Eastern San Joaquin Integrated Regional Water Management Plan 2020 Addendum

FEBRUARY 2021

PREPARED FOR:

Greater San Joaquin County Regional Water Coordinating Committee

LED BY:
San Joaquin County
Department of Public Works
Water Resources Division

PREPARED BY:
GEI Consultants, Inc.

IN ASSOCIATION WITH:
Woodard Curran, Inc.
Environmental Justice for Water

Eastern San Joaquin Integrated Regional Water Management Plan 2020 Addendum

Prepared for:
Greater San Joaquin County Regional Water Coordinating Committee

Led by:
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Environmental Justice for Water

February 11, 2021

In memory of Mark Williamson, GEI –

For authoring the original 2014 IRWMP, initiating and leading this subsequent 2020 IRWMP Addendum, persistently fostering regional collaboration, and setting our IRWM region for success.

His efforts and contributions will always be remembered.

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Acronym List

µg/L	micrograms per liter
1,2,3-TCP	1,2,3-Trichloropropane
AB	Assembly Bill
Addendum	2020 IRWMP Addendum of the 2014 Integrated Regional Water Management Plan
AF/year	acre-feet per year
Brookside	Reclamation District No. 2074
BTEX	benzene, toluene, ethylbenzene, and xylenes
CASGEM	California Statewide Groundwater Elevation Monitoring program
CO2e	carbon dioxide equivalent
Coordinating Committee	Greater San Joaquin County Regional Water Coordinating Committee
County	San Joaquin County
CVFPP	Central Valley Flood Protection Plan
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWC	California Water Code
CWP	California Water Plan
DACs	disadvantaged communities
DACIP	Disadvantaged Community Involvement Grant Program
diesel	petroleum hydrocarbons
DDW	California State Water Resource Control Board, Division of Drinking Water
DREAM	Demonstration Recharge Extraction and Management Project
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
eGRID	Emissions & Generation Resource Integrated Database
ESJ	Eastern San Joaquin
ESJGWA	Eastern San Joaquin Groundwater Authority
ESJWRM	Eastern San Joaquin Water Resources Model
GAMA	Groundwater Ambient Monitoring and Assessment Program
gasoline	petroleum hydrocarbons
GBA	Groundwater Basin Authority
GHG	greenhouse gas
GSA	Groundwater Sustainability Agencies
GSJCRWCC	Greater San Joaquin County Regional Water Coordinating Committee

GSP	Groundwater Sustainability Plan
HCM	Hydrogeologic Conceptual Model
ICU Program	Integrated Conjunctive Use Program
ILRP	Irrigated Lands Regulatory Program
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
kWh/AF	kilowatt hours per acre feet
MAC	Mokelumne-Amador-Calaveras Region
MCL	maximum contaminant level
mg/L	milligrams per liter
MHI	Median Household Income
MokeWISE	Mokelumne Watershed Interregional Sustainability Evaluation Program
NSJWCD	North San Joaquin Water Conversation District
O&M	operation and maintenance
MOU	Memorandum of Understanding
MTBE	Methyl tert-Butyl Ether
PCE	perchloroethylene
PFOA	perfluorooctantoic acid
PFOS	Perfluorooctanesulfonic acid
Plan	Integrated Regional Water Management Plan
RFMP	Regional Flood Management Plan
RMS	Resource Management Strategies
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
Sierra Club	Delta-Sierra Group
SJRFA	San Joaquin River Funding Area
SLR	sea level rise
SMCL	secondary maximum contaminant limit
SWRCB	California State Water Resources Control Board
TCE	trichloroethene
TDS	total dissolved solids
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
VOCs	volatile organic compounds

1.0 Introduction

1.1 IRWMP Background Information

The Northeastern San Joaquin County Groundwater Basin Authority (GBA) was established in 2001 to collectively develop locally supported projects to strengthen water supply reliability in Eastern San Joaquin (ESJ) County. Formed as a joint-powers authority, GBA members agree to work cooperatively and to speak with one voice in their efforts to achieve reliable, affordable water supplies for the region.

