surface Storage – CALFED

This RMS is very specific to Regions where CALFED reservoirs can have an influence and positive impact. The CALFED surface storage reservoir efforts by DWR, USBR, and local water interests include the include Shasta Lake Water Resources Investigation, North-of-the-Delta Offstream Storage, In-Delta Storage Project, Los Vaqueros Reservoir Expansion, and the Upper San Joaquin River Basin Storage Investigation. This RMS is being considered since the Shasta and Friant Reservoirs are linked through the SLDMWA CVP contract supplies and the Authority is a partner with USBR in assessing the feasibility of these projects. .

4.13 Surface Storage – Regional/Local

Surface storage has been an invaluable RMS in California for more than a century. Regional and local surface storage is and will be used in the Westside-San Joaquin Region. The Plan includes projects proposed by Westlands Water District, Los Banos, CCID, SLWD, Grasslands related to the construction of a surface water reservoirs.

Surface storage introduces the possibility to integrate this RMS with other strategies, like conjunctive management, flood management and reoperation, and it provides benefits beyond water supply. Relative to climate change, storage will be an adaptation strategy that directly addresses one of the climate change forecasted impacts (lowering of storage through snowpack). For existing reservoirs, however, climate change impacts need to be evaluated to determine if reoperation measures are necessary to maximize benefits, given predicted pattern changes and timing in hydrology.

4.14 Drinking Water Treatment and Distribution

Drinking water treatment is essential in providing safe drinking water to users in the Westside-San Joaquin Region. Some water agencies in the Region operate water treatment and wellhead treatment facilities and will continue doing so through maintenance of existing water treatment and distribution facilities and the addition of new facilities, as necessary, to meet demands. Currently, no project in this WIWRP includes drinking water treatment or distribution capital investments.

Climate change will potentially impact the operation of treatment facilities for surface water in that the quality of the sources may be modified by higher temperatures, triggering physicochemical changes in source water, and different flow patterns that may trigger changes in turbidity of surface water.

4.15 Groundwater and Aquifer Remediation

In many urban and rural areas in California, groundwater quality degradation has resulted from a wide range of anthropogenic activities and/or natural causes. Groundwater remediation is an RMS that relies on the removal of contaminants that affect the beneficial use of the groundwater. Groundwater can be remediated by passive methods (allowing contaminants to biologically or chemically degrade or disperse in-situ over time) or by active groundwater remediation (treating it in-situ or extracting to treat it). With wellhead treatment, this RMS can result in supplemental supply for non-potable or, in some cases, potable uses.

The Westside-San Joaquin Region implements groundwater monitoring for groundwater levels and quality. A project included in this Plan that has the potential to enhance groundwater quality is the Pleasant Valley Groundwater Bank.

In terms of climate change, additional groundwater supplies resulting from groundwater remediation can increase the Region's reliability during forecasted extended droughts. An additional benefit of groundwater remediation, in some cases, is the creation of the opportunity to store surface supplies in previously unavailable basins and sub-basins (which would be linked to the Conjunctive Management RMS).

4.16 Matching Quality to Use

Water demands can be classified not only by the type of customer requiring the supply, but also by the type of use. Not all demands in the Westside-San Joaquin Region are potable, which makes this RMS relevant where water of lower-than-potable quality, such as recycled water, may be appropriate. The Westside-San Joaquin Region plans on expanding recycled water use (see the Recycled Municipal Water

section), initiating storm water capture and reuse, and expanding the non-potable use of degraded aquifer supplies. An example of a project that does not involve municipal recycled water but provides water fit-for-purpose is the Westside Regional Drainage Plan, which includes a component of collection and reuse of agricultural drainage water on salt tolerant croplands.

In terms of climate change, matching quality to use has the potential to contribute to the region's adaptive capacity since it can increase the reliability by lowering the demand of high-quality sources. Supplying water that is fit for purpose also has the potential to lower energy requirements for treatment and distribution and the energy associated with that, which will contribute to climate change mitigation.

4.17 Pollution Prevention

Pollution prevention relies on eliminating or reducing pollutants at their source so that water quality in receiving waters is preserved by achieving lower pollutant loads. The mechanisms by which prevention is achieved include modification of production processes, use of non-toxic or less toxic substances, and implementation of efficient practices and conservation techniques and technologies that result in lower quantities of pollutants entering the environment. The benefit of pollution prevention is not only the improved water quality, but also a reduction or avoidance of cost for treatment that would be required once pollution occurs.

The Westside-San Joaquin Region applies, and will continue to rely on, this RMS. The Westside Regional Drainage Plan is an example where this strategy would be prominent by controlling high salt loads and selenium discharges to the San Joaquin River.

Pollution prevention practices and methods will be required as adaptation measures for some of the potential effects of climate change related to water quality. These include the likelihood of water quality issues exacerbated by higher temperatures, lower flows, and extended periods with low flows and pollutant loads resulting from runoff after wild fires.

4.18 Salt and Salinity Management

Salinity presents a threat to the Region's economy and in fact, to the entire California economy. Salinity impacts include, among other things, reductions of crop production, reduction of farmable land (with associated lost jobs and community growth), loss of habitat, corrosion of equipment and deterioration of water quality to the point of reduction of potable supply. The Central Valley Salinity Alternatives for Long-term Sustainability initiative (CV-SALTS) is a collaborative effort initiated in 2006 by the Central Valley Salinity Coalition and its activities, initiatives, projects and programs are relevant and important to the Westside-San Joaquin Region. Some of the SLDMWA Member Agencies (and IRWM participating entities) also participate in CV-SALTS, including Westlands Water District and the City of Tracy.

This RMS is critical for the Region, and the Westside Regional Drainage Plan as an example of a project where salinity management plays a central role. In terms of climate change considerations, salts are a conservative pollutant that is removed most commonly by processes requiring high energy inputs. It is unlikely that salt-management strategies will result in climate change mitigation, but on the other hand, once the salts are removed from water, that water can contribute to increases in water supply reliability.

4.19 Urban Runoff Management

Runoff in urban areas is the natural result of increased impervious surfaces, reduced opportunities for evapotranspiration and temporal storage, and the alteration of flow pathways that is triggered by urbanization. For past centuries, during wet weather, the approach for dealing with the large quantities

of runoff has been to channel the flows and remove them as quickly as possible from the urban environment and structures. This results in a lost opportunity to utilize the water from precipitation for beneficial purposes. New practices in urban runoff management focus on a watershed based approach through the implementation of best management practices (BMPs) and Low Impact Development (LID) measures. With this approach, the BMPs and LID practices can reduce pollutant loading and the volumes of runoff.

The Westside-San Joaquin Region IWR Plan does not currently include a project related to urban runoff management, capture or reuse, but will likely apply this RMS in the future.

4.20 Agricultural Lands Stewardship

As stated in the California Water Plan 2013 Update (DWR, 2013), agricultural land managers practice stewardship by conserving and improving land for food, fiber, and biofuel production, watershed functions, soil, air, energy, plants, animals, and other conservation purposes. Agricultural land stewardship also protects open space and the traditional characteristics of rural communities, as well as open space within urban areas.

This RMS is closely linked to the watershed management RMS, sediment management RMS, outreach and engagement RMS and others and thus, the California Department of Conservation administers the Watershed Coordinator Grant Program, supporting projects implementing integrated resource management where landowners build relationships and implement projects that include water conservation, erosion prevention, and public education for water quality, best management practices, science, and planning in watershed management.

The Westside-San Joaquin Region includes significant extensions of agricultural land and its economy relies on this RMS. This RMS will continue to be implemented in the future.

4.21 Economic Incentives (Loans, Grants, and Water Pricing)

Economic incentives are provided through financial and economic policies and strategies to influence water management through changes in water “consumers” behavior. Economic incentives can take the form of water rates, prices, loans and grants, fees, rebates, taxes, etc. They are designed to influence water use (quantity and timing), preference for sources of water supplies and wastewater generation.

Like structural solutions and capital investments for water management, economic incentives usually come at a cost. One example of the cost of an incentive program is the cost of its creation and administration, including the costs of arranging bond funding or low interest rate financing.

This RMS will continue to be relied upon in the Westside-San Joaquin Region to promote efficient water practices in the urban and agricultural sectors. The region also pursues economic incentives from outside its boundaries in the form of grants for the implementation of projects.

The current and proposed regulations by the California Air Resources Board on a carbon market for California (cap-and-trade) have market-based compliance mechanisms for greenhouse gas emissions that may trigger opportunities and responsibilities in the Westside-San Joaquin Region.

4.22 Ecosystem Restoration

Ecosystem restoration improves the condition and sustainability of ecosystems in the region and in California. This RMS for the Westside-San Joaquin Region is applicable to aquatic, riparian, and floodplain ecosystems. In many instances, restoration projects are directly related to the availability of water in natural habitats so the restoration activities main component may require no additional

facilities or capital investments and could be limited to simply satisfying an environmental demand. This RMS is included in the IRWM Plan in some of the projects, including the Refuge Water Supply Diversification Program and the Pleasant Valley Groundwater Banking project, which includes an important habitat and wetlands component.

An important climate change consideration is that forecasts indicate that preservation and restoration of key aquatic habitats may become even more difficult given changes in flow patterns, extended periods of low flows, extended droughts, higher water temperatures and lower water quality. The implementation of this RMS will therefore require coordination with other RMSs for a comprehensive approach.

4.23 Forest Management

The Region's water supplies originate from forest ecosystems in the Sierra Nevada and forest management can directly impact the water quantity and quality for this region. This RMS is therefore quite relevant for the Westside-San Joaquin Region but the implementation will need to occur outside the Region's boundaries and jurisdiction. This RMS is generally not very applicable to the Westside-San Joaquin Region in terms of direct implementation.

4.24 Land Use Planning and Management

The Land Use Planning and Management RMS overlaps with many other RMSs including watershed management, agricultural land stewardship, flood management and others. This RMS can be very effective since the land uses directly affect water supply needs, habitat and ecosystem impacts, and quality and quantity of stormwater. The Region will continue to apply this RMS as a mechanism to manage spatial aspects of economic activity, resource utilization and waste generation. This WIWRP takes into account transportation and land use plans in the region, as well as other planning efforts, and is an example of cross-sector and multi-stakeholder planning that can continue to integrate land use and water resources planning.

4.25 Recharge Area Protection

Protection of recharge areas has two primary dimensions: preserving the ability of an area to provide adequate recharge (quantity) and preventing pollutants from entering groundwater (quality). This RMS requires a number of actions to achieve these two primary objectives.

This RMS will continue to play an important role in the Westside-San Joaquin Region. The surface water to groundwater interaction is critically managed in the region and several projects included in this plan rely on recharge areas to replenish aquifers and bank water into groundwater including the wet weather diversion project by Del Puerto Water District, the Pleasant Valley and Arroyo Pasajero groundwater bank projects and the Lon Baños Creek conjunctive use project.

Related to climate change, maintaining and enhancing recharge areas and groundwater basins are important adaptive strategies given the need for additional storage that will be required to deal with the forecasted climate change impacts in hydrology.

4.26 Water-Dependent Recreation

The Westside-San Joaquin Region has some opportunities for water-dependent recreation (mostly related to trails and hiking in riverine environments), and planners will continue to incorporate these opportunities as part of water projects. An example of a project that creates additional opportunities is the Pleasant Valley Groundwater Banking project where a portion of water purchased from contract

supplies will be allocated annually to support a number of environmental and habitat protection and improvement initiatives. One hundred twenty acres of wetted area within the infiltration basin complex will create a temporary wetland and riparian habitat; with the basins flooded for up to six months a year (and possibly more in wet years), providing food, water, and habitat diversity for a variety of residential and migratory wildlife. Opportunities to combine trails and basin-side parks can be incorporated into that project, providing water-based recreational benefits.

As in the case of ecosystem preservation and restoration, an important climate change consideration is that forecasts indicate that sustaining water levels in areas that provide water-dependent recreation may become even more difficult given changes in flow patterns, extended periods of low flows, extended droughts and lower water quality. The implementation of this RMS will therefore require coordination with other RMSs for a comprehensive approach.

4.27 Sediment Management

Sediment management is a critical element of a larger strategy related to comprehensive watershed management. Sediment can be an asset in specific locations of the watershed where it is desired, and it can be undesirable in other areas where it can become a pollutant that can cloud waters and degrade habitat, form barriers for navigation, alter the geomorphology of the stream habitat, and directly and indirectly impact some species. It can also reduce hydraulic capacity of channels and storage capacity in reservoirs.

Sediment management is an active RMS in the Westside-San Joaquin Region, and management and monitoring will continue to be a part of the water system management in the region. The long-term performance of some of the projects proposed in this WIWRP will depend, among other things, on effective sediment management practices.

4.28 Watershed Management

Watershed Management relies on plans, programs, and projects and activities to maintain and sustain watershed functions and restore and enhance functions that may require specific action. Watershed management is inherently comprehensive, since the watershed integrates communities with the physical, chemical and biological processes that make up a river basin ecosystem. The urban and economic activities of the watershed are necessarily linked to the health and function of it as a natural environment.

This WIWRP is a watershed-based planning effort in the Westside-San Joaquin Region that integrates regional water management. The Region's objectives align with this RMS and with the State's IRWM Planning Guidelines.

An important climate change adaptation consideration is that the adaptive capacity of a watershed as a system will tend to be greater than the isolated adaptive capacity of an individual element of the watershed. Watershed-based approaches to adapt to climate change tend to be more successful than isolated approaches. Similarly, integration of economic activities and resource utilization will likely have better success when considering mitigation efforts.

4.29 Flood Risk Management

Flood management as an RMS is unique to the other strategies in the California Water Plan Update 2013 in that it contains multiple approaches within a single RMS. The 2013 CWP Update discusses a broader perspective of flood management that includes several approaches: nonstructural, restoration of natural floodplain functions, structural, and flood emergency management. This RMS is closely linked to the

Watershed Management RMS but it also links to several others, including Surface Storage and Outreach and Engagement.

The Flood Risk Management RMS would help achieve the Flood Protection goal identified by the Westside-San Joaquin Region. The Region includes specific objectives that are aligned with this RMS and are therefore incorporated into the WIWRP. There are currently no projects in this Plan with the primary purpose of flood management.

4.30 Water and Culture and Outreach and Engagement

The 2013 update of the California Water Plan includes these two additional RMSs (compared to the 2009 CWP Update), related to fostering public groups and individuals to contribute to good water management outcomes by providing insight to decision-makers, adopting water-wise practices, supporting activities that result in beneficial water management outcomes, promoting collaboration and interdisciplinary approaches to solving conflicts, and ensuring access to water management information and decision-making. Additionally, the engagement and outreach needs to consider the fact that there is great diversity about how water is perceived, valued, used, distributed, and regulated in California. Cultural values have an effect on water management decisions, uses and practices, and even regulations.

In the Westside-San Joaquin Region, with its significant agricultural sector, community and institutional stakeholders have a high level of engagement and are intensely aware of the critical role of water in the Region. These RMSs are, and will continue to be, a valuable resource to achieve the Region's objectives and overall goal.

4.31 Other Strategies

Other RMSs such as crop idling, fog collection, rainfed agriculture and waterbag transport are identified in the 2009 CWP. For the Westside-San Joaquin Region, unless all other RMSs have been exhausted, these strategies would not apply as they could have significant economic impacts. These strategies were not included in this WIWRP when developing objectives or projects to achieve those objectives. Irrigated land retirement is a strategy that the Region often has to implement due to limited water supplies and as part of agricultural and irrigation management.

Chapter 5 Integration

The planning process and the regular interaction of the agencies and stakeholders in the region, coordinated by the Water Authority provide structures and opportunities to develop and foster integration. As described in Chapter 1 Governance these include a decision-making structure, comprised of multiple committees, focused work groups, and stakeholders, providing interactions that facilitate integration across jurisdictional boundaries. These interactions also involve multiple agencies and stakeholders in the identification of regional needs, articulation of region-wide objectives, and the selection and prioritization of projects that are consistent with the objectives and multiple benefits throughout the Region.

At the project level, the Plan's overarching approach relies on the selection of individual projects that as a collective group of projects provide measured progress toward meeting Regional objectives. No single project can fully realize the objectives of the Region; therefore, the Plan identifies projects that can better accrue Regional benefits when implemented in conjunction, and projects that can provide synergy in specific areas of benefit. Integration can also result in increased cost effectiveness and greater mitigation of impacts during implementation.

The project review and evaluation process allowed for integration and identification of project efficiencies in the attempt to maximize benefits where possible. The project review process also considers the number of Regional objectives and RMS a project integrates and addresses, therefore projects integrating various objectives, RMS, and presenting multi-benefits typically receive a higher ranking in the process. When projects integrate multiple RMS there is the opportunity to take advantage of synergies in water management.

Interdependency, as it extends into the funding and political aspects of a project, is also critical to consider in the Plan and its implementation since it can bring vital stakeholder support. Implementing a Westside Regional Drainage Plan (WRDP) transfer strategy provides revenue to support advancement of the project; advancement of the project minimizes conflict over drainage, which in turn fosters other opportunities. Thus, the interdependency of strategies at the sub-project level can foster integration of stakeholders' efforts at the Plan level and beyond.

Overall, the Westside-San Joaquin IRWM planning process creates opportunities for integration in terms of projects, stakeholders and institutions, and resources. IRWM planning has developed relationships throughout the Region, as well as procedures and protocols that can be utilized by the participating entities.

Chapter 6 Project Solicitation and Prioritization

This chapter discusses:

- The process used to solicit projects for the Westside-San Joaquin Integrated Water Resources Plan (WIWRP);
- How the projects were reviewed for consistency with the Integrated Regional Water Management Program (IRWMP) and regional objectives;
- How the projects were evaluated with respects to integration; and
- How the projects were prioritized.

The results of these activities are included in Appendix D of this plan.

Finally, this chapter also includes the potential impacts and benefits of implementing this WIWRP and the projects identified within it.

6.1 Project Solicitation and Review

Project solicitation is the process by which agencies, organizations, and/or members of the public submit project concepts for inclusion in the WIWRP. To be considered for inclusion in the plan, projects must be described in sufficient detail to identify the need being met, infrastructure to be constructed and operated, studies to be conducted (if applicable), tasks to be implemented, and the impacts and benefits of the project. However, the projects can be in any stage of development, from conceptual to final design. There are many benefits to submitting a project for inclusion in the WIWRP, including raising local awareness of the potential project and its associated benefits, identification of potential project improvements and/or opportunities for integration, and positioning the project for potential State funding.

The Water Authority embarked on its initial project solicitation effort in the fall of 2004 by soliciting ideas for projects from regional stakeholders that furthered the goals identified in the 2006 WIWRP that was currently under development. Initial inquiries were made to key Member Agencies' managers and staff whom had expressed interest in updating the 2003 Integrated Regional Plan (IRP) and, on

September 23, 2004, a scoping session was conducted. The session produced several project ideas, which were then electronically distributed to the Water Authority's entire membership on September 30, 2004 for consideration and further input.

On February 28, 2005 the Water Authority held its first formal Proposition 50, Chapter 8 IRWM grant application workshop, the purpose of which was to filter the many project ideas submitted during the prior five months and assign tasks relative to the IRP update. On March 21, 2005, the Water Authority sent another notice to the Member Agencies and stakeholders via email regarding the effort to revise the IRP, a tentative time schedule, and solicitation for comments.

In support of this recent plan update, the Water Authority issued yet another call for projects in 2010 and again on June 17, 2014. As before, this call for projects was conducted via email to the stakeholder mailing list previously formed and maintained by the Water Authority. Interested stakeholders were asked to submit project information using the project solicitation form shown in Appendix E for consideration for inclusion in the WIWRP; those with projects already included in the WIWRP were asked to update the project information to reflect current project status. Information was submitted electronically or via the U.S. mail to the Water Authority. Examples of correspondence can be found in Appendix E.

Once the new project information was received, the submitted projects were reviewed for consistency with the WIWRP and IRWM program objectives, and then were evaluated for integration opportunities. Specifically, all submitted project were first screened to ensure that they contributed towards meeting one or more of the Regional Objectives; this step is important as the Plan is a collection of projects intended to support progress toward achieving the objectives of the Region. The breadth of Regional Objectives is such that they cannot be accomplished through implementation of a single project. The Plan therefore establishes a menu of complementary projects.

While individually worthy, the integration of projects otherwise pursued independently allows for the maximization of a project's benefit, while providing the best opportunities available to realize the objectives of the Region. For the most part, most projects provided both independent utility and were only expandable within specific service areas due to water place-of-use restrictions, cost-effectiveness, etc.; however, many individual projects submitted, when working together, did provide a measure of regional benefits without the need for direct integration or merging of projects.

6.2 Project Integration and Prioritization

Integration

The projects contained in this Plan were selected to reduce the imbalance between water demand and supply while improving environmental and socio-economic status through a series of drainage, flood control, groundwater management, land use, water conservation, water quality, water supply, and water use efficiency projects. The overarching goal of the IRWM program and this Plan is to minimize Regional conflict by addressing the most problematic sources of tension affecting our agricultural, municipal, and environmental water use, namely water supply reliability, drainage, and water quality. The Plan is designed to be flexible, adaptive and responsive to changing circumstances.

Projects submitted for inclusion in this plan were evaluated both for independent utility and for the potential integration and/or enhancement to increase benefits and reduce costs. Where reasonable and feasible, project alterations have been made to achieve these objectives. The projects included in the Plan are therefore independent, each contributing towards the achieving the Plan's objectives. The Plan's progress is thus measured by the implementation of its projects, which are selected on the basis

of their perceived ability to add Regional value through incremental progress toward meeting the Regional objectives.