San Joaquin County, as most of the state of California, is faced with the critical challenge of increasingly scarce water resources. Competition for limited surface water supplies from major rivers and the tremendous use of groundwater supplies has increased the magnitude of this challenge.

On July 25, 2007, the GBA adopted the ESJ Integrated Regional Water Management Plan (IRWMP, or Plan). The IRWMP defines and integrates key water management strategies to establish protocols and courses of action to implement the ESJ Integrated Conjunctive Use Program (ICU Program).

The ICU Program is designed to implement a comprehensive and prioritized set of projects and management actions to meet adopted Basin Management Objectives and could potentially provide regional benefits to areas beyond the ESJ Region.

The GBA was renamed the ESJ County GWA in 2013. The Plan was updated in 2014 and adopted on June 11, 2014. The resolution adopting the 2014 IRWMP is presented in Section 1.4.2.

The GBA continued to serve as the Regional Water Management Group (RWMG) for the ESJ Planning Region. However, focus of water resource planning in the region shifted to the development of the Groundwater Sustainability Plan (GSP), a shift accompanied by the formation of another entity – the Eastern San Joaquin Groundwater Authority (ESJGWA).

In early 2019, the ESJ IRWM Region began discussing options for updating the 2014 IRWMP to comply with the 2016 IRWM Guidelines, and member agencies decided to form a new RWMG, called the Greater San Joaquin County Regional Water Coordinating Committee (GSJRWCC or Coordinating Committee). The new entity was established with a vision of expanding the RWMG's boundaries to capture areas within the County that are west of the San Joaquin River (hence the term "Greater"). The GSJCRWCC meets the California Department of Water

Resources' (DWR) definition of an RWMG as defined by California Water Code (CWC) Section 10537.

The GSJCRWCC, unlike the GBA, is formed under a Memorandum of Understanding (MOU) with the goal of expanding membership and increasing consensus-building. The MOU to establish the GSJCRWCC was signed in 2019 and was executed by the County of San Joaquin, Catholic Charities of the Diocese of Stockton Environmental Justice, Central Delta Water Agency, city of Lodi, North San Joaquin Water Conservation District, Reclamation District No. 2074 (Brookside), Stockton East Water District, Delta-Sierra Group (Sierra Club), South Delta Water Agency, and South San Joaquin Irrigation District. On May 1, 2020, the city of Stockton joined the GSJCRWCC. The GSJCRWCC is a RWMG as defined in CWC §10539.Collaboration amongst the GSJCRWCC member agencies has strengthened the potential for broad public support for water management activities as well as the ability to leverage local, state, and federal funds. Like its predecessor, the GSJCRWCC is the RWMG responsible for developing and implementing the IRWMP that meets the requirements of CWC §10540 and §10541.

It is the intent of the GSJCRWCC to develop and implement an IRWMP that meets the requirements of CWC §10540 and §10541. After the IRWMP has been updated (anticipated by Fall 2020), the projects in the IRWMP will be eligible for Integrated Regional Water Management (IRWM) implementation grant funding.

1.2 Update of the IRWMP

The GSJCRWCC, as the RWMG for the ESJ IRWMP is required to amend the adopted 2014 IRWMP to meet the new standards provided in DWR Proposition 1 2016 IRWM Guidelines (updated IRWM guidelines). In August 2014 DWR deemed the IRWMP consistent with the Proposition 84 IRWM Grant Program Guidelines, as documented in the confirmation letter provided in Section 2.

The RWMG, in consultation with DWR, has concluded that an addendum is the most expeditious way to address the updated IRWM Guidelines and allow the IRWM Region to maintain eligibility for upcoming Implementation Grant solicitations.

It is noted that the existing 2014 IRWMP is a final, adopted Plan, with all members of the relevant RWMG (GBA), including any individual project proponents that have sought funding through the IRWMG grant program. officially adopting it. This IRWM Plan Addendum is developed by the GBA's successor as RWMG, the GSJCRWCC.