Prioritization

Ideally, all of the Plan's projects would be implemented simultaneously to achieve all Regional objectives in the near-term; however, many factors influence the readiness of a project. Aside from technical preparedness, a project must secure adequate funding and be politically and institutionally feasible. Projects identified in this Plan were evaluated at two levels, technical and policy, and then segregated into either short-term or long-term priorities. In this context, short-term priorities include those projects that have the most significant and immediate potential to address core issues and settle conflicts, thereby providing the greatest Regional benefit. Long-term projects offer similar value, but do not require the same immediacy for implementation and therefore can address longer-term impacts such as climate change. A secondary project ranking was then conducted in each category to qualitatively consider (1) the relative greenhouse gas (GHG) emissions of the project, both from construction and operation, (2) the level to which the project reduces dependence on the Delta, and (3) the status of the project proponent's adoption of this IRWM plan. As described later in this section, the designation of a project as short- or long-term priority is irrespective of its project status (i.e. conceptual level, in design, or ready for construction). All projects in the Plan provide incremental progress toward full accomplishment of the Region objectives.

Technical assessment of the most recent compendium of projects was conducted by a work group comprised of SLDMWA Member Agency staff and consultants, primarily engineers. This group evaluated the technical and economic feasibility of projects and segregated them into three tiers reflective of a project's stage in planning. The projects were then evaluated based upon their relative benefit to the Region and relationship to broader IRWM preferences and statewide priorities.

Reevaluation of project priorities is essential toward maintaining relevance in an ever-changing world. By iteratively assessing the potential of a project to positively affect progress toward the Regional objectives, as well as external aims, a project's priority may change irrespective of its development status. Put another way, a project may become a short-term priority even if it requires further study or planning because it shows new potential for meeting Regional, state, and federal objectives.

The following legend applies to the abbreviations utilized in the schedule and is intended to provide only a general sense of project progress. Implementation of individual strategies within each project will occur at varying rates.

F&P – Feasibility and Planning;

DERP – Design, Environmental Review, and Permitting;

C&IoS – Construction and Initiation of Service (not all projects require construction).

A prioritized list of the Plan's projects is included in Appendix D. These projects are listed in priority ranking order, from highest to lowest, and tentative implementation schedule. The schedule only forecasts a period of five years as this period is considered a reasonably predictable event horizon. The Plan will be updated and revised and/or the project list may be revisited periodically within this period, which may affect future ranking order and schedule.

Priority Modification

The Water Authority has always viewed the Plan as a "living" document. Since its genesis in 2001, the Plan has been reevaluated and revised approximately every two years. This is a process that will continue in the future in order to address inevitable ecological, economic, resource, and social changes

in a timely and thoughtful manner. Through this effort, old assumptions will be tested and new solutions developed and implemented to address the current objectives of the Region.

The prioritized project list, contained in Appendix D of this Plan, will be revised periodically, but no less than every 5 years. At that time, a call for projects will be issued, submitted projects reviewed and prioritized as stated above, and the revised project list vetted by the Member Agencies and stakeholders following updating. Upon receiving consensus/approval on the revised project list, this updated list will be substituted for the one currently contained herein. No formal plan adoption or re-adoption will be required for project list updating.

6.3 Impacts and Benefits

The 2014 WIWRP is a Regional blueprint that guides resource management in the context of environmental and socioeconomic factors. As a planning document, it is not intended to provide the level of detail necessary to implement specific projects; rather, its purpose is to identify opportunities and facilitate Regional integration through development of partnerships. The specific impacts and benefits associated with each project will be identified in the detailed feasibility studies developed by stakeholders for use in project-specific environmental review and permitting processes. However, for the purposes of this Plan, the impacts and benefits associated with the variety of project types represented by projects in the Plan are described below. Plan-related impacts and benefits are also described.

Project/Program Impacts and Benefits

The potential benefits and impacts associated with the project types included in this Plan are summarized in Table 10 and described in more detail below. Additionally, the projects included in this Plan, by project type, are summarized in the table included in Appendix D.

For each project contained in this Plan, potential benefits and impacts are assumed to be similar to those identified for the general project type. During updates to the Plan, impacts and benefits of projects and Plan implementation will be reevaluated and assessed based on project performance and changes in water resource conditions in the region.

Benefits

Water Supply Reliability Projects

Improving water supply and reliability in the Westside-San Joaquin Region is a key objective of this Plan. Projects included in this category are projects that:

- Diversify the Region's water supply portfolio
- Create new supplies
- Augment existing supplies
- Improve efficiencies of existing supplies
- Offset potable water supplies

In general, projects that would achieve this benefit are summarized as follows, and divided into four general project categories.

1. Groundwater Projects

- Enhance conjunctive management and groundwater storage
- Aquifer storage and recovery
- Stormwater capture and recharge
- Improvement to groundwater monitoring
- Hydrogeologic investigations and groundwater modeling
- Groundwater extraction and/or treatment projects
- Groundwater quality protection projects

2. Water Conservation Projects
   - Water use efficiency and water management projects
3. Recycled and Non-Potable Water Projects
   - Tailwater capture, recirculation and reuse
   - Upgrading wastewater treatment facilities to produce recycled water
   - Stormwater capture and reuse
   - Recycled water treatment and conveyance projects (as previously mentioned)
   - Programs matching water quality to water use
4. Water System Improvement Projects
   - New water supply pipelines and/or rehabilitation/repair projects
   - Water system tie-ins, interconnections, and diversion structures
   - Water transfer projects
   - Surface water diversion and treatment projects
   - Water storage and treatment projects
   - Water quality protection projects

Projects that augment the groundwater basin underlying the Westside-San Joaquin Region also improve water supply reliability. The Delta-Mendota Subbasin and a portion of the Tracy Subbasin of the San Joaquin Valley Groundwater Basin underlie most of Region. Use of groundwater for agricultural irrigation and municipal purposes has resulted in historical declines of available groundwater. In past years, the groundwater basin has experienced overdraft conditions, and the decreasing availability of surface water supplies (delivered through the State and Federal water projects) could exacerbate this problem in the future. Groundwater recharge could help improve the state of the groundwater basin and its long-term sustainability.

Water conservation projects, both for the urban and agricultural sectors, will reduce demands, thereby limiting impacts during periods of drought. These projects will also ensure that all water types are put to their highest and best use, thereby ensuring that the Region's water supplies are not misused. Potable water use can be offset through conservation in addition to stormwater and recycled/non-potable water projects, with new non-potable water supplies used for irrigation or other beneficial uses, helping to increase the region's water supplies.

Recycled water is a drought-resistant supply that can improve water supply reliability. By centralizing sewer collection systems in areas that may still be on septic and/or upgrading existing wastewater treatment plants, a greater volume of wastewater can be treated at existing and new wastewater treatment facilities, creating more recycled water for beneficial uses. Increasing the amount of recycled water available for farmland, landscape, golf course, and school irrigation, industrial uses, and other

uses will lead to other benefits such as potable water offsets and increased nutrient levels for landscape (reducing the need for fertilizers).

Finally, water system improvement projects will both facilitate the movement of water around the region, helping to offset localized shortages, and will minimize unaccounted for water (water loss).

Habitat Protection and Improvement Projects

Projects that contribute to habitat protection and improvement have the ability to enhance and restore the Region's ecosystems and protect threatened, endangered, and sensitive species. These projects can also reduce the risk of wildfire and the associated post-fire erosion, and will provide greater climate change adaptability for the Region. The following types of projects would provide this benefit:

- Land conservation
- Water quality protection projects that would result in surface water quality improvement
- Invasive species removal
- Restoration and enhancement of special aquatic features (e.g. wetlands, springs, bogs, riverine environments)
- Stormwater management and pollution prevention
- Debris cleanup and habitat restoration
- Meadow restoration
- Forest fuels reduction
- Road management activities to reduce runoff to streams
- Flood management projects eliminating or reducing transport of contaminants

Water Quality Projects

Protecting and improving water quality for beneficial uses is consistent with regional interests and the RWQCB Basin Plan. Different types of projects contribute to different types of water quality improvements. For example, groundwater recharge projects can improve groundwater quality in the Delta-Mendota groundwater subbasin, while treatment improvement projects will improve potable water quality. Projects that improve water quality include, but are not limited to:

- Stormwater projects (e.g. stormwater capture and recharge or stormwater management to reduce volume of urban runoff discharged to surface waters)
- Upgrading wastewater treatment plants
- Groundwater monitoring and assessment
- Conversion of septic systems to municipal sewers
- Conjunctive management and groundwater storage
- Sewer collection improvements
- Tailwater capture, recirculation and reuse
- Water treatment projects
- Ecosystem restoration and revegetation projects

- Land conservation
- Salinity management

Agricultural Water Management Projects

Agricultural water management provides many benefits to the region, including economic and job security, water quality protection, water resource protection and habitat protection. Possible projects in this category include:

- Tailwater capture, recirculation and reuse
- Land conservation and land management (to reduce erosion)
- Salinity management
- Ecosystem restoration and enhancement
- Stormwater capture and reuse
- Groundwater monitoring and management
- Recycled water projects delivering water to agricultural users for irrigation
- Agricultural efficient management practices

Urban Water Management Projects

Urban water management projects and programs are, for the most part, conservation projects that manage demand to minimize water use and extend water supplies. These projects not only help with water supply reliability by controlling water demands, but they provide greenhouse gas emissions reductions and the need for new infrastructure by minimizing energy use and avoiding the cost of treatment and expanding/constructing new infrastructure. Conservation projects and programs include:

- Rebate programs for landscape incentives and residential fixtures such as high-efficiency washing machines and ultra-low flow toilets
- Water audits and landscape budgets
- System water audits, leak detection and repair
- Metering with commodity rates
- Public education and outreach programs

Other possible urban water management projects include:

- Using groundwater that does not meet the water quality requirements for drinking water and other non-potable sources of water for landscape irrigation
- Use of ordinances to manage salinity (salt discharges from regenerative water softeners), landscape water use, stormwater runoff pollution
- Promoting the use of Low Impact Development techniques to stormwater capture and groundwater recharge
- Landscaping using drought-resistant plants
- Public education and outreach program

Flood Management Projects

Flooding is a concern for some areas within the Westside-San Joaquin region, especially along the San Joaquin River. Flooding can occur from heavy rainfall, rapid snow melt, saturated soils, or a combination of these conditions. In some cases, flooding is due to inadequate storm drainage systems, unable to handle heavy storms during winter and spring seasons, and from increasing development leading to increases in impervious surface areas and decreases in natural vegetative cover, which reduces the detention and attenuation characteristics of the overland areas. To reduce potential property and structure damage, and economic impacts, flood control enhancement may be provided by projects that:

- Capture and divert stormwater
- Improve levee systems (e.g. floodwalls or setback levees)
- Install pervious pavement or other Low Impact Development infrastructure
- Protection and manage floodplains
- Construct regional flood control infrastructure

Public Education and Outreach Programs

Many water conservation, water quality protection, and water supply projects include public education and environmental awareness components, creating multi-benefit projects or programs. Public outreach programs and components can help promote and increase water efficient management practices, educate about habitat stewardship which can improve water resources, discourage illegal dumping of trash and litter in watercourses, and encourage appropriate water management practices, including appropriate collection and disposal of hazardous liquid wastes and pharmaceuticals.

Public education and outreach can be general, such as those that occur at street fairs, or targeted to specific audiences, such as school children or disadvantaged communities. Targeted outreach programs can help to identify programs to address concerns and issues in specific communities within the Region.

Other Projects and Programs

There are many other possible project/program types that can provide water resource benefits. These include projects and programs that develop, enhance and/or preserve open space, floodplains, parks, and wildlife refuges, provide ancillary benefits through recreation and education, and facilitate water resources projects through data management and sharing.

Open space preservation is a benefit that can be achieved through implementation of land conservation projects. Preserving open space contributes to other benefits such as environmental and recreational benefits, as well as stormwater control, reduced runoff, and flood management benefits. Reservoirs, parks, wildlife refuges and the wilderness within the Westside-San Joaquin Region are used by outdoor recreation enthusiasts throughout the year. Enhancing recreation and public access in the region will be achieved by projects that:

- Conserve and preserve open space and access to public land.
- Remove and control invasive species.
- Improve water quality.
- Provide appropriate sanitation facilities at recreation sites.

- Road management activities to reduce runoff to streams.
- Improve opportunities for public outreach and environmental education.

Data management projects provide benefits by improving data accessibility and dissemination, allowing for the sharing of data collection and reporting activities, and providing public access to data. This can lead to the identification of projects that can help the Region meet its objectives and facilitate project planning, design and implementation.

Finally, local and regional prosperity and economic benefits can be achieved by:

- Avoiding costs of water supply infrastructure with the implementation of water management and water use efficiency projects.
- Avoiding flood damage costs.
- Avoiding impacts to the economy (e.g. businesses and agriculture) associated with water supply interruption.
- Improving the economic resources of disadvantaged communities.
- Increasing tourism with enhanced recreational opportunities and improved water quality and ecosystems.
- Constructing and maintaining proposed IRWM projects.

As previously stated, working on a regional basis aids in protecting the economy of the Westside-San Joaquin Region and minimizing direct monetary impacts felt by DACs in the region through the stabilization of water and wastewater utility rates and agricultural and industrial job stability. IRWM planning and collaboration can lead to multi-benefit projects that achieve cost savings through cost-sharing opportunities, economies of scale, resource sharing, and other mechanisms. Existing resources can be optimized, duplication of efforts avoided, and larger scale efforts developed to provide cost savings to all parties involved.

Impacts

Implementation of the projects described in this plan may also have quantitative and/or qualitative impacts if the WIWRP and/or its component projects are not managed or implemented properly. These impacts may include increased project costs to agencies and ratepayers, delayed construction and/or operation of planned facilities leading to delayed water supply and other benefits, and negative impacts to surface water and/or groundwater quality. If the projects are not implemented, limitations on operational flexibility could increase, especially in times of drought, leading to increased water rationing and associated pressure on water users and the environment.

Project-specific environmental compliance processes will be completed by project proponents prior to project implementation. These processes will determine the significance of project-related environmental impacts. Each project will comply with the CEQA and NEPA requirements, if applicable, prior to and throughout implementation and mitigate potential impacts where possible.

Negative impacts that could be associated with the implementation of projects and programs included in this Plan are similar to those of other water resources projects. In general, temporary, site-specific impacts related to construction and potential long-term impacts associated with project operation are anticipated. Short-term, site-specific construction impacts from implementing physical project facilities may include increased traffic and/or congestion; noise; and impacts to public services, utilities, and aesthetics. Other potential, longer-term impacts are described in more detail below.

Potential impacts from project implementation are briefly described in the following sections.

Water Quality Degradation

Groundwater-related projects, such as projects that increase groundwater pumping or implement conjunctive use, could degrade water quality if not operated appropriately for the groundwater basin and conditions. In addition, projects that involve the implementation of potentially contaminating activities in groundwater recharge areas could result in negative impacts to groundwater quality. Surface water quality could be similarly impacted by projects that encourage recreation and/or intensive development by increasing loading of nutrients, bacteria, and other contaminants to adjacent surface water bodies, negatively impacting water quality for water supply and environmental needs.

Recreation-related projects also have the potential to increase erosion and sedimentation. Increased motor vehicle traffic and foot traffic can increase erosion and sedimentation to adjacent water bodies, negatively affecting water quality for water supply and the environment/habitat purposes. Water quality issues associated with increased erosion and sedimentation can be detrimental to aquatic communities. Additionally, storm drains and channel modifications that are implemented to manage flood flows can contribute to erosion and sedimentation.

Reduced Groundwater Availability and Reliability

There are groundwater quality issues in many areas within the Tracy and Delta-Mendota groundwater subbasins. Projects that impact water quality and/or yield could reduce overall groundwater availability and water supply reliability to users depending on the source. Increased groundwater pumping in the subbasins could create overdraft conditions, potentially degrading water quality and further decreasing overall reliability.

Land Use Compatibility (Rights-of-Way)

A potential impact of any project that includes construction of physical facilities is land use compatibility. The types of projects that could potentially have land use compatibility or rights-of-way issues include:

- Water conveyance facilities
- Storage tanks or reservoirs
- Treatment plants
- Wastewater collection
- Tailwater collection and recirculation
- Recycled water distribution facilities

Construction of new facilities outside of disturbed areas, such as roads, could result in disturbance of otherwise undisturbed areas and may result in loss of open space and habitat.

Disturbance of Habitat and Endangered Species

Open spaces in the Region provide habitat for numerous species, including special-status species (i.e. endangered, threatened, sensitive, or candidate). Projects that involve facility construction have the ability to disturb surrounding habitat and endangered species, depending on the location, type of construction, and facilities. All projects implemented will comply with CEQA and NEPA, as applicable, and as part of the process, will identify and implement mitigation measures for potential environmental impacts as necessary.

Energy Consumption

The water sector plays a significant role in California's energy consumption. Implementing certain projects may increase energy use. Water and wastewater treatment projects that require significant amounts of power may result in increased energy consumption in the region, as would increase groundwater pumping and the transmission of water around the Region. Increased energy consumption can increase greenhouse gas emissions, further exacerbating projected climate change impacts.

Economic Impacts

Implementation of certain projects may have associated long-term economic impacts to agencies, irrigators/landowners and ratepayers. Project financing has historically provided a challenge in areas of the Westside-San Joaquin Region. Even when grants and/or low-interest loans are available to subsidize project capital costs, agency rate revenues are sometimes insufficient to properly operate and maintain the project. Because funds available to implementing agencies are generally limited, it will be important to evaluate financing methods and avenues for potential projects prior to implementation such that potential economic impacts on ratepayers, landowners, and agencies in the Region can be minimized.

Table 10: Project Impacts and Benefits

Project Type	Project Type – Sub-Category	Regional		Interregional		Example Projects
		Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits	
Water Supply Reliability	• Conjunctive Use • Groundwater Management • Storage Development • Improved Conveyance • Recycled Water • Stormwater Capture and Reuse/Recharge • Conservation	• Water quality degradation • Reduced groundwater availability and reliability	• Increased groundwater storage / recharge • Improved water supply reliability • Improved water quality • Reduced land subsidence and/or fissuring • Improved water management coordination • Avoided costs of imported water supply • Avoided costs of water supply infrastructure • Local economic prosperity	• Water quality degradation • Reduced groundwater availability and reliability	• Increased groundwater storage/recharge • Improved water supply reliability • Improved water quality • Reduced land subsidence and/or fissuring • Improved water management coordination • Avoided costs of imported water supply • Avoided costs of water supply infrastructure • Regional economic prosperity	Pleasant Valley Groundwater Banking Project
Habitat Protection and Improvement	• Land Conservation • Invasive Species Removal • Restoration/Revegetation	• Economic impacts • Disturbance of habitat and endangered species • Increased sedimentation and erosion	• Improved water quality • Flood control enhancement • Habitat protection, restoration and enhancement • Open space preservation • Reduced threat to wildfires	• Economic impacts • Disturbance of habitat and endangered species • Increased sedimentation and erosion	• Improved water quality • Flood control enhancement • Habitat protection, restoration and enhancement • Open space preservation • Reduced threat to wildfires	**Pleasant Valley Groundwater Banking Project**
Water Quality	• Salinity Management • Pollution Prevention • Stormwater Runoff Quality Management • Local Impact Development • Septic to Sewer Conversion	• Water quality degradation • Disturbance of habitat and endangered species • Land use compatibility	• Improved water quality • Improved water supply reliability	• Water quality degradation	• Improved water quality • Improved water supply reliability	**Pleasant Valley Groundwater Banking Project** **Westside Regional Drainage Project**
Agricultural Water Management	• Conservation • Tailwater Capture and Recirculation • Recycled Water Conveyance and Use	• Land use compatibility • Water quality degradation • Disturbance of habitat and endangered species	• Improved water supply reliability • Increased nutrient levels for plants • Potable water offsets	• Land use compatibility • Water quality degradation • Disturbance of habitat and endangered species	• Improved water supply reliability • Increased nutrient levels for plants • Potable water offsets	

Table 10: Project Impacts and Benefits

Project Type	Project Type – Sub-Category	Regional		Interregional		Example Projects
		Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits	
Urban Water Management	• Conservation • Leak Detection and Repair • Recycled Water Conveyance and Use	• Land use compatibility • Water quality degradation • Disturbance of habitat and endangered species	• Improved water supply reliability • Increased nutrient levels for plants • Potable water offsets	• Land use compatibility • Water quality degradation • Disturbance of habitat and endangered species	• Improved water supply reliability • Increased nutrient levels for plants • Potable water offsets	
Flood Management	• Improved Infrastructure	• Land use compatibility (rights-of-way) • Disturbance of habitat and endangered species • Increased sedimentation and erosion • Economic impacts	• Flood control enhancement • Increased groundwater storage / recharge • Avoided costs of flood damage • Local economic prosperity	• Land use compatibility (rights-of-way) • Disturbance of habitat and endangered species • Increased sedimentation and erosion • Economic impacts	• Flood control enhancement • Increased groundwater storage / recharge • Avoided costs of flood damage • Regional economic prosperity	
Public Education and Outreach	• Conservation Education • General Public Education • DAC Support • Regional Outreach Activities	None	• Identification and facilitation of projects directly supporting DACs • Increased public awareness and support of projects • Improved consumer response to RMS • Improved facilitation of project implementation	None	• Identification and facilitation of projects directly supporting DACs • Increased public awareness and support of projects • Improved consumer response to RMS • Improved facilitation of project implementation	
Other	• Data Collection and Management • Recreation – Parks, Trails	**None**	• Improved data accessibility and dissemination • Public access to data • Project implementation facilitation • Enhanced recreation and public access • Local economic prosperity	None	• Improved data accessibility and dissemination • Public access to data • Project implementation facilitation • Enhanced recreation and public access • Regional economic prosperity	

At the Plan level, implementation of this WIWRP may have additional impacts and/or benefits beyond those identified for the project types previously described. A summary of these potential Plan-level impacts and benefits are described below.

Regional Impacts and Benefits

Implementation of this Plan and ongoing IRWM planning will lead to numerous and wide-ranging benefits including, at a minimum:

- A more sufficient and reliable water supply;
- Protection of existing water quality;
- Better use of existing supplies;
- Cost-effective, multi-benefit projects;
- Improved Regional water supply resiliency;
- Improved Regional understanding and management of water resources; and
- Increased understanding of water resources issues.

These benefits will preserve the economic and environmental health and well-being of the Region, provide cost-sharing opportunities through economics of scale and resource sharing, will improve the coordination and facilitation of joint projects, and will reduce conflicts by addressing the issues and concerns of stakeholders within the Region, in adjacent areas in neighboring IRWM regions and in the counties encompassed by this Plan.

As previously described, potential impacts of implementation of this Plan could include a variety of temporary construction-related impacts during project construction, including dust, noise, and traffic generation. Other impacts may include increased costs associated with water infrastructure financing. Additional impacts may be identified on a project-by-project basis during CEQA or NEPA analyses.

If the projects contained herein are not implemented, the impacts to the region, water, wastewater and irrigation agencies, and residents within it would be vast. The same issues the region is currently experiencing would not be resolved, and while individual, localized planning efforts and projects would likely continue, they would not achieve the same magnitude and multitude of benefits delivered from regional planning and implementation.

Interregional Benefits and Impacts

Interregional projects such as the North Valley Regional Recycled Water Project, a joint project between the Westside-San Joaquin and East Stanislaus Regions, stand to provide benefits that extend beyond regional boundaries. These projects not only benefit the local agencies and residents of the Westside-San Joaquin Region, but the Delta and members of the public throughout California. Specific ways in which the Plan provides benefits beyond the Westside-San Joaquin Region include the following:

- Improved regional water supply and reliability for the Region and the counties in which it resides, achieved through several water storage and recycled water projects, will reduce pressure on the Delta, the groundwater basin, and the agricultural-based economy in times of significant drought. Additional wastewater reuse projects will also reduce the demand for potable water, potentially increasing downstream supplies.

- Conjunctive use projects will increase water supply reliability within the region, resulting in increased surface water supply availability in dry years and reduced pressure on the San Joaquin River and the State and Federal water projects as primary water supplies.

Most likely, project-dependent construction-related impacts would not impact other IRWM regions, as project and program facilities would be implemented within the Region itself. These construction impacts would be temporary in nature and will result in predominantly local impacts, if any.

There is also the potential to benefit resources beyond local and regional water resources. For example, enhanced tree cover, while viewed as a habitat enhancement, may also directly benefit regional air quality through the creation of microclimates and the filtering capacity provided by trees. By optimizing water supply operations and implementing conjunctive use, additional surface water supplies may be available for hydropower generation to benefit statewide energy resources and for the proposed San Joaquin River Wildlife Refuge expansion.

Benefits and Impacts to DACs and EJ-Related Concerns

Protection of the people and economy of DACs and correction of environmental justice concerns are priorities for the WIWRP. (Please note, there are no federally- or state-recognized Native American communities in the Westside-San Joaquin Region.) Environmental justice is addressed by ensuring that all stakeholders have access to the IRWM planning decision-making process and that minority and/or low-income populations do not bear disproportionately high and adverse human health or environmental impacts. Working on a regional basis aids in protecting the economy of the Region and the counties in which it resides, and minimizes direct monetary impacts felt by DACs in the region through the stabilization of utility rates. Implementation of the Region's flood control projects will protect the local communities from disastrous flood damage. Regional coordination has been, and will continue to be, achieved through public meetings and communication, conducting routine reviews to ensure that DACs are not being adversely affected by project and Plan implementation, and by using grant monies receive to help offset project implementation costs.

Impacts to DACs will be kept to a minimum, and ongoing coordination and public involvement will aid in preventing possible impacts. Construction of project facilities will create short-term environmental impacts (noise, dust, traffic disruption) at neighboring communities. A preliminary analysis of the areas affected by construction of project facilities will ensure that these construction nuisance impacts will not be borne predominantly by any minority population or low-income group.

Chapter 7 Plan Performance and Monitoring

The Westside-San Joaquin IRWM Region will only know if it is making progress toward meetings its objectives if it monitors the progress of WIWRP implementation through project development and implementation. It is also important that the projects included in the IRWMP comply with applicable rules, laws, and permit requirements. This section outlines the processes to ensure these items occur.

7.1 Project Monitoring

The project proponent, acting as the lead agency implementing a project in the WIWRP, will be responsible for preparing a project-specific monitoring plan prior to construction, performing monitoring activities, and tracking and maintaining monitoring information. The monitoring plan must identify project-specific performance measures and include, at a minimum, the following:

- Project objectives / performance measures
- What is being monitoring (e.g. water quality before and after construction)
- Monitoring location and frequency
- Who will perform monitoring
- Monitoring methodology
- How the data will be collected, tracked, reviewed and maintained
- What statewide databases will the data be uploaded to
- Schedule of monitoring and demonstration of available funding and resources for monitoring timeline
- Protocol and measures if problems are encountered during monitoring

While a monitoring plan is only required for projects that are funded through the IRWM grant program, the Westside-San Joaquin RWMG encourages preparation of a monitoring plan and performance of monitoring activities regardless of the funding source in order to evaluate project effectiveness and contribute to lessons learned. Measuring how a project is meeting both the project objectives and contributing to the Region's objectives will help the SLDMWA and stakeholders better understand the effectiveness of the project, similar projects, and may assist in understanding the Region's objectives and/or need to update the objectives.

As described in Chapter 8 Data Management, as a project is developed and implemented, the project proponent must upload relevant project data and documents to statewide databases, as appropriate. The Westside-San Joaquin Region does not have its own data management system/database, so it is relying on the use of available local, statewide, and federal databases to share data with other SLDMWA Member Agencies and stakeholders. During project monitoring, data must be collected according to the procedures and using the methods described in Chapter 8 Data Management. The project proponent will be responsible for ensuring all rules, laws, and permitting requirements are complied with for its project. This includes acquiring necessary permits and complying the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), if necessary.

7.2 Plan Implementation Monitoring

On an annual basis, the SLDMWA and regional stakeholders will convene to discuss the status of projects included in the WIWRP and implementation of the project performance monitoring plans and associated results. This will help gauge Plan implementation and progress in meeting the Region's overall goal and objectives. Monitoring and evaluation of WIWRP implementation is heavily dependent on Project Monitoring, described in the previous section. Implementation of the Westside-San Joaquin IWRP is equivalent to implementing the projects included in the Plan and the only way to meet the Region's objectives. All SLDMWA Member Agencies and project proponents will attend the meeting. The list of projects will be reviewed and status briefly discussed for each project. A table will be prepared summarizing this information; an example of this table is shown in Table 11.

Table 11: Example Project Status Table

Project	Project Proponent	Status	Performance Monitoring Plan Prepared?
Project A	Water Agency A	In Design	No
Project B	Water Agency B	Construction Started in July 2014	Yes

For projects that have been or are in the process of being implemented, the monitoring plan and results will be reviewed. Monitoring results will be appended to the Status Table. The monitoring results should help the group determine if the project objectives were achieved or are in the process of being achieved and if the project has or will contribute to the Region's objectives. The project proponent will be responsible for attending the meeting, providing the monitoring plan and data for review and discussion, and being prepared to discuss its project, objectives, and how it has or will meet the Region's objectives. A matrix will be prepared showing the projects that have been or being implemented in the last year and which Region objectives it is contributing to. Any Region objectives that have not yet been addressed will be highlighted and discussed. If projects have not helped to meet these objectives, it could mean that objectives are not relevant to the Region, are not realistic and achievable, and should be reconsidered. It could also mean that projects have not been implemented that contribute to the objectives. For example, if in a given year, multiple water supply projects are implemented, the flood management related objectives may not be met. The SLDMWA and participating agencies can take this information into consideration when discussing which projects should be implemented in the near-term, during project prioritization, and during preparation of grant applications.

The SLDMWA will maintain the meeting materials, including the Project Status Table, Project Performance Monitoring Tables and results, and the Project/Objectives matrix. These materials will be revisited and updated each year.

Chapter 8 Data Management

The Westside-San Joaquin Region is a relatively large IRWM region with many RWMG member agencies; as a result, a significant amount of data are generated on a regular basis as a result of IRWM planning, regional and agency planning, in support of state programs (such as CASGEM) and related to the projects included in this Plan. For the purposes of this section, data includes, but are not limited to:

- Designs, including plans and specifications, of projects included in the Plan.
- Feasibility studies or other planning documents for projects included in the Plan.
- Data gathered prior to, during, or after construction of the projects included in the Plan (e.g. groundwater quality data).
- Data gathered in support of other programs.

8.1 Data Needs

During preparation of the WIWRP Update, the following data needs were identified:

- Updated water supply gap analysis. The Westside Water Supply Gap Analysis was completed for and presented in the *2003 Westside Integrated Resources Management Plan* (SLDMWA, 2003). The analysis evaluated current and projected future water supplies and demands in the Region and estimated water supply shortages (gaps) under present (1999) and 2025 conditions. This analysis should be updated to evaluate conditions in years beyond 2025 and to provide a more up-to-date picture of the water supplies and demands in the Region.
- Region-specific climate change analysis. Potential climate change impacts and vulnerabilities for the Westside-San Joaquin Region are described in Chapter 13 of this Plan. The discussion is based on *Our Changing Climate 2012, Vulnerability & Adaptation to the Increasing Risks from Climate Change in California*, a summary report from the California Climate Change Center completed in July 2012. While this study provides adequate detail regarding potential impacts to the Central Valley, it would be beneficial to perform a climate change analysis specific to the Westside-San Joaquin Region and its potential impacts on SLDMWA Member Agencies. Many of the agencies in the Region rely heavily on CVP water supplies, which are expected to be significantly impacted by climate change and biological and water quality changes in the Delta. Having a thorough understanding of how climate change may impact water supplies through a more robust analysis could be critical in sustainable, long-term water supply planning.
- With the recent dry years, groundwater levels throughout the Central Valley have been falling at an unprecedented rate. Understanding the current status of the underlying groundwater basin, along with a detailed water balance and ongoing groundwater elevation monitoring, can provide the Region with critical information that will allow them to effectively manage the underlying groundwater basin in a sustainable manner.
- Similar to groundwater elevations, understanding current groundwater quality and potential sources of pollutant loadings to the groundwater basin is essential to managing the groundwater basin in an effective, sustainable manner. In addition to the water balance previously described, delineating the areas of the basin that are most permeable, and therefore contribute the most recharge to the basin, is key to protecting them. Similarly, understanding current land use practices and their potential impacts to groundwater quality will provide needed understanding for identifying and implementing management strategies to control potential future loadings.
- Recycled water is a 'drought-proof supply' that can add to the Region's water supply portfolio. A Recycled Water Master Plan (RWMP), or at a minimum, a recycled water market assessment, can provide necessary information to determine what demands exist, both in the present and future, for recycled water and what supplies are available to fulfill those demands.

8.2 Data Collection, Maintenance, and Dissemination

Gathering and developing data at a project level is essential to the successful development and implementation of that project. Data gathered relative to a project are generally collected and managed by the lead implementing entity. While there is no centralized data management system (DMS) for the Westside-San Joaquin Region, project specific data are available from websites, published reports, implementing entities, and governmental agencies. The Region is leveraging the availability of statewide

databases, using those as a means of sharing and transferring information between interested parties, including IRWM planning participants, stakeholders within and outside the region, and state and federal agencies. Using the existing statewide databases supports the efforts to share collected data and ensures the data collected through the IRWM planning process are available for education and potentially other analyses to better understand water resources in the Region and in California. It also allows stakeholders to contribute to data analyses by using the publically available websites which interested parties can access and review.

Each SLDMWA Member Agency and/or project proponent is responsible for collecting, maintaining, performing quality assurance/ quality control (QA/QC) on data collected, and uploading its data to relevant statewide databases, including but not limited to:

- California Environmental Data Exchange Network (CEDEN) - http://www.ceden.org/
- Water Data Library (WDL) - http://www.water.ca.gov/waterdatalibrary/
- California Statewide Groundwater Elevation Monitoring (CASGEM) - http://www.water.ca.gov/groundwater/casgem/
- California Environmental Resources Evaluation System (CERES) - http://ceres.ca.gov/search
- CEQAnet Database - http://www.ceqanet.ca.gov/

Data collection techniques are determined on a project-by-project basis, and may vary slightly for each entity. Typical data collection techniques are summarized in the following table. Water agencies in the Westside-San Joaquin Region monitor groundwater levels, groundwater quality, and water use as part of regular water management activities. Additional data may be collected in new locations for project-specific purposes.

Table 12: Typical Data Collection Techniques

Data Type	Method for Collection	Relevant Statewide Database
Groundwater Levels	Electronic water level indicator or sounding cable	CASGEM, WDL
Groundwater Quality	Well sampling	CEDEN, WDL, Geotracker
Water Demand	SCADA, meter readings	Maintained locally
Environmental Documentation (e.g. EIRs, Negative Declarations)	Prepared by lead agency and submitted to the State Clearinghouse within the Office of Planning and Research	CEQAnet Database
Surface Water Flows	Weirs, staff gages	CEDEN, CAWSC, eWRIMS
Surface Water Quality	Surface water sampling	CEDEN, WDL, SWAMP

QA/QC measures may differ among entities, but typically, the data are reviewed, validated, and put into the appropriate format compatible with and necessary to integrate into existing databases. Projects that receive IRWM grant funding administered by DWR are required to monitor the project for up to 10 years following completion and ensure data are collected, maintained, and distributed as required.

Chapter 9 Financing

The SLDMWA has identified a variety of potential funding sources and mechanisms for ongoing IRWM planning in the Westside-San Joaquin Region, as well as implementation of the WIWRP (i.e. implementation of the projects included in the Plan). To implement many of the projects that comprise the Plan, funding will be sought from local, Regional, State, and federal funding opportunities. Each project will have unique requirements, so funding will be sought from one to all of the aforementioned sources as appropriate. Lastly, the source of funding for a particular project does not always correspond with whom ultimately pays the cost; this is particularly true with respect to the projects with federal interest and involvement. Potential funding for IRWM planning and implementation of projects is described in the following sections.

9.1 IRWM Planning Financing

The Westside-San Joaquin Region has made significant progress in IRWM planning in the last decade. The participating agencies and stakeholders recognize the need to maintain momentum by continuing coordination in IRWM planning efforts, even after the WIWRP Update is finalized. The most efficient and cost-effective way to ensure ongoing IRWM planning discussions take place in the Region is to include a standing agenda item on the SLDMWA Board of Directors (BOD) regular Board meeting agendas. The agenda item will allow for discussion of items of interest, such as IRWM grant applications, the implementation of a project included in the WIWRP, or opportunities for land use or water supply coordination with and between IRWM planning participants. Additionally, should additional action be required, other meetings specific to IRWM planning may be schedule. Funding sources for ongoing IRWM planning and coordination, and for future WIWRP updates are summarized in the following table.

Table 13: Funding Sources for Ongoing IRWM Planning

Funding Source	Certainty / Longevity
SLDMWA Member Agencies	High – the Member Agencies executed a cost-sharing agreement to update the 2006 WIWRP to the 2014 WIWRP. Any remaining budget can be used for ongoing IRWM coordination after the update is finalized. Future cost sharing agreements can be executed for future updates and IRWM planning activities.
Future rounds of IRWM planning grants administered by DWR	Low – It is unknown if there will be future rounds of planning grants. This would be dependent upon future funding for the IRWM program

9.2 Project Financing

Table 14 summarizes the potential funding sources and certainty of funding for capital, implementation, and operations and maintenance (O&M) costs for projects implemented in the Westside-San Joaquin Region. Typically, grant and loan funding is not available for financing of O&M costs or for land purchases. Note that financing for projects is also considered in the Project Review Process as described in Chapter 6.

Table 14: Funding Sources for Projects that Implement the IRWMP

Funding Source	Certainty	Additional Notes
Ratepayers (within Project Proponent service area or area of project benefit)	High – user rates pay for O&M of a utility's system. Depends upon rate structure adopted by the project proponent and the Proposition 218 rate approval process.	
General Funds (of Project Proponents)	High – general or capital improvement funds are set aside by agencies to fund general operations and construction of facility improvements. Depend upon agency approval.	
Special taxes, assessments, and fees (within Project Proponent service area or area of project benefit)	High - Monthly user fees, special taxes, and assessments can be assessed by some agencies should new facilities directly benefit existing customers. Depends upon the rate structure adopted by the project proponent and the Proposition 218 rate approval process.	
Clean Water State Revolving Fund Loan Program administered by the State Water Resources Control Board (SWRCB)	High – the SWRCB has $200 to $300 million available annually for low-interest loans (typically ½ of the General Obligation Bond Rate) for water recycling, wastewater treatment, and sewer collection projects. As a revolving loan program, future funding will be available should project proponents decide to seek loan(s).	No project funding secured to date.
Water Recycling Funding Program – Planning and Construction Grants from SWRCB	Low – Construction grants are virtually exhausted. Planning grants are available for facilities planning studies to determine the feasibility of using recycled water to offset potable water supplies. Grants cover 50% of eligible costs, up to maximum of $75,000. Planning grants may be available for project proponents seeking funds for facilities planning of recycled water projects.	No project funding secured to date.
Drinking Water State Revolving Fund Loan Program administered by the California Department of Public Health (SWRCB)	High – approximately $100 to $200 million is available on an annual basis for drinking water projects. Low-interest loans are available for project proponents should they decide to seek financing.	No project funding secured to date.
Infrastructure State Revolving Fund Loan Program administered by the California Infrastructure and Economic Development Bank (I-Bank)	High – low-interest loans are available from I-Bank for infrastructure projects (such as water distribution). Maximum loan amount is $25 million per applicant. Applications are accepted on a continuous basis should a project proponent seek funding.	No project funding secured to date.
Title XVI Water Recycling and Reclamation Program – Construction Grants	Medium – grants up to 25% of project costs or $20 million, whichever is less, are available from the Bureau of Reclamation (USBR) for water recycling projects. A Title XVI Feasibility must be submitted to USBR for approval, then a congressional appropriation must be made.	No project funding secured to date.

Funding Source	Certainty	Additional Notes
WaterSMART Title XVI Water Recycling and Reclamation Program – Feasibility Study Grants from USBR	Low – grants up to $150,000 were available for preparation of Title XVI Feasibility Studies for applications submitted in May 2014. It is possible future rounds may be administered.	No project funding secured to date.
NRCS Agricultural Management Assistance (AMA) Program	Medium – provides financial assistance up to 75% of cost of installing conservation practices.	
NRCS Conservation Stewardship Program (CSP)	Low – CSP participants are paid for conservation performance; the higher the operational performance, the higher the payment. Focus is on promoting the use of conservation practices to encourage land stewardship.	
NRCS Environmental Quality Incentives Program (EQIP)	Low – voluntary program that provides technical and financial assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns.	
Bonds – revenue bonds can be issued to pay for capital costs of projects allowing for repayment of debt service over 20- to 30- year timeframe	Medium – depends on the bond market and the existing debt of project proponents	
Future rounds of IRWM implementation grants administered by DWR	Medium – The Region is pursuing grant funding through the 2014 Expedited Drought Grants. DWR will announce draft funding recommendations in September 2014. DWR also plans to administer the final round of implementation grants in 2015. The Westside-San Joaquin Region will decide at that time if it will seek funding. A minimum of $6,674,114 will be available in the San Joaquin Funding Area, within which the Region lies.	No project funding secured to date.

Chapter 10 Technical Analysis

The Westside-San Joaquin IWRP serves as a guide to illustrate the regional opportunities that have been developed to improve resource management and integration within the Region. The purpose of this section is to document the data and technical analyses that were used in the development and update of the Plan.

Multiple plans, studies, and data sets were used to prepare the original 2006 IWRP and the 2014 IRWMP Update. These are summarized in Table 15. While the 2006 IWRP provided a starting point for the 2014 IRWMP Update, additional plans and data prepared and compiled since 2006 were used to ensure the Plan addresses current day conditions and is forecasted for the 20-year planning horizon. The use of the plans and data sets shown in the following table helped the SLDMWA and the Region's stakeholders better understand water management in the Region and identify data gaps as described in Chapter 8 Data Management. In most cases the studies and data sets were prepared by or for the local planning entities in the Region and are therefore representative of the Westside-San Joaquin Region, current day conditions, historic records, and provide the best information for forecasting future years.