1.3 Organization of this Addendum

This IRWMP Addendum is organized according to the 16 IRWM Plan Standards provided in the 2016 Proposition 1 IRWM Grant Program Guidelines and is structured consistent with the DWR

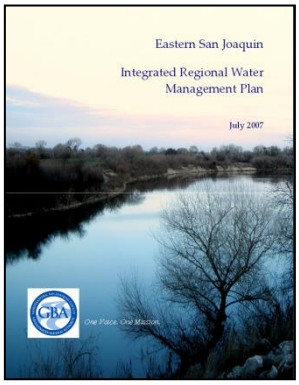
Plan Review Tool to identify where the existing 2014 IRWMP meets, or does not currently meet, the new standards.

IRWM Plan Standards are used to describe the required contents of an IRWM Plan and can be used as criteria in Implementation Grant applications. The Proposition 1 2016 IRWM Guidelines include updates to nine of the 16 IRWM Plan Standards, as shown in Table 1-1. Each of these Standards is discussed in this IRWMP Addendum to show how the 2014 IRWMP meets the new element(s) of these Standards (new elements are shown in **blue text**). Additional explanation or edited IRWMP text is provided, if necessary, to demonstrate that this IRWMP Addendum fully meets the new requirements. The remaining seven of the 16 IRWM Plan Standards have not changed since the Proposition 84 IRWM Guidelines and therefore they are not re-addressed within this Addendum.

Table 1-1. Updated 2016 IRWM Standards.

	IRWM Plan Standard	Standard Affected by the 2016 Proposition 1 IRWM Guidelines
1	Governance	No
2	Region Description	Yes
3	Objectives	Yes
4	Resource Management Strategies	Yes
5	Integration	No
6	Project Review Process	Yes
7	Impact and Benefit	No
8	Plan Performance and Monitoring	Yes
9	Data Management	No
10	Finance	No
11	Technical Analysis	No
12	Relation to Local Water Planning	Yes
13	Relation to Local Land Use Planning	Yes
14	Stakeholder Involvement	Yes
15	Coordination	No
16	Climate Change	Yes

1.3.1 Vision for the 2020 IRWMP Update



The 2014 ESJ IRWMP[1] was based on the requirements in the approved DWR guidelines for the Plan at that time. DWR released new guidelines in 2016 which revised existing requirements, and existing IRWM plans must be updated to be consistent with Proposition 1 requirements which provide the funding for proposed projects in adopted IRWMPs.

To that end, the GSJCRWCC began its update process in 2019 to develop an IRWMP Addendum in alignment with new requirements and position regional projects to be eligible for future IRWMP funding. One goal of this effort is to incorporate more recent data and projections to keep goals current and to adjust projects and management actions as necessary. Another objective is to develop newly required sections of the Plan, including storm/flood water management and climate change, to ensure existing programs and projects align with this new information. Additionally, the update process provides an opportunity to address areas of the existing Plan that DWR believes can be strengthened thereby providing additional planning support as the GSJCRWCC works toward realizing Plan objectives. Based on the MOU signed by each of the GSJCRWCC member organizations, overall goals for the region focus on developing a comprehensive planning document to facilitate regional cooperation in providing water supply reliability, water recycling, water conservation, water quality improvement, stormwater capture and management, flood management, and environmental and habitat protection and improvement.

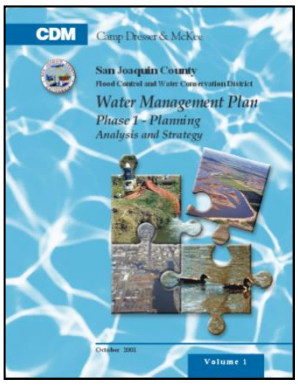
Since 2012, California law (Assembly Bill [AB] 685) has declared that every person in the state has a right to clean, safe, and affordable drinking water. In 2019, SB 200 was signed to further the goal to "provide safe drinking water in every California community, for every Californian." This IRWMP recognizes – and has been developed with consideration of – the human right to water. Through the IRWM program, small and disadvantaged communities (DAC) water systems can seek information as they pursue the improvement of infrastructure, meeting of regulatory standards, and building of their knowledge base. The SWRCB's Human Right to Water portal can be used to identify contaminants that are commonly violating drinking water standards using data from local Water Districts and the State Drinking Water Information System (SDWIS), which collects sample results from all State regulated public water systems. For information on how this pertains to San Joaquin County, *see* https://ofmpub.epa.gov/apex/sfdw/f?p=108:103::::RP.