Table 15: Studies and Data Sets Used to Prepare the Westside-San Joaquin IWRP

Study or Data Set	Analysis Method	Results / Derived Information	Use in IRMWP	Source
2006-2010 MHI Data for Census Tracts, Block Groups, and Places	Used GIS data to create maps and tables	Identified DACs	Identified DACs in the region to include in Region Description and apply in stakeholder outreach	U.S. Census Bureau's American Community Survey
Population projections, projected water demand	Review of study, data collection and assimilation	Projected future water needs	Applied to water supply and demand analysis	City of Patterson *2010 Urban Water Management Plan*
Groundwater conceptual model, groundwater elevations and trends	Review of study, data collection and assimilation	Groundwater management needs	Development of RMS and identification of related projects	SLDMWA *Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area*
Groundwater conceptual model, groundwater elevations and trends	Review of study, data collection and assimilation	Groundwater management needs	Development of RMS and identification of related projects	SLDMWA Draft *Groundwater Management Plan for the Southern Agencies in the Delta-Mendota Canal Service Area*
Central Valley Improvement Act	Review of Public Law	Effects on CVP Water Supply	Quality and Quantity of Water Resources	USBR Title 34
Geology, Hydrology, and Water Quality of the Tracy-Dos Palos Area	Review of study, data collection and assimilation	Groundwater management needs	Estimates of Groundwater Storage Capacity	United States Department of the Interior Geological Survey – Water Resources Division
Groundwater Quality in Public Supply Wells	Review of study, data collection and assimilation	Groundwater quality	Identifying groundwater quality issues	Department of Water Resources (DWR)
Water Supply Gap Analysis	Use of current data to project future supply gaps	Water supply management information	Evaluate current and projected future water supplies and demands	SLDMWA *West Side Integrated Resources Management Plan*
Guidelines for Cloud Seeding to augment precipitation	Review of study, data collection and assimilation	Precipitation enhancement	Resource management	ASCE MOP 81
Conservation and improvement of land	Review of study, data collection and assimilation	Effects of Agrarian Stewardship on water conservation	Connection to Large Scale Water Conservation	Department of Water Resources (DWR) *California Water Plan 2013 Update*
Low Salinity Zone and Fish Abundance	Assimilation of diverging professional opinions	Low Salinity Zone (LSZ) model uncertainty	Salt and Salinity Management	SLDMWA *Bringing the Flows into Focus*

Study or Data Set	Analysis Method	Results / Derived Information	Use in IRMWP	Source
Climate Change	Review of study, data collection and assimilation	Parameters affecting climate change	Future Water Management Planning	*DWR* *California Water Plan Update 2009 - Integrated Water Management*
Climate Change	Review of study, data collection and assimilation	Parameters affecting climate change	Future Water Management Planning	DWR *Climate Change Handbook for Regional Water Planning*
Climate Change	Review of study, data collection and assimilation	Parameters affecting climate change	Future Water Management Planning	CNRA *California Adaptation Planning Guide*
Climate Change	Review of study, data collection and assimilation	Parameters affecting climate change	Future Water Management Planning	Null, et all. *Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada*
Hydrologic Response and Watershed Sensitivity	Review of study, data collection and assimilation	Modeling of 15 watersheds and deriving of statistical parameters and results	Future Water Management Planning	Null, et all. *Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada*
Sea Level Rise	Review of study, data collection and assimilation	Prediction of Sea Level Rise	Sea Level Rise (SLR) Tables	National Research Council *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future.*
Urban Water Management Data	Review of study, data collection and assimilation	Plans and guidelines for present and future surface water management and treatment	Relation of Local Planning to Regional Planning	Erler & Kalinowski. *City of Tracy 2010 Urban Water Management Plan*
Urban Water Management Data	Review of study, data collection and assimilation	Plans and guidelines for present and future surface water management and treatment	Relation of Local Planning to Regional Planning	AECOM *City of Los Banos 2010 Urban Water Management Plan*
Urban Water Management Data	Review of study, data collection and assimilation	Plans and guidelines for present and future surface water management and treatment	Relation of Local Planning to Regional Planning	The H_2O Group *City of Patterson 2010 Urban Water Management Plan*

Study or Data Set	Analysis Method	Results / Derived Information	Use in IRMWP	Source
General Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	City of Patterson *City of Patterson 2010 General Plan*
General Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	Dyett & Bhatia *City of Los Banos 2030 General Plan*
General Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	Nolte *Merced County General Plan Update: Qualitative Comparison of Water Supply and Demands in Merced County*
General Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	Merced County *Merced County 2030 General Plan*
General Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	City of Fresno *2025 Fresno General Plan and related Draft Environmental Impact Report No. 10130*
Water Management Plan	Review of study, data collection and assimilation	Plans and guidelines for present and future	Water Supply Assessments	Del Puerto Water District. 2011. *Del Puerto Water District Water Management Plan 2008 Criteria*

Chapter 11 Relation to Local Planning

11.1 Local Water Planning

The San Luis & Delta-Mendota Water Authority (SLDMWA), Member Agencies and other planning entities in the Westside-San Joaquin Region have a long history of coordinated planning efforts, both through IRWM planning, other local water planning efforts, water delivery coordination (i.e. through the Delta-Mendota Canal) and water resources projects over the years. The 2014 WIWRP Update allows the Region to incorporate various planning efforts, including groundwater management, urban water management, agricultural water management, water supply planning, City and County general planning, irrigation district master planning, flood management, and other planning efforts that are shared within the Region. A list of the local water plans that were used in the Westside-San Joaquin IWRP is included in Chapter 10 Technical Analysis . A brief summary of how the local planning efforts relate to IRWM planning is included in the following sections. The SLDMWA and its Member Agencies manage water resources through planning efforts and coordination with each other, state and federal agencies, and other local planning entities, as necessary. The Member Agencies will continue to do so in the future, and will leverage IRWM planning in the Region, as well as the relationships formed and maintained

through the planning process. During future WIWRP updates, local planning documents that have been prepared and updated since the last WIWRP update will be reviewed and incorporated, as appropriate. Updates of local planning documents and WIWRP updates will require ongoing coordination to ensure consistency and allow for input from local planning entities and Westside-San Joaquin IRWM planning participants in all relevant, water resources-related planning efforts. Because many of the local water planning entities in the Region are SLDMWA Member Agencies (i.e. Westside-San Joaquin IRWM planning participants and members of the Westside-San Joaquin RWMG), they can coordinate on a regular basis for water management planning activities, both through the IRWM planning process and local planning efforts.

Groundwater Management

Since 1995, the SLDMWA has held an activity agreement with the City of Tracy, Plainview Water District, Del Puerto Water District, Banta-Carbona Irrigation District, West Stanislaus Irrigation District, Patterson Irrigation District, and Westside Irrigation District.1 By using an umbrella organization to develop and implement its groundwater management plans, the SLDMWA has been able to comprehensively review factors influencing the water balance associated with the Delta-Mendota groundwater basin. These factors include groundwater elevations, estimates of basin-wide groundwater pumping and sustainable yield, and groundwater quality. This information has been compiled into two groundwater management plans, one for the northern part of the region (AECOM & SLDMWA, 2011)and one for the southern part of the region. Both plans meet the requirements set forth by AB303, with the northern plan completed and adopted and the southern plan presently in draft form.

The SLDMWA has regular meetings to continually discuss the dynamic groundwater system. The USGS has also provided data from its multiple groundwater level monitoring facilities to the Water Authority for inclusion in data analyses. The SLDWMA is now working alongside its member agencies and other regional stakeholders to identify management objectives, implement the groundwater management plans, actively monitor the groundwater basin, and identify and execute management strategies to management the basin in a sustainable manner.

Urban Water Management

There are many urban water providers within the Westside-San Joaquin Region, however, not all are required to prepare Urban Water Management Plans (UWMPs) per the California Water Code. (Per the Urban Water Management Planning Act [Division 6 Part 2.6 of the Water Code §10610 – 10656], every urban water supplier that either provides over 3,000 acre-feet of water annually or serves more than 3,000 or more connections is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years and prepare and submit an UWMP to the Department of Water Resources every five years.) The Cities of Tracy (Erler & Kalinowski, 2011), Los Banos (AECOM, 2011), and Patterson (H_2O, 2011) submitted UWMPs in 2010. These plans are used to evaluate water supplies and demands within their sphere of influence, estimate water supply shortfalls in the future, document water conservation measures already being implemented, and identify additional conservation measures that can be implemented in the future. These documents are then used, in turn, to provide the same information to this WIWRP to be incorporated into a regional analysis of demands and supplies.

In addition to UWMPs, the Region's urban entities participate in other related planning activities. Examples of this planning include:

1 "Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area", SLDMWA July 2011.

- The City of Tracy has coordinated with several regional agencies that are responsible for planning different water sources. Agencies have been categorized by water sources; include the DMC/CVP, the South County Water Supply Project, Tracy Basin Assembly Bill 3030 Regional Groundwater Management Plan, and the Semitropic Water Bank. The City of Tracy has used these regional planning efforts to feed its local planning efforts and the design of local projects.
- The City of Patterson has held regular meetings and discussions with its local water purveyors and agencies to discuss water resources management and civic planning efforts and to identify the best approach to developing regional water programs. There has been discussion on groundwater banking, the sharing and transferring of water supplies, protection of water quality, use of recycled water, and long-term impacts of pumping ground water. In 2006, the City of Patterson joined a study with the Stanislaus County, both of which are members of the Westside-San Joaquin Region, to evaluate the region's water supply and treatment options and how to use these options to meet local demands. While satisfying the requirements of Division 6 of the California Water Code, the City could benefit from coordination with other regional agencies, including the SLDMWA and its Member Agencies.
- The City of Newman has been coordinating with Crows Landing, Stanislaus County, and the Central California Irrigation District (CCID) on the Orestimba Creek Project for the last 15-20 years. This is a multi-benefit project to capture stormwater runoff from the creek and recharge the groundwater basin. Coordinated projects such as this reflect not only local water resources planning, but the desire of the Region's stakeholders for larger, broader solutions to water resource issues.

Agricultural Water Management

With the passage of the CVPIA and then SBx7-7 in 2013, agricultural water supplies are required to comply with water conservation requirements outline in Part 2.55 of Division 6 of the California Water Code. This code section requires, among other things, that agricultural water supplies prepare and submit Agricultural Water Management Plans (AWMP) to the California Department of Water Resources. These AWMP are required to describe their water uses and the quantity and quality of water resources at their disposal, to provide water accounting and water supply reliability information, and to summarize water use efficiency measures current in place or planned for the future. Similar to UWMPs, the water demand and supply projections contained within the AWMPs are used in the IRWM planning process to evaluate overall regional demands and supply availability in an effort to better manage water resources on a regional basis.

In an effort to address projected supply shortfalls, many local water districts (who are also SLDMWA Member Agencies) have developed creative solutions to the Region's problems. These solutions have resolved local problems, but due to proximity and connections through the SLDMWA, many of these solutions have also provided models for other districts within the Region and/or provided solutions that can be expanded to address problems on a Regional basis.

An example of coordinated agricultural water management planning is a SLDMWA board meeting held on March 4, 2014 to discuss the impacts of drought on the Region's agriculture. In this meeting, the Board concluded that the CVP and the SWP are over-regulated and indicated that they are planning to partner with local cities to pursue reforming regulations and investing in more high-tech infrastructure.

City and County General Planning

The Westside-San Joaquin Region includes portions of five California counties: San Joaquin, Stanislaus, Merced, Fresno and Kings. Each County develops and maintains a General Plan, which includes goals and policies related to water resources within the County. As with other local planning documents, the Counties' goals, objectives and policies of water resources management are considered and incorporated into the management of water resources at the IRWM Regional level.

In addition to General Planning, other types of water resource planning occurs at the County level. For example Fresno County is helping implement and maintain the Fresno County Metropolitan Flood Control District's Storm Drainage and Flood Control Master Plan, updating as needed. As part of this planning, the County is helping to determine optimal locations for drainage basins and other facilities that spur urban development in more localized communities. Cities in Fresno County communicate their own needs to Fresno County so as to provide parameters for these plans. Fresno has made use of past studies of the SLDMWA in making its policies (and vice versa). Another example of coordinated local planning efforts is in Merced County. Merced County is reviewing existing incorporated and unincorporated communities and anticipated new towns in order to identify current groundwater and surface water resources and compare this supply to future projected demands within these communities. This requires active participation of the County, its cities, and its unincorporated communities. It has based its projects, in part, based on past studies of the SLDMWA.

Flood Protection

The Mid-San Joaquin River (Mid SJR) Regional Flood Management Plan (RFMP) is one of six DWR-funded regional flood management planning efforts in the Central Valley. The Mid SJR RFMP is currently in development and is expected to be completed in September 2014. The RFMP covers the areas surrounding the San Joaquin River, between the Stanislaus-San Joaquin River confluence and the Merced-San Joaquin River confluence. The team developing the RFMP is comprised of Resource District 2092, Stanislaus County, the Department of Water Resources, a consultant team, an outreach team, and 16 stakeholder groups and organizations, including several cities, counties, and irrigation districts. The Mid SJR RFMP is being developed to identify projects to prevent flooding in the Mid SJR region, and includes an assessment of regional flood hazards, proposed improvement, regional priorities, enhanced operations and management, emergency response planning, land use and environmental enhancements, a regional financial plan, and an updated regional atlas. The plan development, because of its large number of interested groups, is locally-driven and requires heavy collaboration.

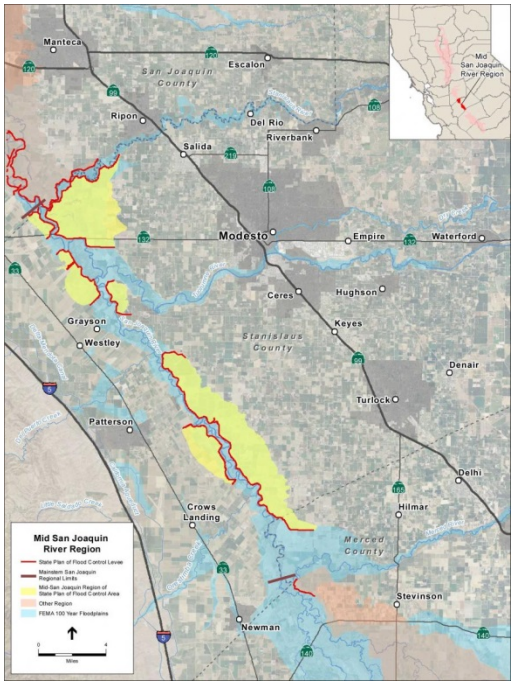


Figure 12: Mid SJR RFMP Area

Westside-San Joaquin Region cities that are not within the Mid SJR floodplain, such as Patterson and Newman, have developed with their own independent floodplain management plans. Together, the projects developed under the Mid SJR RFMP and these locally-developed plans provide the basis for Regional flood management.

Watershed Management

The SLDMWA does not currently manage any watersheds, and in fact, lies at the lower reaches of most of the larger river watersheds. Most watershed management that has occurred in the Westside-San Joaquin Region has been through project-specific planning efforts and indirectly through day-to-day operations (i.e. delivery of CVP water that has originally passed through the San Joaquin River Watershed). Future watershed management opportunities may arise, however, as the Region looks to capturing and reusing stormwater runoff from smaller creeks originating on the west side of the San Joaquin Valley.

Low Impact Development (LID)

There are currently minimal efforts in the Westside-San Joaquin Region aimed towards the implementation of Low Impact Development. As most of the Region is composed of non-urban environments, the benefits of implementing LID may be less than in largely urbanized areas. The SLDMWA recognizes that LID may have the potential to aid regional stormwater treatment, and plans to have further discussions on its implementation within the Region.

Water Supply Assessments

California Senate Bill (SB) 610 Water Supply Assessments (WSAs) and SB 221 Written Verifications of Water Supply are required by California Water Code for new developments to evaluate long-term water demands from proposed developments and to ensure that existing and/or projected new supplies are available to meet those demands into the future. Water supply assessments often consider data in the UWMPs and IRWMPs as the basis for their analysis. In turn, WSAs can provide data and analyses for incorporation into the WIWRP, again in terms of developing a regional picture of water demands and supplies.

In preparing and analyzing WSAs, SLDMWA incorporates local planning elements from several water infrastructure facility planning documents, including the Jones Pumping Plant, the Delta Mendota Canal, and San Luis Reservoir, in addition to planning by federal contractors. The Water Authority uses this planning information in combination with real-time data collection such as flow rates in the DMC at Vernalis and the San Joaquin River, to develop Daily Water Operations Reports such as Figure 13. The SLDMWA also considers seasonal and historical reservoir water storage, reservoir drawdown rates, current export and outflow data to develop future water demand and supply projections. Many regional cities, counties, and water districts store data in their general plans, such as City of Patterson (City of Patterson, 2010), Los Banos (Dyett & Bhatia, 2007), Merced County (Nolte, 2009) and (Merced County, 2011), Fresno County (Fresno Planning and Development Department, 2002), and the Del Puerto Water District (Del Puerto Water District, 2011). These reports are then used to identify solutions to water supply issues within the Westside-San Joaquin Region, redirect or alter existing water balances as needed, and to formulate management plans. Allocation of water to urban areas and agricultural services are then determined based on water year type and water availability.

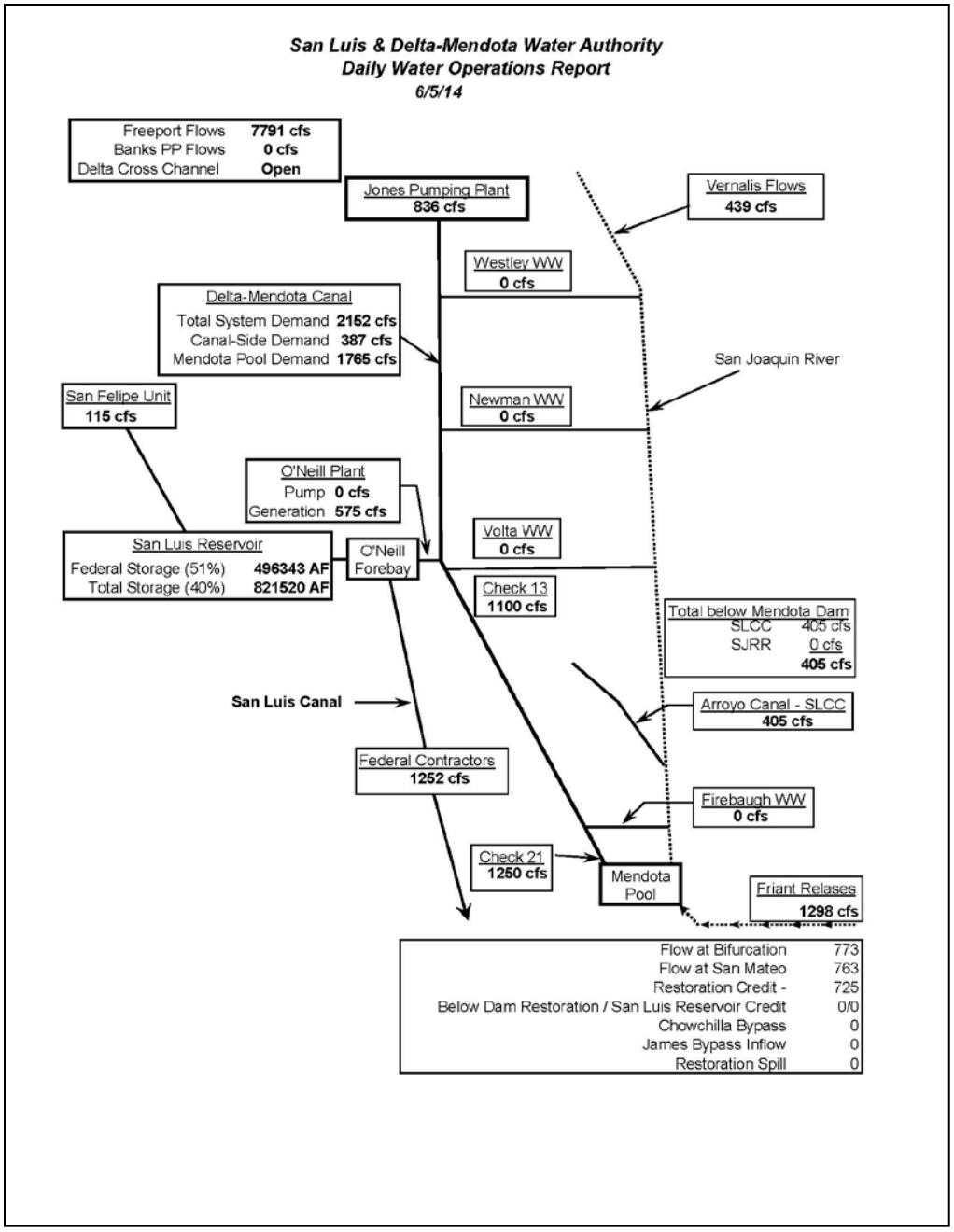


Figure 13: Sample SLDMWA Daily Water Operations Report

Stormwater Management

The SLDMWA is currently involved in stormwater management. Stormwater runoff management has been handled primarily on the county and city level. Examples of this type of planning include:

- Fresno County has plans to install curbing and gutters on existing developed roadways which are lacking drainage communities. The County is also working with the Fresno Metropolitan Flood Control District to discuss which methodologies will be effective in removing pollutants and maintaining high quality surface and groundwater.
- Merced County's Stormwater Management Program (SWMP) involves the coordination of City of Atwater, City of Merced, County of Merced, and Merced Irrigation District. These entities work together to promote public education, public involvement, to design and construct treatment infrastructure, to manage new developments, and to create prevention programs.

However, as with watershed management and LID, future opportunities for stormwater management may arise at the regional level in the future as the Region looks to capturing and reusing stormwater runoff from smaller creeks originating on the west side of the San Joaquin Valley

Salt and Salinity Management

The SLDMWA is actively working with a variety of other planning agencies to monitor the salinity levels in the Sacramento-San Joaquin Delta. Multiple federal, state and local agencies have researched and implemented salt-management strategies around the complexity of this system, both in terms of its dynamic, tidally-influenced nature and management and protection its diverse local ecosystem. A workshop was held in 2012 where a number of agencies (including the DWR, Bay Delta Conservation Plan, California Department of Fish and Wildlife (DFW), the Northern California Water Association, the Water Resources Control Board) came together to address three key issues:

1. Ecosystem Changes and the Low Salinity Zone (LSZ);
2. Bay-Delta Fishery Resources; and
3. Analytical Tools for evaluating the Water Supply, Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan.

The SLDMWA summarized the results of the workshop and the 2006 Water Quality Control Plan Update into a document entitled *Bringing Flows Into Focus* (SLDMWA, 2014), and is actively collaborating with participating organizations in tackling these multidimensional problems.

Outside of the Delta, other salinity problems are being addressed with innovative techniques. The Panoche Water and Drainage District, a SLDMWA Member Agency, is collaborating with WaterFX on a project that desalinates agricultural runoff through use of solar collectors. In addition to solving drainage problems, the desalination plants have an added bonus of providing fresh water at a rate of 10 gallons per minute. Because of its enormous cost-benefit results, it is now being used as a prototype for much larger facilities throughout the region. The City of Tracy is now pursuing a project to create its own desalination plant.

Emergency Response, Disaster Plans

Table 16 summarizes flood emergency responders, by emergency level, for the San Joaquin River Hydrologic Region. While cognizant of this structure, SLDMWA is not an emergency responder as it has no flood-related duties at either the county or regional level. The Water Authority does, however, maintain its own emergency response plans, and coordinates regularly with the USBR and the counties in which it lies to ensure coordination of emergency response efforts.

Table 16: Summary of Flood Emergency Responders

FLOOD EMERGENCY RESPONDERS, SAN JOAQUIN RIVER HYDROLOGIC REGION		
Responder	**Level**	**Comment**
Person(s) or organization(s) on the site	0	Any emergency
Emergency services units of the 34 cities in the region	1	Any emergency
Lower San Joaquin Levee District	1	Levees and bypasses, Mendota to Merced River
Reclamation Districts 1602, 2099, 2100, 2101, 2102	1	Levees on the west bank of the San Joaquin River
Reclamation Districts 2031, 2063, 2091, 2092	1	Levees on the east bank of the San Joaquin River
Emergency services units of the 16 counties in the region	1 or 2	Any emergency, and by request from Level 1 responders
Department of Water Resources	2	Flood Operations Center, flood fight and Corps liaison
California Emergency Management Agency, Coastal Region	3	Any emergency, Alameda, Contra Costa, and San Benito Counties, by request of county (operational area)
California Emergency Management Agency, Inland Region	3	Any emergency, Alpine, Amador, Calaveras, El Dorado, Fresno, Madera, Mariposa, Merced, Sacramento, San Joaquin, Stanislaus, and Tuolumne Counties, by request of county (operational area)
California Emergency Management Agency, Southern Region	3	Any emergency, Mono County, by request of county (operational area)
US Army Corps of Engineers	3	Specified water-related emergencies, by request of DWR
California Conservation Corps	3	Personnel and equipment for flood fight
Department of Forestry and Fire Protection	3	Personnel and equipment for flood fight
California Emergency Management Agency Headquarters	4	All emergencies, entire hydrologic region, by request of Cal EMA Region

11.2 Relation to Local Land Use Planning

The Member Agencies of the Water Authority in general do not have land use planning authority. As such, regional stakeholders have had to reach out and educate local land use planners and decision makers on the relationship between their legal authority to affect land use and the subsequent impacts upon water resource management. Many of these efforts are relatively recent and result from rapid urban development to meet housing demand throughout the Region. More developed and detailed efforts have occurred with respect to regional conservation and general plans.

SLDMWA, its Member Agencies and Regional stakeholders have the opportunity to participate in local land use planning and conversely, land use planners are able to participate in the Westside-San Joaquin IRWM planning process through attendance of meetings, submittal of projects for inclusion in the Plan, and public review and comment. As the certainty of water supplies continues to change due to climate change and as cities in the Central Valley continue to grow, local water and land use planning entities recognize the need for continued coordination and collaboration. This will likely occur through meetings specific to land and water planning, through the IRWM planning process, and the existing land use planning efforts. Additional meetings and coordination should contribute to a collaborative, proactive relationship between land use planner and SLDMWA water managers.

Land use decisions made by local governments affect many aspects of the SLDMWA Member Agencies' management and regulatory compliance responsibilities, including conveyance capacity, drainage, flood control, operational flexibility, water quality, and water supply. For decades, city and county land use

decisions have been made in isolation from the resource considerations of local water agencies. Within the last several years, as the rate of development has increased inversely to the abilities of local water agencies, conflicts have arisen and the need for education and collaboration has become evident. In response, local water agencies and governments have initiated discussions to identify resource management issues related to growth and are beginning to develop formal cooperative processes to ensure mutually acceptable outcomes.

Measures to mitigate or offset impacts to sensitive species and communities have been developed and implemented by the cities and counties in the Region as part of their General Plans. Additionally, many of the goals of the general planning documents are consistent with the Westside-San Joaquin objectives and consider water management issues. For example, the Conservation and Open Space Element of the Stanislaus County General Plan emphasizes the conservation and management of economically productive natural resources and conservation of open space lands (any parcel or area of land or water that is essentially unimproved). Creating and maintaining open space is beneficial to groundwater recharge and the stabilization of groundwater quality. Many of the general plans in the Region seek to conserve function and values of wetland communities and related riparian areas which, in turn, positively affect aesthetics, water quality, floodplain management, ecological function, recreation, and tourism. The SLDMWA Member Agencies and land use planners have coordinated on the General Plans of all five counties in which it lies.

Land use planning and water planning are intrinsically related. For example, the City of Mendota experiences flooding from Panoche-Silver Creek in certain areas. Growth and the implementation of land use planning cannot occur until a solution to flooding is identified and implemented. Land use changes and growth, which would diversify the local economy, is limited to areas not affected by the flooding problem. Additionally, prior to growth within the Westside-San Joaquin Region, adequate water supplies must be secured and conflicts with agricultural water use addressed. These issues offer opportunities to develop an integrated solution that manage flooding, water resources, and land use planning in an effective and efficient manner.

Chapter 12 Stakeholder Involvement

The Westside-San Joaquin IRWM region believes that stakeholder outreach and involvement are vital to developing regional solutions to ongoing water resources conflicts. Formed for the purpose of coordinating the operations of key state water infrastructure for the benefit of many, it is inherent in the Water Authority to serve and represent the needs of its members. As the RWMG for the Westside-San Joaquin Region, the Water Authority extends this charter and belief to the regional level, seeking input and involvement from all regional stakeholders.

12.1 Water Authority Composition

The Water Authority serves the needs of 29 Member Agencies (Table 1), which are predominantly agricultural in nature, by developing and conveying information concerning a variety of issues that serve the common interest of the membership, such as: Sacramento and San Joaquin Delta exports, water supply, water quality, water development, conservation, distribution, drainage, contractual rights, and surface and groundwater management. The Water Authority and all of its Member Agencies are legal entities, established under various aspects of California law. As such, all Board and standing committee meetings are open to the public and are posted on the website and noticed in the paper; agendas and minutes are produced and made readily available ahead of the meeting, and public comment periods are offered at each meeting.

The Water Authority's Board of Directors (Appendix B) is comprised of nineteen individuals and supported by several standing committees. Participation on the Board and standing committees is divided among five formal Divisions that compose the entirety of the Water Authority's membership. Members of these institutional bodies are generally directors, managers, or staff of the Member Agencies that express a particular interest or provide a particular skill relative to the body's area of concern (i.e. resource policy, O&M, finance, etc.). Extensive participation by Member Agencies not only informs the Water Authority's actions but provides a feedback loop through which ideas, such as the WIWRP, may be vetted. Additionally, many of these individuals also participate in groups outside the realm of water, such as commodity bargaining associations, governmental associations, redevelopment agencies, planning commissions, and non-profit organizations. Participation in this breadth of organizations provides stakeholders, and thus the Plan, great perspective about and understanding of intricate interests that contribute to the Plan's scope and potential to provide direct and ancillary benefit to the Region and beyond through stakeholder selection of its objectives, RMS, and projects.

12.2 Stakeholder Identification and Involvement

The Water Authority leads the development and update of the WIWRP, and begins the process through a formal Notice of Intent to update the Plan through an announcement of the update and request for project submittals to its member agencies (Appendices E and F). Through connections with its member agencies, regional planning efforts, and member agency participation in planning projects throughout the San Joaquin Valley as a whole, the Water Authority has developed an extensive stakeholder list consisting of water agencies, irrigation districts, cities, federal, state and county representatives, and non-profit organizations (Appendix A). The Notice of Intent and announcements to the stakeholder list help create a public process that provides outreach and opportunities to participate in the Westside-San Joaquin IRWM planning process.

In general, individual project strategies have helped to shape potential stakeholder groups, and it is recognized that projects are successfully implemented only through meaningful stakeholder commitments and support from interested parties. Although, there is no single approach in identifying or soliciting a project's stakeholders, the general approach to Regional outreach ranges from one-on-one communication, conducting project scoping meetings, giving presentations, attending or holding public meetings, and forming formal stakeholder organizations to formalize governance and communication strategies. Interested stakeholders and other interested parties can join the Plan review and/or implementation process at any time regardless of their ability to contribute financially. The Water Authority's website is a tool utilized to provide ease of involvement. Comments can be submitted via the website and people can sign up to receive email updates and meeting notifications. Barriers to involvement include primarily the lack of awareness of IRWM planning. The SLDMWA and its Member Agencies attempt to inform stakeholders and members of the public of the Westside-San Joaquin IRWM planning effort through emails, announcements, and meetings. Any interested party, stakeholder, or member of the public that is interested in participating in the IRWM planning process is welcome to.

Since its original Plan development efforts, the Water Authority has held both formal and informational meetings open to the public, inviting member agencies, potential stakeholders, members of disadvantage communities and interested parties to understand the plan updating purpose, describe the decision making processes, and invite participation and generate ideas and projects. Stakeholders identified are listed below. A variety of stakeholder participation is required in order to create a balance in interest; for example, participation by both water districts and environmental groups allows for all sides of project impacts and benefits to be discussed at the planning-level.

Table 17: Westside-San Joaquin Regional Stakeholders

Category	Participant Name
Irrigation/Water Districts	San Luis Water District Del Puerto Water District Central California Irrigation District Patterson Irrigation District Banta-Carbona Irrigation District Westlands Water District Pleasant Valley Water District
Other Agencies/Authorities	San Luis & Delta-Mendota Water Authority San Joaquin River Exchange Contractors Water Authority
Cities	City of Patterson City of Newman City of Los Banos City of San Joaquin City of Huron City of Firebaugh
Other Communities (including Disadvantaged Communities)	Community of Santa Nella (DAC) Community of San Luis Hills
Other Utilities	Las Deltas Mutual Water Company Stratford Public Utility District
Counties	San Joaquin Stanislaus Merced Fresno Kings
Federal, State and Local Agencies	California Bureau of Reclamation California Department of Water Resources Central Valley Regional Water Quality Control Board
Environmental/Other Groups	TM Ecology Self-Help Enterprise

12.3 Decision Making Process

Stakeholders interact on at least a monthly basis on the administration of the Plan through the Water Authority's administrative mechanisms, which include the O&M Technical Committee, the policy-oriented Water Resources Committee, and the Finance & Administration Committee. These institutions evaluate and synthesize information and offer recommendations to the Board of Directors (which is the ultimate decisional authority) when action is warranted. In addition, ad-hoc working groups and

steering committees are formed, as necessary, to focus on matters of particular expertise, such as the update of this Plan. Board action is not only informed by the Water Authority's standing committees, but also by the institutions the directors represent.

Fully exercising the opportunities to inform and vet the Plan cannot always result in consensus. Stakeholders in any process are routinely confronted with the necessity to make decisions that provide the greatest collective benefit at the exclusion or minimization of a sub-group's interest. These occasions do not necessarily indicate conflict within the larger group but are often more indicative of the sub-group's particular circumstance. In such instances, the acuteness of need can override the sub-group's actions in spite of their support for the larger effort. When such divergence occurs, vigorous multilateral communication is essential to maintaining the effort's full support. The Plan has strived to foster broad, interlaced relationships committed to its progress and resolved to communicate through differences and inevitable periods of strife.

12.4 Outreach to Disadvantaged Communities

A Disadvantaged Community (DAC), according to the State of California (CA Water Code, Section 79505.5(a)), is a community with a Median Household Income (MHI) less than 80 percent of the California statewide median household income. DWR compiled the U.S. Census Bureau's American Community Survey (ACS) data for the period of 2006 to 2010. Based on this data, a community with an MHI of $48,706 or less is considered a DAC.

Within the Westside-San Joaquin Region, all five of counties contained in the Region (San Joaquin, Stanislaus, Merced, Fresno and Kings Counties) have communities that meet the DAC definition and almost the entire Region is considered disadvantaged (see Figure 11 in Chapter 2 Region Description). To promote DAC identification and involvement, the Westside-San Joaquin Region conducted an extensive survey of private and public community representatives to educate and encourage understanding of the IRWM process, to help understand the issues confronted by DACs, and to better address the needs of minority and/or low-income communities. In mid-2009, the Westside-San Joaquin Region conducted a comprehensive review of community water agencies, flood control agencies, and environmental justice organizations within its boundaries. The results of this review were used to develop a list of potential stakeholders for directed further outreach on IRWM issues and targeting DACs. At the end of December, 2009, the Region mailed formal letters to these potential stakeholders requesting participation in a survey to identify water quality, water treatment flood control and water supply needs for disadvantaged communities in the Region. Follow-up contacts were made first by email, and then by telephone, in January of 2010. This effort resulted in:

- Identification of DACs in the Region;
- Development of interest in participating in the IRWM planning process; and
- An initial list of 22 projects that would benefit DACs and low-income communities.

DAC representatives that participated in this initial outreach effort and in recent project list updates include Cities of Newman and San Joaquin, and Stratford Public Utility District.

12.5 Outreach to Native American Communities

According to the U.S. Department of the Interior Indian Affairs, as of March 2014, there are no listed federally-recognized tribes within the Westside-San Joaquin IRWM Region.

Chapter 13 Climate Change

The potential effects of climate change in California are well documented in multiple studies, reports and agencies communications (DWR, 2009; CNRA, 2012; Null, et al, 2010; DWR, 2011) and generally point to increased temperatures, sea level rise (SLR), a reduced winter snowpack, altered precipitation patterns, and more frequent storm events. The purpose of this section is to identify the forecasted climate change impacts specific to the Westside-San Joaquin Region and interpret these changes in climatic and hydrologic variables in terms of the region's vulnerability. This section also describes how the RMSs pursued in the region can be useful as adaptation responses for the areas of vulnerability and how the Region can monitor climate change information relevant to the region in the future. This section of the Westside-San Joaquin Region Integrated Water Resources Plan is not the only one that discusses it. Climate change aspects are relevant for many of the components of this plan (Objectives, Coordination, RMS, etc.) and it is therefore discussed, as applicable, in the respective chapters.

Climate change is a term with a very specific physical meaning – the long-term change in climatic conditions on the planet – but in the context of integrated regional water management, the term has crossover implications in the physical and natural systems, the social and economic activities, and the interaction between stakeholders to plan and implement projects and strategies to accomplish objectives. Several specific aspects of climate change (and terms) are discussed in this section:

- Climate change mitigation refers to reductions in greenhouse gas (GHG) emissions that may result from the implementation of policies, projects, and programs, and are discussed in this chapter when presenting RMSs considered by the Westside-San Joaquin Region
- Climate change adaptation refers to policies, projects and programs that can be used to reduce the vulnerability of the Region to climate change and are discussed in this chapter when presenting RMSs considered by the Westside-San Joaquin Region
- Climate change impacts refers to changes in specific climatic variables and sea level, but also the resulting impacts in specific aspects of the water resources system such as streamflows, snowpack, water temperature, ecosystem stress, etc. Impacts are discussed in this section first as part of the assessment of vulnerability, but also in terms of how the performance of specific projects and RMSs may vary as a result of climate change
- Climate change data refers to data, information, modeling results and forecasts related to specific climate, hydrology and ecology variables of interest to the Region. This is discussed in the vulnerability assessment at the end of the chapter when presenting a general plan for continued data gathering efforts

13.1 Legislative and Policy Context

The climate change elements of this WIWRP need to consider the current legislative, regulatory and policy context. In California, specifically, there are a number of policies and legislations dealing with climate change (mitigation, adaptation, vulnerability assessment). Relevant legislation pieces and resolutions in terms of California's response to climate change have been considered in this plan and are summarized in the next sections.

Executive Order EO S-3-05

EO S-3-05 establishes GHG emission reduction targets for California:

- By 2010, reduce GHG emissions to 2000 California levels
- By 2020, reduce GHG emissions to 1990 California levels
- By 2050, reduce GHG emissions to 80 percent below 1990 California levels

The California Environmental Protection Agency (CalEPA) has established the Climate Action Team (CAT) to coordinate efforts to meet these targets. Specifically relevant to the water sector is the Water-Energy subgroup (also known as WET-CAT) which is tasked with exploring mitigation strategies for energy consumption related to water use.

Assembly Bill 32

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, codifies the mid-term GHG reduction target established in EO S-3-05 and provides further details for those targets. AB 32 identifies the California Air Resources Board (CARB) as the State agency responsible to develop regulations, emission limits and additional measures to meet the limits.

CARB has designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions.

Senate Bill 97 (2007)

Senate Bill 97 (SB 97) directed the Governor's Office of Planning and Research (OPR) to develop Guideline amendments for the California Environmental Quality Act (CEQA) to include the analysis of climate change in the environmental permitting process. The CEQA Guidelines call for lead agencies to determine baseline conditions and levels of significance and to evaluate mitigation measures. The guidelines do not prescribe mitigation measures.

Executive Order S-13-08 (2008)

EO S-13-08 is an executive order with the purpose of advancing California's ability to adapt to climate change and more specifically SLR. It directs a number of State agencies to engage in planning and research efforts to assess the vulnerability of California's transportation system and key coastal infrastructure to different SLR scenarios for the years 2050 and 2100. It also required the CAT (see EO S-3-05 above) to develop state strategies for adaptation in the water sector, ocean and coastal resources, infrastructure, biodiversity, and other areas.

California Ocean Protection Council Resolution

Adopted in March 2011, this resolution directs entities implementing coastal projects to consider SLR vulnerabilities and establishes that state agencies should make decisions regarding coastal and ocean management based upon guiding principles presented in the 2009 California Climate Adaptation Strategy (see below).

California Climate Adaptation Strategy (2009)

The Natural Resource Agency developed the California Climate Adaptation Strategy (2009) in response to EO S-13-08, outlining a set of guiding principles: "California must protect public health and safety and critical infrastructure; California must protect, restore, and enhance ocean and coastal ecosystems, on which our economy and wellbeing depend; California must ensure public access to coastal areas and

protect beaches, natural shoreline, and park and recreational resources; new development and communities must be planned and designed for long-term sustainability in the face of climate change; California must look for ways to facilitate adaptation of existing development and communities to reduce their vulnerability to climate change impacts over time; and California must begin now to adapt to the impacts of climate change. We can no longer act as if nothing is changing."

Twelve key recommendations resulting from the strategy are:

1. Appoint a Climate Adaptation Advisory Panel (CAAP) to assess the greatest risks to California from climate change and to recommend strategies to reduce those risks, building on the Climate Change Adaptation Strategy.
2. Implement the 20x2020 water use reductions and expand surface and groundwater storage; implement efforts to fix Delta water supply, quality and ecosystems; support agricultural water use efficiency; improve statewide water quality; improve Delta ecosystem conditions; and stabilize water supplies as developed in the Bay Delta Conservation Plan.
3. Consider project alternatives that avoid significant new development in areas that cannot be adequately protected from flooding, wildfire, and erosion due to climate change.
4. Prepare, as appropriate, agency-specific adaptation plans, guidance or criteria.
5. For all significant state projects, including infrastructure projects, consider the potential impacts of locating such projects in areas susceptible to hazards resulting from climate change.
6. The CAAP and other agencies will assess California's vulnerability to climate change, identify impacts to state assets, and promote climate adaptation/mitigation awareness through the Hazard Mitigation Web Portal and My Hazards Website, as well as other appropriate sites.
7. Identify key California land and aquatic habitats that could change significantly during this century due to climate change.
8. The California Department of Public Health will develop guidance for use by local health departments and other agencies to assess mitigation and adaptation strategies, which include impacts on vulnerable populations and communities, and assessment of cumulative health impacts.
9. Communities with General Plans and Local Coastal Plans should begin, when possible, to amend their plans to assess climate change impacts, identify areas most vulnerable to these impacts, and develop reasonable and rational risk reduction strategies using the CAS as guidance.
10. State firefighting agencies should begin immediately to include climate change impact information into fire program planning to inform future planning efforts.
11. State agencies should meet projected population growth and increased energy demand with greater energy conservation and an increased use of renewable energy.
12. New climate change impact research should be broadened and funded.

GHG Reporting Rule (2009)

Closely related to SB32 but at the federal level, in September 2009, United States Environmental Protection Agency (USEPA) released the Mandatory Reporting of Greenhouse Gases Rule (74FR56260, Reporting Rule) which requires reporting of GHG data and other relevant information from large sources and suppliers in the United States.

Senate Bill 375 (2008)

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375) aligns with the State's goals to reduce GHG emissions through coordinated transportation and land use planning. Under the Act, CARB sets regional targets for GHG emissions reductions from passenger vehicle use. In 2010, ARB established these targets for 2020 and 2035 for each region covered by one of the State's metropolitan planning organizations (MPO). For the Westside-San Joaquin Region, the corresponding MPOs are the San Joaquin Council of Governments, Stanislaus Council of Governments, Merced County Association of Governments, Madera County Transportation Commission, and the Council of Fresno County Governments. CARB will periodically review and update the targets, as needed.

13.2 Climate Change Projections for the Region

For the WIWRP, two main sources of information have been used to define potential climate change impacts for the region. The first one is the Climate Resilience Evaluation and Awareness Tool (CREAT) tool developed by the USEPA, from which specific temperature and precipitation forecasts are available with geographic specificity. The second source of information is a study on hydrologic response and watershed sensitivity to climate change for the watersheds of the Sierra Nevada, published in 2010 (Null et. al., 2010). The importance of the hydrologic response study is that the climate variables of temperature and precipitation have been used as inputs to mechanistic hydrology models that forecast watershed impacts. The following sections describe the CREAT results and the analysis by Null et. al.