The original 2007 IRWMP, the 2014 update, and this 2020 IRWMP Addendum serve to fulfill these goals and further regional and shared solutions for drinking water systems. For information

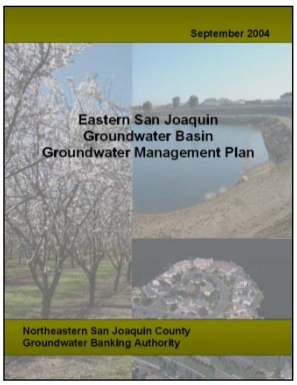
[1] Northeastern San Joaquin County Groundwater Banking Authority, June 2014, 2014Eastern San Joaquin Integrated Regional Water Management Plan Update

on groundwater quality, *see* Section 4.2, and for information on drinking water quality violations in small communities in the county, *see* Section 4.9.5.

1.3.2 Expectations for the IRWM Plan Update



The GSJCRWCC is working to develop a strong foundation to guide and support responsible water management in the ESJ Region. The central component of this foundation is the IRWMP, which will act as the implementation document for the Integrated Conjunctive Use Program. The 2001 Countywide Water Management Plan[2] described water management issues and provided an inventory of water management options. The 2004 Groundwater Management Plan[3] focused on objectives for sustainable management options for the Basin. Both documents outlined strategies that will be further developed as part of the IRWMP Update.



The 2020 IRWMP Update integrates several different efforts to complete the planning process and place the GSJCRWCC, as a regional planning agency, in the best position to compete for state funding through grants and other means, and to facilitate the implementation of high priority projects identified in the Plan. Note that 15 projects are proposed for funding in this IRWMP Addendum, though projects from the GSP, Regional Flood Management Plan (RFMP), and previous IRWMP updates are included by reference as they are still part of this IRWMP process.

To summarize, the goal is to develop an IRWMP that can be looked upon as a paradigm for water resource planning in the ESJ Region. As such, in addition to containing all of the elements required by legislation, it will serve as the "road map" for sustainable water resource management well into the future.

Where changes to the adopted 2014 IRWMP were necessary, actual text from the 2014 IRWMP section is shown in **red text** in this IRWMP Addendum document with changes shown in "track changes"; new text is in red underline and deleted text is in red strikeout.

As noted above, new 2016 IRWMP requirements are addressed in **blue text**.

References to the 2014 Plan sections are also provided for additional clarification. It is recommended that this IRWMP Addendum be reviewed with the 2014 IRWMP (*see* Attachment

[2] Camp Dresser & McKee, October 2001, San Joaquin County Water Management Plan, Phase 1 – Planning, Analysis and Strategy

[3] Northeastern San Joaquin County Groundwater Banking Authority, September 2004, Eastern San Joaquin Groundwater Basin Groundwater Management Plan

A [to be included with final]), as sections throughout the IRWMP are being modified per this Addendum.

A copy of the DWR Plan Review Form is provided in Section 4.13 and in Appendix A.

This is not a full update of the 2014 IRWM Plan. The IRWMP Addendum will first be accepted by the GSJCRWCC and then routed to individual members and proponents of projects included in the Plan for adoption by the governing bodies of these entities.