CREAT Results

The Climate Resilience Evaluation and Awareness Tool (CREAT) is a risk assessment- and scenario-based planning application for utilities in United States. Developed by USEPA, it contains basic national and regional climate science information, and has the ability to access data for specific geographic locations with comparisons of temperature and precipitation under mid-term and long-term conditions using different sets of predictions.

The most significant watersheds for the Westside-San Joaquin Region are the western-slope Sierra Nevada watersheds of the Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. CREAT results were generated for an area in the Kings River headwaters and in the Tuolumne River headwaters (southern-most, mid/northern). Table 18 shows the predicted change in annual temperature and precipitation forecasted for the year 2060 for a global circulation model (GCM) with a hot and dry tendency (worst-case projections).

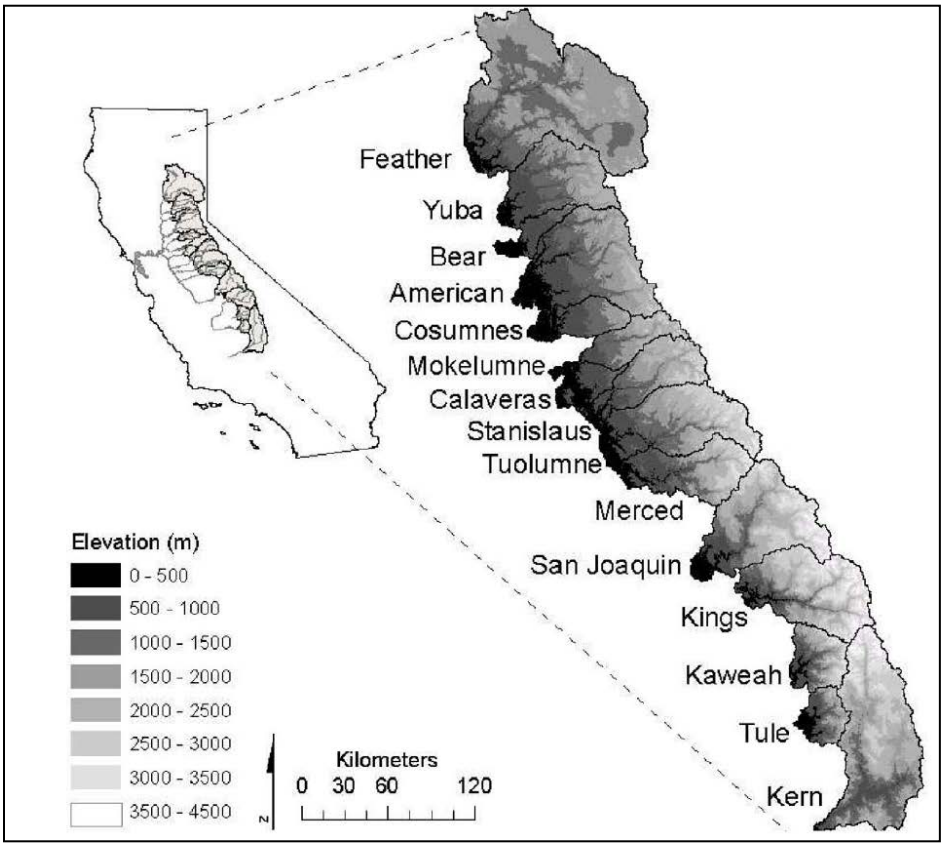
Table 18: Changes in Temperature and Precipitation (CREAT Results, 2060 Prediction)

Watershed	Average Temperature Difference	Annual Precipitation Difference	Storm Intensity Difference for 10-Year Storm
Kings River	+5.09 ^{o}F	-6.74 in.	+0.61 in./day
Tuolumne River	+4.95 ^{o}F	-7.05 in.	+0.91 in./day

The seasonality of precipitation changes from CREAT database models indicates that most of the precipitation differences would occur in the winter months, which is to be expected given the precipitation trends in California (e.g. wet season in winter).

Hydrology Impacts and Watershed Sensitivity

While the forecasted results in temperature and precipitation give an idea of how the local weather is expected to change on average, it is necessary to translate those changes into impacts on water resources systems. The study *Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada* (Null, et. al., 2010) assessed the differential hydrologic responses to climate change of 15 west-slope Sierra Nevada watersheds. Figure 14 shows the watersheds evaluated in the 2010 study. The Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers, which correspond to the most significant watersheds for the Westside-San Joaquin Region, are all included in the analysis.



Source: Null et al, 2010.

Figure 14: West-Slope Sierra Nevada Watersheds Studied

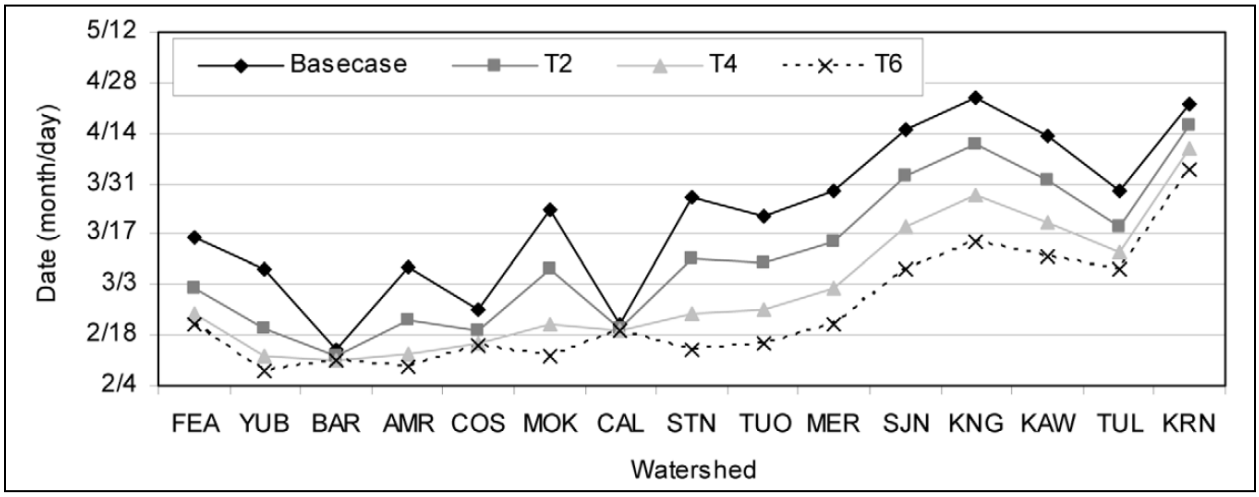
The study of hydrologic response and watershed sensitivity is based on a mechanistic hydrology model developed in WEAP21 (Water Evaluation and Planning model, developed by Stockholm Environmental Institute) to simulate intra-basin hydrologic dynamics given the climate variables. A weakness of the study is the fact that the precipitation used in the model is actual historical data as opposed to predicted precipitation from GCMs. The modeled period of 1981 to 2001, however, includes a wide range of climatic variability including the wettest year on record, the flood year of record and a prolonged drought, 1983, 1997, and 1988-1992, respectively. In terms of temperature, incremental climate warming alternatives were developed with uniform increases in air temperature of 2°C, 4°C, and 6°C (T2, T4 and T6, respectively) to evaluate impacts on regional water systems. For each scenario, the model produced simulated hydrology sequences and computed mean annual flow (MAF), centroid timing (CT) and low-flow duration (LFD) for each of the watersheds in the study.

Results of modeling the 15 watersheds indicated that increases in temperature generally result in lower MAF. A summary of the reduction in average annual flow for the relevant watersheds contributing flows to the Westside-San Joaquin Region is presented in Table 19. Reductions in MAF could have significant implication for the ability to meet demands for agricultural, urban and environmental water uses.

Table 19: Modeled Mean Annual Flow (MAF) for Watersheds and Temperature Scenarios

Watershed	Annual Average Flow (mcm)				Change from Base Case (%)		
	Base Case	*T2*	*T4*	*T6*	*T2*	*T4*	*T6*
Stanislaus	1,561	1,523	1,482	1,435	-2.4	-5.1	-8.1
Tuolumne	2,445	2,401	2,354	2,304	-1.8	-3.7	-5.8
Merced	1,348	1,308	1,272	1,237	-3.0	-5.6	-8.2
San Joaquin	2,294	2,265	2,235	2,201	-1.3	-2.6	-4.1
Kings	2,117	2,094	2,070	2,041	-1.1	-2.2	-3.6

In California climate change predictions, the timing of stream flows is consistently shown to be an element with considerable impact, affecting the management of surface water reservoirs for both flood control and water supply. The study by Null et. al. (2010) evaluated the runoff centroid timing (CT), which is the date at which the total annual runoff at the outlet of each watershed has passed. CT is mostly driven by snowmelt, which is of course driven by temperature. Results of the study for all of the 15 watersheds modeled are presented in Figure 15.



Source: Null et. al., 2010 – Figure 6, page 8
Base case – baseline scenario
T2 – 2°C temperature increase
T4 – 4°C temperature increase
T6 – 6°C temperature increase

FEA – Feather
YUB – Yuba
BAR – Bear
AMR – American
COS – Cosumnes

MOK – Mokelumne
CAL – Calaveras
STN – Stanislaus
TUO – Tuolumne
MER – Merced

SJN – San Joaquin
KNG – Kings
KAW – Kaweah
TUL – Tule
KRN – Kern

Figure 15: Average Centroid Timing by Watershed and Climate Scenario

The results in Figure 15 are presented with the label for each watershed in the x-axis in the order of north to south. The y-axis presents the CT (date). The relevant watersheds for the Westside-San Joaquin Region are labeled as follows:

Stanislaus – STN

Tuolumne – TUO

Merced – MER

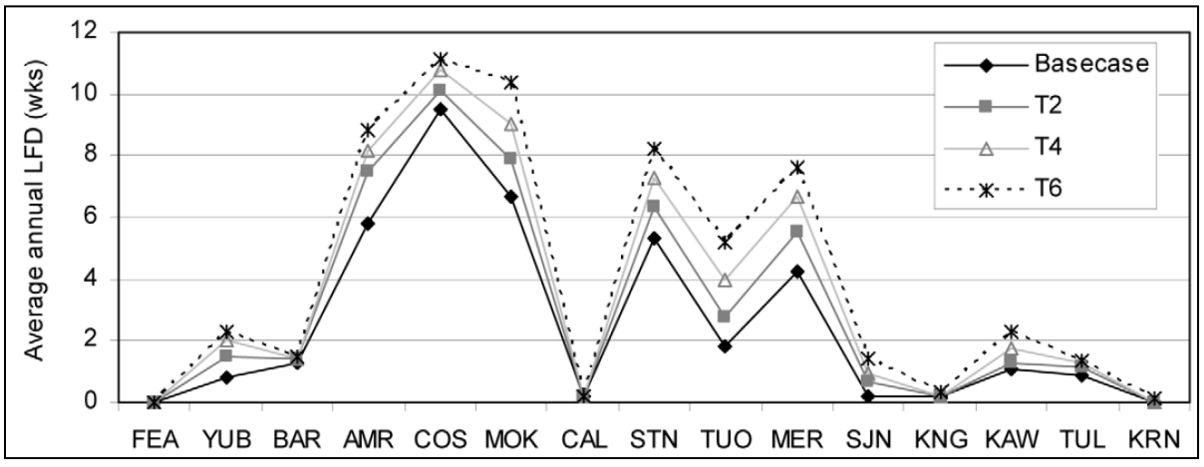
San Joaquin – SJN

Kings - KNG

The results show significant changes in CT as indicated by the separation of the lines from base case to T2, T4, and T6. The minimum difference in CT is for the scenario with a 2°C increase in temperature, which is about a 2-week change of in CT. The difference with T6 is over one month, indicating that the flows would arrive to the Region about more than a month earlier due to earlier snowmelt. This could have significant implications for water management in the Region. The watersheds of interest have very similar impacts in CT mostly due to the fact that they have similar proportion of areas of high and lower elevations. Areas of high elevations are more susceptible to hydrology changes due to temperature increase given that these are snowpack-driven watersheds.

A third variable simulated in the Null et. al. (2010) study is low flow duration (LFD). LFD is the number of weeks with "low flow" conditions and, in this case, "low flow" has been defined as periods of at least three weeks where weekly discharge divided by total discharge for the water year is less than 1%. Although this definition of low flow is not specifically related to a regulatory basis, it does represent a flow condition that can stress a water supply system and aquatic habitat.

The results of modeling simulating changes in CT are presented in Figure 16 with the label for each watershed in the x-axis in the order of north to south. The y-axis presents the number of weeks under low flow conditions (average over the hydrology years simulated).



Source: Null et. al., 2010 – Figure 8, page 9
Base case – baseline scenario
T2 – 2°C temperature increase
T4 – 4°C temperature increase
T6 – 6°C temperature increase

FEA – Feather
YUB – Yuba
BAR – Bear
AMR – American
COS – Cosumnes

MOK – Mokelumne
CAL – Calaveras
STN – Stanislaus
TUO – Tuolumne
MER – Merced

SJN – San Joaquin
KNG – Kings
KAW – Kaweah
TUL – Tule
KRN – Kern

Figure 16: Average Number of Low Flow Weeks by Watershed and Climate Scenario

For the relevant watersheds for the Westside-San Joaquin Region (Stanislaus, Tuolumne, Merced, San Joaquin and Kings), the results show changes in LFD for the Stanislaus, Tuolumne and Merced Rivers as indicated by the separation of the lines from base case to T2, T4, and T6. The minimum difference in LFD is for the scenario with a 2°C increase in temperature, which is about one more week of LFD. Changes are much less significant for the San Joaquin and Kings Rivers. It is also relevant to mention that the estimated LFD in this case are specifically for the rivers in a geographic location outside the Westside-San Joaquin Region. The low flows in these locations, however, will be likely correlated with lower flows downstream in areas within the Westside-San Joaquin Region.

Sea Level Rise (SLR)

Even though the Westside-San Joaquin Region is not a coastal region, it is dependent on the Central Valley Project (CVP) for water supply to a large extent. Disruptions in the overall operation of the CVP can result in impacts to all CVP contractors. This makes SLR a relevant, climate change-driven factor to consider in terms of vulnerability. The following section, where the vulnerability of the region is discussed, will include a description of the relevance of SLR to water supply for the Westside-San Joaquin Region. Table 20 presents assessments of potential SLR in the Delta region.

Table 20: Sea Level Rise Projections for San Francisco and Delta Region (2050)

Projection	Range
28.0 ± 9.2 cm	12.3-60.8 cm
11.0 ± 3.6 in	4.84-23.9 in

Source: NRC, 2012. Projected sea levels are increases in mean sea level for the year 2000

13.3 Westside-San Joaquin Region Vulnerability

The vulnerability of the Region has been assessed using the comprehensive characterization in the Region Description chapter of this plan, and using the studies referenced so far for California-wide predictions and specifically for areas relevant or within the Westside-San Joaquin Region. The different sectors of the water resources systems in the Region were assessed using the Department of Water Resources (DWR's) *Climate Change Handbook for Regional Water Planning* as a guideline. The following sections describe the areas of vulnerability that are also summarized in Table 21.

Table 21: Westside-San Joaquin Region Vulnerability to Climate Change

Area of Vulnerability	Summary
Water Demands	A large percentage of the water demand in the Westside-San Joaquin Region is driven by irrigation. Higher temperatures will drive evapotranspiration rates. This is applicable not only to agricultural demands (although that is the most significant impact), but also to outdoor demands in urban areas in the Region.
Water Supply	The Region is highly dependent on surface flows that are vulnerable to decreased precipitation and snowpack in the Sierra Nevada. The water management system in the Region, and intra-regionally, relies heavily in surface storage, including snowpack in the Sierras. The balance of water storage to snowpack is vulnerable with earlier snowmelt and more intense short-duration events. More extended and potentially more frequent droughts exacerbate vulnerability, compounding the supply vulnerability and resulting in expected higher demands in agricultural and urban areas.
Water Quality	Surface water quality is vulnerable due to several factors including the low flow duration, an expected reduction meadows and a potential increase in storm intensity with short-term turbidity effects. Groundwater quality can also be vulnerable due more pressure on aquifers to offset surface supply shortages creating overdraft conditions. Wildfires are expected to be more likely with post-event impacts to surface water quality.
Flood Management	Flood management is vulnerable to the changes in the balance of storage to streamflow triggered by earlier snowmelt. More intense storms are also predicted while meadow area may be reduced, eliminating a natural peak flow reduction mechanism.
Ecosystem and Habitat	Some terrestrial habitats will be vulnerable to increases in the frequency of wildfires, but the higher vulnerability may be in aquatic habitat due to changes in runoff timing and increased low flow periods and droughts. Higher water temperatures can also degrade water quality and stress aquatic species of interest.

These areas of vulnerability were discussed among the Westside-San Joaquin Region stakeholders and prioritized to help identify those areas members felt were important to address first. The ranking of these vulnerabilities were as follow:

High Priority (address first) – water supply, water quality and flood management vulnerabilities

Lower Priority (medium- to long-term solutions) – water demands and ecosystem/habitat vulnerabilities

Water Demands and Supply

The correlation between temperature and water demand for irrigation is well documented and understood. In the Westside-San Joaquin Region, about 800,000 acres are partially or solely irrigated with CVP water (depending on water availability conditions). Thus the largest percentage of the water demand is driven by agricultural irrigation, and higher temperatures will drive evapotranspiration rates, increasing demands. This is applicable not only to agricultural demands (although that is the most significant impact), but also to outdoor demands in urban areas in the region.

In terms of environmental demands, Section 3406(d)(1) of the CVPIA requires firm water supplies to be delivered to federal, state and some private wildlife refuges, as defined in the Central Valley Project

Improvement Act (CVPIA). Historically, the wetlands throughout the region received water from the San Joaquin River. Following development of the CVP, most of the refuges received irrigation tail water for much of their supply, until the CVPIA required firm water supplies of suitable quality to maintain and improve wetland habitat. This specific demand and other habitat-related demands may not increase, but will continue to stress water supply under climate change conditions.

Compounded with increases in demands is the fact that supply is projected to be vulnerable to climate change impacts. Reduced annual precipitation and the timing of that precipitation combined with higher temperatures will result in new seasonality of flows due to earlier snowmelt in the Sierra Nevada. Section 1.2 described the specific hydrology impacts for the Westside-San Joaquin Region.

Reduced surface water supplies could trigger a reduction in agricultural water use, resulting in a corresponding increase in groundwater use. This, in turn, may result in groundwater elevation declines such that infiltration from rivers to groundwater occurs, resulting in a groundwater-base flow disconnect. Many of the water users in the Region rely on groundwater on a permanent, seasonal or dry-year basis, and overall stresses in surface water make groundwater in the Tracy, Delta-Mendota and Westside subbasins susceptible to overdraft.

CVP Supply

Disruptions in the overall operation of the CVP can result in impacts to all CVP contractors, and some critical elements of the CVP are vulnerable to sea level rise in terms of salinity impacts. A rising sea level will impact the Delta by increasing the risk of overtopping and other forms of levee failure, and by increased saline/brackish tidal pressure, which if not countered by increases in freshwater outflows, will lead to higher salinity intrusion and higher salinity levels in the Delta.

The CVP's Jones Pumping Plant is located in the southwestern edge of the Delta and lifts water into the Delta-Mendota Canal, which travels southward to the Mendota Pool, supplying water along the way to other CVP reservoirs. Increased salinity levels at the plant due to a levee failure (with higher consequences exacerbated by SLR) could require a temporary stop in diversions to the CVP as, even though irrigation canals are not subject to drinking water regulations, agricultural users are sensitive to water quality, depending on the types of crop being grown. There are no set thresholds for salinity, bromide, or other constituents at which the Jones Pumping Plant would cease operations, but a significant increase in salinity in the vicinity of the pumping plants intakes could result in CVP disruption with impacts to the Westside-San Joaquin Region.

Water Quality

Surface water quality is vulnerable due to several factors, including larger periods of low flows, more frequent and intense droughts, and higher water temperature that can reduce dissolve oxygen concentrations. The vulnerability of meadows, even though the largest areas are geographically outside the Westside-San Joaquin Region, can have consequences in water quality since natural vegetation removes pollutants and/or prevent them from entering streams. Wildfires are expected to be more likely with post-event impacts to surface water quality also. A potential increase in storm intensity could also trigger short-term turbidity increases. These surface water negative impacts also affect habitat vulnerability, described below, by reducing or degrading suitable habitat.

Groundwater quality can also be vulnerable due more pressure on aquifers to offset surface supply shortages developing a need for deeper wells or shallower wells with lower water quality than currently produced. Overdraft conditions may persist for longer periods not allowing the basins to recover during periods of wet hydrology, with consequences for lower water quality. Increase pumping of deeper,

higher quality groundwater can result in increased vertical gradients, with poorer quality shallow groundwater migrating to and impacting the deeper zones.

Flood Management

A majority of the San Joaquin River's 100-year floodplain (in the stretch of the San Joaquin River at the geographic edge of the Westside-San Joaquin Region) is within the Region. The vulnerability of the region to floods is not just theoretical since there have been, in relatively recent past, critical flooding events with great consequences for the economy, infrastructure, assets and residents. These historical floods have been triggered by high peak flows due to high-intensity storms and/or rapid snowmelt at the Sierra Nevada foothills triggered by tropical storms. As described in Section 1.2, it is expected that more intense storms could result from climate change. The Westside-San Joaquin Region is vulnerable to changes in the balance of storage to streamflow triggered by earlier snowmelt under climate change conditions, and more intense storms are predicted while meadow area may be reduced, eliminating a natural peak flow attenuation mechanism.

Ecosystem and Habitat

There are a number of natural areas in the San Joaquin Valley that, while scattered throughout the region, provide concentrated areas of grasslands and habitats, such as freshwater marshes, valley sink scrub, and grassland vernal pool habitats. Some terrestrial habitats can be vulnerable to increase frequency of wildfires, but higher vulnerability exists for aquatic habitat due to changes in runoff timing and increased low flow periods and droughts. Increases in water demands and reductions in overall water supplies will add a significant water management challenge for the Region in protecting habitats under increased competition for limited supply, particularly in dry years. Higher water temperatures can also degrade water quality and stress aquatic species of interest.

Prioritizing Vulnerabilities

The Westside-San Joaquin Region has not coordinated an effort to explicitly and formally prioritize the vulnerabilities described above. The majority of the projects included in this WIWRP are related to, or have important components of, water supply, reflecting the Region's views on the importance of addressing water supply needs today and into the future. And while a key regional objective, this WIWRP also has strong statements relating to flood management and environmental stewardship.

13.4 Enhancing the Region's Adaptive Capacity

The Westside-San Joaquin Region has been collaborating on planning and program and project implementation efforts for many years. Regional planning has been the primary forum to address regional issues and conflicts, and this WIWRP is a new effort to address some urgent concerns. This WIWRP distinguishes itself from previous regional planning efforts in the Westside-San Joaquin Region in that a formal assessment of climate change impacts and vulnerability has been performed, and RMSs are discussed in the context of climate change adaptation and mitigation. 0 includes a discussion on climate change considerations for the strategies. In many cases, an RMS applicable to the Region has the potential to mitigate climate change impacts by reducing GHG emissions, and in many cases, the RMSs can be used to adapt to climate change impacts, reducing the Region's vulnerability. The RMSs are presented in Table 22 with references to the vulnerability areas in which they can increase the regions resiliency.

13.5 Plans for Future Data Gathering

The general strategy for climate change data gathering is to align this specific data collection need with the overall data management process for the Region. As part of IRWM project implementation, different types of data will be collected to track project performance and meet monitoring program requirements. Variables relevant to climate change will be combined with data collection processes and ongoing programs to minimize duplication of efforts.

Table 22: RMS Applicability to Climate Change Adaptation for Westside-San Joaquin Region

RMS	Vulnerability Area RMS Helps Support	RMS	Vulnerability Area RMS Helps Support
Agricultural Water Use Efficiency	WS, WD	Matching Quality to Use	WS, WD
Urban Water Use Efficiency	WS, WD	Pollution Prevention	WS, WQ, H
Conveyance – Delta		Salt and Salinity Management	WS, WQ, H
Conveyance – Regional/Local	WS, WD, WQ, FM, H	Urban Runoff Management	WS, FM, WQ, H
System Reoperation	WS, WQ	Agricultural Lands Stewardship	WD, WQ, H
Water Transfers	WS, WD	Economic Incentives (Loans, Grants, and Water Pricing)	WS, WD, WQ, FM, H
Conjunctive Management and Groundwater Storage	WS, WQ	Ecosystem Restoration	WQ, H
Desalination	WS, WQ	Forest Management	WS, WQ, H
Precipitation Enhancement	WS	Land Use Planning and Management	WS, WD, WQ, FM, H
Recycled Municipal Water	WS, WQ	Recharge Area Protection	SW, WQ, H
Surface Storage – CALFED		Water-Dependent Recreation	WQ, H
Surface Storage – Regional/Local	WS, FM, H	Watershed Management	WS, WD, WQ, FM, H
Drinking Water Treatment and Distribution	WS	Flood Risk Management	FM, H
Groundwater Remediation / Aquifer Remediation	WS, WQ	Outreach and Engagement	WS, WD, WQ, FM, H
Sediment Management	WQ, H	Water and Culture	WS, WD, WQ, FM, H

WS: Water Supply
WD: Water Demand
WQ: Water Quality
FM: Flood Management
H: Habitat

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USBR. 2005. *Public Draft, Central Valley Project, West San Joaquin Division, San Luis Unit, Long-Term Water Service Contract Renewal Environmental Impact Statement and Appendices*. September.

Appendix A: Westside-San Joaquin Regional Stakeholder Contact List

Westside-San Joaquin IRWM Stakeholder List

Name	Affiliation	Email Address
Allen Lagarbo	City of Modesto	Alagarbo@modestogov.com
Amy Montgomery	Santa Nella Community Water District	amontgomery@sncwd.com
Anthony Chavarria	City of Firebaugh	achavarria@ci.firebaugh.ca.us
Ara Azhderian	San Luis & Delta-Mendota Water Authority	ara.azhderian@sldmwa.org
Bill Jacoby		Billjjacoby@aol.com
Bobby Pierce		RobertPierce@gvni.com
Bre Slimick	Self Help Enterprises	bres@selfhelpenterprises.org
Chase Hurley		chase@hmrd.net
Chris Linneman	Summers Engineering, Inc.	linneman@summerseng.com
Chris White	Central California irrigation District	cwhite@ccidwater.org
Cruz Ramos		cruzramos@kermantel.net
Dan Nelson	San Luis & Delta-Mendota Water Authority	dan.nelson@sldmwa.org
Dan Pope	Westlands Water District	dpope@westlandswater.org
Danielle Sotelo	City of Heron	sotelo@californiaconsulting.org
Danny Wade	Tranquility Irrigation District	danny@trqid.com
Dave Kaiser		dkaiserbv@hotmail.com
David Weisenberger		bcid@inreach.com
Dennis Falaschi		dfalaschi@aol.com
Diana Brooks	City of San Joaquin	dianabrooks@cityofsanjoaquin.com
Diane Rathmann		drathmann@aol.com
Doug Heald	City of Kerman	dhearld@cityofkerman.org
Eric Osterling	Kings River Conservation District	eosterling@krcd.org
Ernest Taylor	Department of Water Resources	etaylor@water.ca.gov
Ernie Garza	City of Gustine	egarza@cityofgustine.com
Frances Mizuno	San Luis & Delta-Mendota Water Authority	frances.mizuno@sldmwa.org
Garner Reynolds	City of Turlock	greynolds@cityofnewman.com
Greg Farley	Department of Water Resources	sfarley@water.ca.gov
James Nelson	Storm Water Consulting, Inc.	jnelson@stormwaterconsulting.com
Jeannie Habben	Chowchilla-Red Top Resource Conservation District	info@cfwatershed.org
Jeff Bryant		bryant_jeff@sbcglobal.net
Jeff Mitchell	UC Davis	jpmitchell@ucdavis.edu
Jessica Wright	Grassland Water District	jwright@gwdwater.org
Jim Miller		jimmiller1709@att.net
Joe McGahan	Summers Engineering, Inc.	jmcgahan@summerseng.com
John Beam		jabenvironmental@gmail.com
John Mallyon		jmallyon@hughes.net
Jon Rubin	San Luis & Delta-Mendota Water Authority	Jon.Rubin@sldmwa.org
Jose Guiterrez	Westlands Water District	jgutierrez@westlandswater.org
Kaomine Vang	CSU Fresno	kaominev@csufresno.edu
Kathy Wood McLaughlin		kwoodmclaughlin@gmail.com
Keith Wallace	Department of Water Resources	kawallac@water.ca.gov
Laurel Firestone	Community Water Center	laurel.firestone@communitywatercenter.org
Liz Reeves	Tranquility Irrigation District	liz@trqid.com
Lon Martin	San Luis Water District	lonmartin@att.net
Marcos Hedrick	Panoche Water District	mhedrick@panochewd.org
Maria Herrera	Community Water Center	maria.herrera@communitywatercenter.org
Mark Fachin	City of Los Banos	mark.fachin@losbanos.org
Mark Horne	Cardno	Mark.Horne@cardno.com
Martin McIntyre		mcintyre.martin@gmail.com
Melissa Whitten		mel@aim.com
Mica Nitschke (Home)		micanitschke@gmail.com
Michelle Dooley	Department of Water Resources	mmdooley@water.ca.gov
Mike Willett	City of Patterson	MWillett@ci.patterson.ca.us

Name	Affiliation	Email Address
Monica Reis	Department of Water Resources	mreis@water.ca.gov
Nicholas Pinhey	City of Modesto	pinhey@modestogov.com
Orvil McKinnis Jr.	Westlands Water District	omckinnis@westlandswater.org
Palmer McCoy		pmccoy@hmrd.net
Paul Ashby	Adams Ashby Group	pashby@adamsashbygroup.com
Paul Boyer	Self Help Enterprises	PaulB@selfhelpenterprises.org
Peter Rietkerk	Patterson Irrigation District	prietkerk@PattersonID.org
Phil McMurray	Linneman Law Ofices	pmcmurray@linnemanlaw.com
Randy Houk		rghccc@sbcglobal.net
Ric Ortega	Grassland Water District	rortega@gwdwater.org
Richard Moss	Provost & Prichard Consulting Group	rmoss@ppeng.com
Rick Gilmore	Byron Bethany Irrigation Distrit	r.gilmore@bbid.org
Rod Stiefvater	SpecCrop	RStiefvater@speccrop.com
Roger Masuda	California Water Law	rmasuda@calwaterlaw.com
Russ Freeman	Westlands Water District	rfreeman@westlandswater.org
Sarge Green	CSU Fresno	sgreen@csufresno.edu
Steve Bayley	City of Tracy	steveb@ci.tracy.ca.us
Steve Fausone	Red Fern Ranch	stevef@redfernranches.com
Steve Kaiser		stevekaisers@aol.com
Steve Sloan		corinasks@yahoo.com
Susan Mussett	San Luis & Delta-Mendota Water Authority	susan.mussett@sldmwa.org
Tom Glover	Westlands Water District	tglover@westlandswater.org
Tony Whitehurst		arwhitehurst@sbcglobal.net
Tracey Rosin	Central California irrigation District	trosin@ccidwater.org
Trevor Joseph	Department of Water Resources	tjoseph@water.ca.gov
Veronica Woodruff	Grassland Water District	veronica@grasslandwetlands.org
Vince Roos		vroos@intersectlogic.net
Anthea Hansen	Del Puerto Water District	ahansen@delpuertowd.org

Appendix B: SLDMWA Member Agencies and Board of Directors

Appendix B – SLDMWA Member Agencies and Board of Directors

San Luis Delta-Mendota Water Authority Member Agencies by Division

Division 1: Delta Division – Upper DMC

1) Banta-Carbona Irrigation District
2) Byron-Bethany Irrigation District
3) City of Tracy
4) Del Puerto Water District
5) Patterson Irrigation District
6) Westside Irrigation District
7) West Stanislaus Irrigation District

Division 2: San Luis Unit – SLC

8) Panoche Water District
9) Pleasant Valley Water District
10) San Luis Water District
11) Westlands Water District

Division 3: Exchange Contractors and Refuges

12) Central California Irrigation District
13) Columbia Canal Company
14) Firebaugh Canal Water District
15) Grassland Water District
16) Henry Miller Reclamation District #2131

Division 4: San Felipe Division

17) San Benito County Water District
18) Santa Clara Valley Water District

Division 5: Delta Division – Lower DMC & Mendota Pool

19) Broadview Water District
20) Eagle Field Water District
21) Fresno Slough Water District
22) James Irrigation District
23) Laguna Water District
24) Mercy Springs Water District
25) Oro Loma Water District
26) Pacheco Water District
27) Reclamation District 1606
28) Tranquillity Irrigation District
29) Turner Island Water District

San Luis Delta-Mendota Water Authority Board of Directors

OFFICERS:
Michael Stearns, Chairman
Vacant, Vice Chairman
Tona Mederios, Treasurer/Auditor
Daniel G. Nelson, Secretary
Dennis Falaschi, Assistant Secretary

Division 1:
James McLeod, Director, Banta-Carbona ID
David Weisenberger, Alternate, Banta-Carbona ID

Bobby Pierce, Director, West Stanislaus I.D.
David Kaiser, Alternate, Westside ID

Anthea Hansen, Director, Del Puerto WD
Earl Perez, Alternate, Del Puerto WD

Rick Gilmore, Director, Byron Bethany ID/CVPSA
Peter Rietkerk, Alternate, Patterson ID

Division 2:
Don Peracchi, Director, Westlands WD
Jason Peltier, Alternate, Westlands WD

Sarah Woolf, Director, Westlands WD
Jason Peltier, Alternate, Westlands WD

John Bennett, Director, Panoche WD
Dennis Falaschi, Alternate, Panoche WD

Chris Hurd, Director, San Luis WD
Martin McIntyre, Alternate, San Luis WD

Division 3:
Michael Stearns, Director, Firebaugh CWD
Jeff Bryant, Alternate, Firebaugh CWD

James O'Banion, Director, Central California ID
Chris White, Alternate, Central California ID

James Nickel, Director, Henry Miller R.D. 2131
Randy Houk, Alternate, Columbia CC

Ric Ortega, Director, Grassland WD
Mike Gardner, Alternate, Grassland WD

Division 4:
Richard Santos, Director, Santa Clara Valley WD
Cindy Kao, Alternate, Santa Clara Valley WD

Dennis Kennedy, Director, Santa Clara Valley WD
Joan Maher, Alternate, Santa Clara Valley WD

John Tobias, Director, San Benito County WD
Jeff Cattaneo, Alternate, San Benito County WD

Joseph Tonascia, Director, San Benito County WD
Jeff Cattaneo, Alternate, San Benito County WD

Division 5:
Bill Pucheu, Director, Tranquility ID
Berj Moosekian, Alternate, Pacheco WD

Tom Birmingham, Director, Broadview WD
Dave Ciapponi, Alternate, Broadview WD

John Mallyon, Director, James ID
Thomas W. Chaney, Alternate, James ID

Appendix C: Water Supply Gap Analysis Data

WESTSIDE AGRICULTURAL CONTRACTOR DATA

TABLE A-1
Acreage and Water Supplies for Westside Agricultural Water Service Contractors

		Service Contractors[1]				
Agricultural/M&I Contractors	**Contract No.**	**2025 Acres**	**1999 Acres**	**Local Surface Supply**	**Ground Water**	**Total Project Water Quantity**
Banta Carbona ID	4305A-LTR1	15,500	14,461	29,770	230	25,000
Broadview WD	8092IR3	8,163	8,960	0	0	26,980
Centinella WD	W0055IR8	940	460			2,500
Del Puerto WD	922-LTR1	44,750	38,422	0	3,000	140,198
Eagle Field WD	7754IR3	777	1,242			4,560
Laguna WD	W0266IR3	400	393			800
Mercy Springs WD – partial [3]	3365IR8A	2,223	1,580	0	0	7,040
Santa Clara Valley WD, Pajaro Valley WMA, & Westlands WD [3]	3365IR8B	0	0	0	0	6,260
Oro Loma WD	7823IR3	767	1,003			4,600
Pacheco WD – DMC & SLU	W0469	3,768	4,070	4,400	0	10,000
Panoche WD – DMC & SLU	7864A	37,361	36,197	0	0	93,900
Byron Bethany Irrigation District (CVP)	785IR10	2,961	4,523	0	0	20,180
San Benito County WC & FCD	W0130	25,700	25,317	0	4,000	35,550
San Luis WD – DMC & SLU	7773A	41,744	42,932	0	5,000	124,500
Santa Clara Valley WD [2]	W0023	26,177	37,757	34,350	35,675	33,100
The Westside ID	W0045-LT1	6,399	6,243	24,000	0	5,000
Westlands WD	495A & 106-E	606,100	545,847	0	175,000	1,143,695
West Stanislaus ID	1072-LTR1	25,600	26,493	45,000	5,000	50,000
Widren WD	8018IR3	835	423	0	0	2,990
Total		**850,165**	**796,323**	**137,520**	**227,905**	**1,736,853**

[1] Data from Stoddard and Associates.
[2] Agricultural water source is primarily groundwater. SCVWD augments natural recharge with a managed recharge program utilizing both local runoff and imported water supplied. Only 23,425 AF of groundwater and 22,271 AF of surface water are available in a Critical Dry year.
[3] Acres and local water supplies for SCVWD and WWD have already been included under Contracts W-0023 and 495A, respectively.

TABLE A-2
Acreage and Water Supplies for Westside Agricultural Water Rights Settlement Contractors

Water Rights Settlement Contractors[1]								
Contractor	**Contract No.**	**2025 Acres**	**1999 Acres**	**Local Surface Supply (AF)**	**Ground Water (AF)**	**Project Water (AF)**	**Water Rights (non-Project) (AF)**	**Total Water (AF)**
Coelho Family Trust – Partial	7859A	2,250	1,008			2,080	1,332	3,412
Dudley & Co. (Marchini Farms)	4448A					0	2,280	2,280
Fresno Slough WD	4019A	1,215	1,027			4,000	866	4,866
Hughes MD and M	3537A					70	93	163
James ID	700A	23,000	23,665	9,700	12,000	35,300	9,700	45,000
Patterson ID	3598AIR3	13,466	14,706	23,000	2,000	16,500	6,000	22,500
Recl. District No. 1606	3802A	170	120			228	342	570
Tranquillity ID	701ALTR1	9,270	9,366	20,200	2,000	13,800	20,200	34,000
Totals		**49,371**	**49,892**	**52,900**	**16,000**	**71,978**	**40,813**	**112,791**

[1] Agricultural water rights settlement contractors having both a project and non-project supply.

TABLE A-3
Westside Crop Mix by District and by Sub-region, 1999 Acreage

CVP Region Contractor	Hay and Pasture	Field Crops	Vegetables	Melons	Fruits	Sugar Beets or Cotton	Nuts	Sum
San Luis Unit								
San Luis WD-DMC	2,216	5,306	5,261	4,858	3,855	12,061	9,375	42,932
Pacheco WD-DMC	279	90	1,101	1,240	0	1,360	0	4,070
Panoche WD-DMC	3,364	4,161	8,799	4,937	653	13,689	594	36,197
Westlands WD	15,250	91,967	158,809	17,944	17,982	210,752	33,143	545,847
San Luis Sub Total	21,109	101,524	173,970	28,979	22,490	237,862	43,112	629,046
Percent	3%	16%	28%	5%	4%	38%	7%	100%
Southern DMC								
Eagle Field WD	309	250	134	0	0	549	0	1,242
Laguna WD	76	0	0	0	0	317	0	393
Fresno Slough WD	0	688	13	0	0	326	0	1,027
Broadview WD	0	1,862	1,148	795	0	5,155	0	8,960
Widren WD	0	336	0	0	0	87	0	423
Oro Loma WD	0	839	0	0	0	164	0	1,003
Mercy Springs WD	786	374	0	0	0	420	0	1,580
James ID	131	9,329	1,481	140	382	11,433	769	23,665
Coelho Family Trust	0	0	0	0	310	698	0	1,008
Tranquillity ID	118	2,492	581	0	0	6,145	30	9,366
South DMC Sub Total	1,420	16,170	3,357	935	692	25,294	799	48,667
Percent	3%	33%	7%	2%	1%	52%	2%	100%
Northern DMC								
Banta-Carbona ID	1,953	2,969	3,669	366	1,217	302	3,985	14,461
Centinella WD	40	35	0	0	0	0	385	460
Del Puerto WD	3,526	3,754	8,855	1,380	5,398	80	15,429	38,422
Patterson WD	4,870	4,099	2,388	17	2,184	54	1,094	14,706
Byron Bethany Irrigation District (CVP)	2,990	445	472	122	377	0	117	4,523
Westside ID	3,676	1,006	806	0	20	669	66	6,243
West Stanislaus ID	1,798	5,010	12,368	767	3,183	0	3,367	26,493

TABLE A-3
Westside Crop Mix by District and by Sub-region, 1999 Acreage

CVP Region Contractor	Hay and Pasture	Field Crops	Vegetables	Melons	Fruits	Sugar Beets or Cotton	Nuts	Sum
North DMC total	18,853	17,318	28,558	2,652	12,379	1,105	24,443	105,308
Percent	18%	16%	27%	3%	12%	1%	23%	100%
San Felipe Unit								
Santa Clara Valley WD	8,100	453	12,052	0	4,639	0	525	25,769
San Benito County WD	0	0	0	0	0	0	0	25,317
San Felipe Sub Total (SCVWD Only)	8,100	453	12,052	0	4,639	0	525	25,769
Percent	31%	2%	47%	0%	18%	0%	2%	100%
Grand Total	49,482	135,465	217,937	32,566	40,200	264,261	68,879	808,790
Percent	6%	17%	27%	4%	5%	33%	9%	100%

Note: The acreage total in Tables A-1 and A-2 for 1999 (799,105 + 48,892 = 848,997), is used to calculate the agricultural potential water use shown in Table 3-2. The acreage in A-3 is 808,790 and does not include 25,317 acres (San Benito County WD), 120 acres (Reclamation District 1606), 11,988 acres (additional Santa Clara Valley WD acres) and 2,782 acres (Santa Clara Valley WD/Pajaro Valley WMA/Westlands WD). These acreages are not included in Table A-3 because crop mix data was not available. 808,790 + 25,317 + 120 + 11,988 + 2,782 = 848,997 acres total in the analysis.

WESTSIDE WATER SUPPLY GAP ANALYSIS DATA

TABLE C-1
Acreage and Water Supplies for Westside Agricultural Water Service Contractors

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Panoche WD – DMC & SLU	7864A	37,361	36,197	0	0	93,900
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Fresno Slough WD	4019A	1,215	1,027			4,000	866	4,866
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Southern DMC								
Eagle Field WD	309	250	134	0	0	549	0	1,242
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Fresno Slough WD	0	688	13	0	0	326	0	1,027
Broadview WD	0	1,862	1,148	795	0	5,155	0	8,960
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James ID	131	9,329	1,481	140	382	11,433	769	23,665
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Banta-Carbona ID	1,953	2,969	3,669	366	1,217	302	3,985	14,461
Centinella WD	40	35	0	0	0	0	385	460
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Westside ID	3,676	1,006	806	0	20	669	66	6,243
West Stanislaus ID	1,798	5,010	12,368	767	3,183	0	3,367	26,493

TABLE C-3
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San Felipe Unit								
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San Benito County WD	0	0	0	0	0	0	0	25,317
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Grand Total	49,482	135,465	217,937	32,566	40,200	264,261	68,879	808,790
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Note: The acreage total in Tables A-1 and A-2 for 1999 (799,105 + 48,892 = 848,997), is used to calculate the agricultural potential water use shown in Table 3-2. The acreage in A-3 is 808,790 and does not include 25,317 acres (San Benito County WD), 120 acres (Reclamation District 1606), 11,988 acres (additional Santa Clara Valley WD acres) and 2,782 acres (Santa Clara Valley WD/Pajaro Valley WMA/Westlands WD). These acreages are not included in Table A-3 because crop mix data was not available. 808,790 + 25,317 + 120 + 11,988 + 2,782 = 848,997 acres total in the analysis.

Appendix D: Prioritized Project List

Project Title	Project Proponent	Project Category		Project Type									Other Type	Priority		Relative GHG Emissions			Contributes to Reduced Dependence on Delta? (Y/N)	Project Status	Date of IRWMP Adoption*
		Technical	Policy	Water Supply Reliability	Habitat Protection and Improvement	Water Quality	Agricultural Water Management	Urban Water Management	Flood Management	Public Education and Outreach	Other			Short-Term	Long-Term	High	Medium	Low			
Projects Added in 2014 Call for Projects																					
Orestimba Creek Recharge Project	Del Puerto Water District	X		X		X					X		conjunctive use, groundwater recharge	X			X		Yes	DERP	
Kaljain Pumping Plant and Conveyance System	San Luis Water District	X					X							X			X		Yes	DERP	
Nonpotable Water System, Phase III	City of Patterson	X						X						X			X		No	DERP	
Turf Removal Project	City of Patterson	X						X			X		conservation	X				X	No	DERP	
Agricultural Drainage Recirculation and Intertie Expansion	Patterson Irrigation District	X					X							X		X			Yes	DERP	
Recycled Water Upgrade to Wastewater System	City of San Joaquin	X		X				X			X		recycling	X		X			No	DERP	
Las Deltas Mutual Water Company (LDMW) and Firebaugh Public Utilities (FPUD) Drinking Water Consolidation and System Replacement Project	Las Deltas Mutual Water Company	X		X							X		drinking water	X			X		No	DERP	
Orestimba Creek Flood Management Project	City of Newman	X							X						X			X	No	DERP	
Huron Wastewater Recycling Project	City of Huron	X		X				X			X		recycling	X		X			No	DERP	
Newman Water Quality Improvement and Water Conservation Project	City of Newman	X				X					X		conservation		X			X	No	DERP	
Groundwater Monitoring Program: Multi-Well Aquifer Monitoring	San Luis & Delta Mendota Water Authority	X									X		data collection	X				X	No	F&P	
Stratford Pipeline Replacement	Stratford Public Utility District	X						X						X				X	No	F&P	
Stratford Water Meter Replacement	Stratford Public Utility District	X						X							X			X	No	F&P	
Water Hyacinth Removal Project	TM Ecology	X			X										X			X	No	DERP	
Lift Canal Rehabilitation Project	Banta-Carbona Irrigation District (BCID)	X					X								X		X		Yes	DERP	
North Valley Regional Recycled Water Program	Del Puerto Water District	X		X			X	X			X		recycling, inter-regional	X		X			Yes	DERP	
Projects from 2006 WIWRP																					
Arroyo Pasajero Groundwater Banking Project	Westlands Water District	X		X		X					X		conjunctive use, groundwater recharge	X			X		Yes	DERP	
Level 2 Refuge Water Supply Diversification Program		X			X										X		X			C&IoS	
Los Banos Creek Conjunctive Use Project		X												X				X	Yes	DERP	
Pleasant Valley Groundwater Banking Project	Pleasant Valley Water District	X		X		X					X		conjunctive use, groundwater recharge		X		X		No	DERP	
SJRECWA-SLDMWA Water Transfer Program	San Luis & Delta Mendota Water Authority	X		X							X		water transfer	X			X		Yes	C&IoS	
San Luis Rservoir Low Point Improvement Project	U.S. Bureau of Reclamation	X		X							X		storage		X	X			Yes	DERP/C&IoS	
Southwest Stanislaus County Regional Drainage Management Project		X					X								X		X		No	DERP	
Westside Regional Drainage Plan - Reuse Land Purchase			X				X								X			X	Yes	DERP	
Westside Regional Drainage Plan - Reuse Area Development		X					X				X		reuse/reclaimation		X	X				DERP	
Westside Regional Drainage Plan - Irrigation Improvements		X					X								X		X			DERP	
Westside Regional Drainage Plan - Infrastructure Improvements		X					X								X		X			DERP	
Westside Regional Drainage Plan - Groundwater Pumping		X					X								X		X			DERP	
Westside Regional Drainage Plan - Salt Disposal Development Project		X					X								X	X				DERP	
Westside Surface Storage Reservoir Project	Westlands Water District	X					X								X	X			Yes	DERP	
Conceptual Projects																					
Del Puerto Canyon Reservoir Project	Del Puerto Water District														X					F&P	
Del Puerto Water District Gravel Pit Reservoir Project	Del Puerto Water District														X					F&P	

* Adoption dates are pending

Project Status Abbreviations:

F&P - Feasibility and Planning

DERP - Design, Environmental Review and Permitting

C&IoS - Construction and Initation of Services (not all projects require construction)

Appendix E: Project Solicitation Form and Correspondence

Leslie Dumas

From: Ara Azhderian <ara.azhderian@sldmwa.org>
Sent: Tuesday, June 17, 2014 9:21 AM
To: Allen Lagarbo; Amy Montgomery; Anthony Chavarria; Ara Azhderian; Bill Jacoby; Bobby Pierce; Bre Slimick; Chase Hurley; Chris Linneman; Chris White; Cruz Ramos; Dan Nelson; Danny Wade; David Weisenberger; Diana Brooks; Diane Rathmann; Eric Osterling; Ernest Taylor; Ernie Garza; Frances Mizuno; Garner Reynolds; Greg Farley; James Nelson; Jeannie Habben; Jeff Bryant; Jim Miller; Joe McGahan; John Beam; John Mallyon; Jon Rubin; Kaomine Vang; Kathy Wood McLaughlin; Laurel Firestone; Liz Reeves; Marcos Hedrick; Maria Herrera; Mark Fachin; Mark Horne; Martin McIntyre; Melissa Whitten; Mica Nitschke (Home); Michelle Dooley; Mike Willett; Monica Reis; Nicholas Pinhey; Orvil McKinnis Jr.; Palmer McCoy; Paul Ashby; Paul Boyer; Peter Rietkerk; Phil McMurray; Randy Houk; Ric Ortega; Richard Moss; Rick Gilmore ; Rod Stiefvater ; Roger Masuda; Russ Freeman; Sarge Green; Steve Bayley; Steve Fausone; Steve Kaiser; Steve Sloan; Susan Mussett; Tom Glover; Tony Whitehurst; Tracey Rosin ; Trevor Joseph; Veronica Woodruff; Vince Roos; Anthea Hansen; Leslie Dumas
Subject: 2014 Westside Integrated Water Resources Plan Update - CALL FOR PROJECTS

Importance: High

Dear WIWRP Stakeholders,

The San Luis & Delta-Mendota Water Authority (SLDMWA) is updating the Westside-San Joaquin Integrated Water Resources Plan (WIWRP) to meet new State guidelines and to update regional strategies, priorities, and objectives to better reflect current circumstances. Integrated regional water management plans are, and have been, generated throughout the State to promote collaborative water resources management within a specified region by identifying regional water resource needs and solutions, generating regional partnerships, and providing funding support. Projects identified in these plans involve drainage, flood control, groundwater management, land use, water conservation, water quality, water supply, and water use efficiency, to improve water management.

You are receiving this notice because of your past interest and/or participation in advancing projects to help improve regional strategies, priorities, and objectives. This letter is a 'Call for Projects' to be considered for inclusion in the 2014 Westside-San Joaquin IWRP. To have your project included in the plan, basic project information is required by July 4th, which will then be evaluated for consistency with the WIWRP goals and objectives. Projects must be included in the WIWRP in order to be eligible for State grant funding that is periodically available through the State's IRWM grant program. There will be a WIWRP stakeholder call to discuss current efforts and answer questions on Wednesday July 9th at 2 pm. Dial in information will be distributed shortly. Please pass this notice on to any others you believe may be interested in participating in the update of the Westside-San Joaquin Integrated Water Resources Plan.

Stakeholders are invited to submit projects to be included in the updated Westside-San Joaquin IWRP Update by July 4th. Submittal guidelines including project submittal templates can be found on the SLDMWA

website beginning June 20th at www.sldmwa.org/irwmp. All required project information should be submitted to Leslie Dumas at ldumas@rmcwater.com.

For questions or comments, please contact Ara Azhderian at 209-826-9696 or ara.azhderian@sldmwa.org.

Sincerely,

Ara Azhderian
Water Policy Administrator

Leslie Dumas

From: Ara Azhderian <ara.azhderian@sldmwa.org>
Sent: Wednesday, July 09, 2014 10:34 AM
To: Anthea Hansen; Anthony Chavarria; Bill Jacoby; Bobby Pierce; Chase Hurley; Chris Linneman; Chris White; Cruz Ramos; Dan Nelson; Dan Pope; Danielle Sotelo; Danny Wade; Dave Kaiser; David Weisenberger; Dennis Falaschi; Diane Rathmann; Doug Hearld; Eric Osterling; Ernie Garza; Frances Mizuno; Jeannie Habben; Jeff Bryant; Jeff Mitchell; Jessica Wright; John Mallyon; Jose Gutierrez; Kathy Wood McLaughlin; Keith Wallace; Koosun Kim; Laurel Firestone; Leslie Dumas; Liz Reeves; Lon Martin; Mark Fachin; Martin McIntyre; Mike Willett; Nicholas Pinhey; Peter Rietkerk; Randy Houk; Ric Ortega; Rick Gilmore ; Steve Bayley; Steve Fausone; Steve Sloan; Sue Ruiz; Susan Mussett; Tony Whitehurst; Veronica Woodruff; dane.mathis@water.ca.gov
Subject: Project informaiton for TODAY'S 2pm WIWRP Stakeholder conference call
Attachments: 2014 Project List Update_Project Benefits.pdf; 2014 Project List Update_Project Cost and Status.pdf; 2014 Project List Update_Project Description.pdf; 2014 Project List Update_Project Info.pdf; 2014 Project List Update_Project Prioritization.pdf; Project List Update_2014.xlsx

Greetings all,

For this afternoon's discussion, please see the attached. There is an updated project list (EXCEL file), summarizing all new projects (including those in the grant application) plus those in the 2006 WIWRP, information on project consistency with the IRWM plan overarching goal and objectives, and a summary of all related project information to the extent possible. The information is broken out in separate management spreadsheets in PDF form (each is a separate page in the EXCEL file). The main one we will focus on is the PDF file called project prioritization. Stakeholder input on the ranking of the projects is requested by Friday, July 11th.

Leslie Dumas with RMC Water and Environment will walk everyone through this information.

Best,
ara

Westside-San Joaquin
Integrated Water Resources Plan Update
Project Information Sheet

PLEASE SUBMIT COMPLETED FORMS BY July 4, 2014

Questions and completed forms should be directed to:
Leslie Dumas
RMC Water and Environment
925-627-4113
ldumas@rmcwater.com

Proposed Project

Project Title: Click here to enter text.

Project Location: Click here to enter text.

Submitting Entity / Project Proponent: Click here to enter text.

Eligibility

In order to be considered for inclusion in the Westside-San Joaquin Integrated Water Resources Plan (WIWRP), the project must meet at least one WIWRP Objective, at least one Statewide Priority, and address at least two Resource Management Strategies. If your project does not meet these minimum requirements it will not be included in the Plan Update.

WIWRP Objectives

Please describe how your project advances one or more of the WIWRP Objectives.

☐ *Objective A:* Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation

Description: Click here to enter text.

☐ *Objective B:* Develop Regional solutions that protect environmental and habitat concerns and provide potential for improvement.

Description: Click here to enter text.

☐ *Objective C:* Improve South-of-Delta water supply reliability by an average of 25%.

Description: Click here to enter text.

☐ *Objective D:* Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially.

Description: Click here to enter text.

☐ *Objective E:* Maximize utility of Regional aquifers while reducing potential for overdraft.

Description: Click here to enter text.

☐ *Objective F*: Consider recreational potential in project development.

Description: Click here to enter text.

☐ *Objective G:* Capture stormwater for higher beneficial use whenever practicable.

Description: Click here to enter text.

☐ *Objective H:* Always promote and enhance water conservation.

Description: Click here to enter text.

☐ *Objective I:* Develop Regional solutions that provide opportunity for water quality improvement.

Description: Click here to enter text.

☐ *Objective J:* Always promote and enhance water recycling.

Description: Click here to enter text.

☐ *Objective K:* When possible, align projects to complement existing wetland.

Description: Click here to enter text.

Statewide Priorities

Please check all that apply.

☐ Drought Preparedness
☐ Use and Reuse Water More Efficiently
☐ Climate Change Response Actions
☐ Expand Environmental Stewardship
☐ Practice Integrated Flood Management
☐ Protect Surface Water and Groundwater Quality
☐ Improve Tribal Water and Natural Resources
☐ Ensure Equitable Distribution of Benefits

Resource Management Strategies

Please select all that apply to your project.

- ☐ Agricultural Water Use Efficiency
- ☐ Urban Water Use Efficiency
- ☐ Conveyance – Delta
- ☐ Conveyance – Regional/local
- ☐ System Reoperation
- ☐ Water Transfers
- ☐ Conjunctive Management & Groundwater Storage
- ☐ Desalination
- ☐ Precipitation Enhancement
- ☐ Recycled Municipal Water
- ☐ Surface Storage – CALFED
- ☐ Surface Storage – Regional/local
- ☐ Drinking Water Treatment and Distribution
- ☐ Groundwater Remediation/Aquifer Remediation
- ☐ Matching Quality to Use
- ☐ Pollution Prevention
- ☐ Salt and Salinity Management
- ☐ Urban Runoff Management
- ☐ Flood Risk Management
- ☐ Agricultural Lands Stewardship
- ☐ Economic Incentives (Loans, Grants and Water Pricing)
- ☐ Ecosystem Restoration
- ☐ Forest Management
- ☐ Recharge Area Protection
- ☐ Water-Dependent Recreation
- ☐ Watershed Management
- ☐ Crop Idling for Water Transfers
- ☐ Dewvaporation or Atmospheric Pressure Desalination
- ☐ Fog Collection
- ☐ Irrigated Land Retirement
- ☐ Rainfed Agriculture
- ☐ Waterbag Transport/Storage Technolog

Responsible Agency Information

Contact Name: Click here to enter text.

Affiliation: Click here to enter text.

Address: Click here to enter text.

Phone: Click here to enter text.

Email: Click here to enter text.

Other Participating Agencies (if applicable): Click here to enter text.

Project Description

Project Description

Please provide a description of your project, including the project location, area and/or entities that will be affected by or will benefit from your project, related water and environmental resources within the project boundaries, and any potential obstacles to implementation. Attach extra pages if necessary. If feasible, please attach a copy of all relevant project studies or links to websites.

Click here to enter text.

Project Status: Choose from Dropdown Menu

Readiness to Proceed

Please discuss project readiness and anticipated start date. Include a description of the status of design and environmental documentation (if applicable), and securing required matching funds.

Click here to enter text.

Environmental Documentation

Describe the environmental documentation required (e.g. Environmental Impact Report or Negative Declaration) for the proposed project and the status of the required documentation. If environmental documentation is required but has not been started, please provide the estimated timeframe for completing the required documentation.

Click here to enter text.

Multi-entity Integration and Benefits

Is your project linked to or combined with another project? If yes, please describe the linked / integrated projects and other possible project participants. Describe entities that benefit from the project and describe the benefits to each entity.

Click here to enter text.

Technical Feasibility

Please list background information, studies or other documentation (including author and year) that detail the technical feasibility of the project.

Click here to enter text.

Economic Feasibility

Please provide estimated project costs (capital, operations and maintenance, and replacement) and estimated project life.

Capital Cost: $ Click here to enter text.

Annual O&M Costs: $ Click here to enter text.

Replacement Costs, Description of Equipment to be Replaced, & Frequency of Replacement (e.g., every 5 years): Click here to enter text.

Estimated Project Life (Years): Click here to enter text.

Cost Basis (if not 2011 dollars): Click here to enter text.

Possible Funding Sources: Click here to enter text.

Please describe the economic feasibility of the project. If an economic analysis (benefit:cost analysis or cost-effectiveness analysis)of the project has been completed, please provide the findings of that analysis and the reference (including author and year). If an economic analysis has not been completed for the project, please provide a detailed description of expected project benefits, including benefits to water supply, water quality, and natural resources, using numeric values when possible (e.g., acres of habitat restored, acre-feet per year of water supply generated, etc). Suggested metrics are provided below.

Summary of Economic Analysis Report (including title, author, and year): Click here to enter text.

Water Supply Avoided Costs

Avoided Pumping / Conveyance Costs: Click here to enter text.

Avoided Water Treatment Costs: Click here to enter text.

Avoided Wastewater Treatment Costs: Click here to enter text.

Avoided Costs of New Supplies: Click here to enter text.

Other: Click here to enter text.

Water Quality Avoided Costs

Avoided Water Treatment Costs: Click here to enter text.

Avoided Wastewater Treatment Costs: Click here to enter text.

Other: Click here to enter text.

Benefits

Quantifiable Benefits

Please provide the quantifiable benefits for Water Supply, Water Quality, and Resource Stewardship, as appropriate.

Water Supply Benefits

Acre-feet Per Year of New Supply: Click here to enter text.

Acre-feet Per Year of Reduced Demand: Click here to enter text.

Water Quality Benefits

Reduction in pollutant loading: Click here to enter text.

Reduction in pollutant transport: Click here to enter text.

Resource Stewardship Benefits

Acres of Habitat Created, Restored, or Enhanced: Click here to enter text.

Increase in new or enhanced recreation / public access opportunities (e.g., miles of trail): Click here to enter text.

Reduction in flood-related damages: Click here to enter text.

Reduction in greenhouse gas emissions: Click here to enter text.

Other: Click here to enter text.

Disadvantaged Communities / Environmental Justice

Please describe how the project will benefit or impact disadvantaged communities or environmental justice goals.

Click here to enter text.

Native American Tribal Communities

Please describe how the project will benefit or impact Native American tribal communities.

Click here to enter text.

Climate Change Adaptation or Mitigation

Please discuss how your project contributes to climate change adaptation and/or mitigation of greenhouse gas emissions. Please discuss potential climate change-related impacts of the project (e.g., increased greenhouse gas emissions). Also discuss the likeliness of these climate change benefits and / or impacts.

Click here to enter text.

Appendix F: Notice of Intent to Update the Plan

MERCED SUN-STAR www.mercedsunstar.com
LOS BANOS ENTERPRISE www.losbanosenterprise.com
CHOWCHILLA NEWS www.chowchillanews.com
Livingston Chronicle
Atwater Signal
Vida en el valle

Customer
SAN LUIS DELTA MENDOTA WATEI

Payor Customer
SAN LUIS DELTA MENDOTA WATEI

Customer Account
336443

Payor Account
336443

Customer Address
PO BOX 2157, ,
LOS BANOS CA 93635 USA

Payor Address
PO BOX 2157, ,
LOS BANOS CA 93635 USA

Customer Phone
209-826-9696

Payor Phone
209-826-9696

Sales Rep.
mgonzalez@mercedsun-star.com

Order Taker
mgonzalez@mercedsun-star.com

PO Number	Payment Method	Blind Box

Tear Sheets	Proofs	Affidavits
0	0	0

Net Amount	Tax Amount	Total Amount
$232.86	$0.00	$232.86

Payment Amt	Amount Due
$0.00	$232.86

Ad Number	Ad Size	Color
0001128721-01	1.0 X 69 Li	<NONE>

Product Information	# Inserts	Cost
Placement/Classification		
Run Dates		
Run Schedule Invoice Text		
MER-Los Banos Enterprise:Print:	2	$202.86
0300 - Legals Classified		
7/4/2014, 7/11/2014		
The San Luis & Delta-Mendota Water Authority (SLDMWA) is u		
MER-upsell.mercedsunstar.com:Online:	2	$30.00
0300 - Legals Classified		
7/4/2014, 7/11/2014		
The San Luis & Delta-Mendota Water Authority (SLDMWA) is u		

The San Luis & Delta-Mendota Water Authority (SLDMWA) is updating the Westside-San Joaquin Integrated Water Resources Plan (WIWRP) to meet new State guidelines and to update regional strategies, priorities, and objectives to better reflect current circumstances. Integrated regional water management plans are, and have been, generated throughout the State to promote collaborative water resources management within a specified region by identifying regional water resource needs and solutions, generating regional partnerships, and providing funding support. Projects identified in these plans involve drainage, flood control, groundwater management, land use, water conservation, water quality, water supply, and water use efficiency, to improve water management.

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Stakeholders interested in submitting projects for consideration to be included in the Westside-San Joaquin IWRP update will find project submittal forms on the SLDMWA website at www.sldmwa.org/irwmp. All required project information should be submitted to Leslie Dumas at ldumas@rmcwater.com.

For questions or comments, please contact Ara Azhderian at 209-826-9696 or ara.azhderian@sldmwa.org.

To download a copy of the Project Solicitation Form in Word (.docx) or Adobe (.pdf) format, please go to: http://www.sldmwa.org/integrated-regional-water-management-plan/
LB-1128721 July 4, 11, 2014

Prepared by:

RMC
water and environment

2175 N. California Blvd
Suite 315
Walnut Creek, CA 94596
925.627.4100 ☎

rmcwater.com

Complex Challenges | Innovative Solutions