2.0 Documentation of the 2014 IRWMP

This section provide documentation of the 2014 IRWMP acceptance. This includes:

- Resolution R-14-1: Resolution to Adopt the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update (*see* Section 2.1)
- DWR Consistency Letter that finds the IRWM Plan is consistent with the Planning Act and Standards contained in the 2012 IRWM Grant Program Guidelines (*see* Section 2.2)
- IRWM Plan Standards Review Form – from DWR that reviews the Plan by each IRWMP Standard (*see* Section 2.3)

2.1 2014 IRWM Plan Adoption Resolution

BEFORE THE BOARD OF DIRECTORS OF THE
EASTERN SAN JOAQUIN COUNTY GROUNDWATER BASIN AUTHORITY

RESOLUTION R-14-1
RESOLUTION TO ADOPT THE
EASTERN SAN JOAQUIN INTEGRATED REGIONAL WATER MANAGEMENT
PLAN 2014 UPDATE

WHEREAS, organized in 2001, the Northeastern San Joaquin County Groundwater Banking Authority has the primary goal to develop locally-supported groundwater projects that improve water supply reliability in Northeastern San Joaquin County and to provide benefits to project participants and San Joaquin County as a whole; and,

WHEREAS, the Northeastern San Joaquin County Groundwater Banking Authority amended its Joint Exercise of Powers Agreement in 2013 and was renamed the Eastern San Joaquin County Groundwater Basin Authority (GBA); and,

WHEREAS, the Eastern San Joaquim Region is a bonafide region recognized by the State Department of Water Resources (DWR) and is eligible to develop an Integrated Regional Water Management Plan pursuant to DWR established guidelines; and,

WHEREAS, the GBA has properly noticed pursuant to California Water Code § 10543 and Government Code § 6066 Notices of Intent to Prepare the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update; and,

WHEREAS, the GBA has prepared the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update pursuant to California Water Code § 10530 *et.seq;* and,

WHEREAS, the purpose of the Eastern San Joaquin Integrated Water Management Plan 2014 Update is to further integrate key water resource stakeholders and strategies, establish a governing structure, integrate with flood management and ensure a comprehensive effort is implemented to outreach to and involve Disadvantage Communities (DAC), as well as to prioritize and implement a menu of projects that address a number of water management strategies including reduce water demand, improve operational efficiency, increase water supply, improve water quality, practice resources stewardship, and improved flood management; and,

WHEREAS, the GBA has encouraged and accepted the participation of a wide variety of agencies and DAC representatives throughout Eastern San Joaquin County, are within the Regional Integration Area, and those who have vested interest in regional water management issues; and,

WHEREAS, the GBA has properly noticed pursuant to California Water Code § 10543 and Government Code § 6066 Notices of Intent to Adopt the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update; and,

WHEREAS, the Board of Directors of the Eastern San Joaquin County Groundwater Basin Authority have held a duly and regularly noticed Public Hearing on the question of whether to approve this Resolution to Adopt the Eastern San Joaquin Integrated Regional Water Management Plan in accordance with Water Code § 10543; and,

WHEREAS, the Board of Directors of the Eastern San Joaquin County Groundwater Basin Authority find that the adoption of the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update is exempt from the California Environmental Quality Act (CEQA) due to statutory and categorical exemptions.

NOW, THEREFORE, BE IT RESOLVED that this Board of Directors finds that the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update is exempt from the CEQA and hereby adopts the Eastern San Joaquin Integrated Regional Water Management Plan 2014 Update.

PASSED AND ADOPTED this June 11, 2014, by the following vote of the Board of Directors of the Eastern San Joaquin County Groundwater Basin Authority, to wit:

AYES: PANIZZA, LYTLE, VOGEL, KATZAKIAN, FERRARO, HERRICK, KUIL, NOMELLINI, and SCANLON

NOES:

ABSENT:

ATTEST: THOMAS M. GAU
Secretary of the
Eastern San Joaquin County
Groundwater Basin Authority

KEN VOGEL, Chairman
Board of Directors of the
Eastern San Joaquin County
Groundwater Basin Authority

2.2 DWR Consistency Letter

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

EDMUND G. BROWN JR., *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
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August 15, 2014

Mr. Brandon W. Nakagawa, P.E.
Water Resources Coordinator
Eastern San Joaquin County Groundwater Basin Authority
1810 East Hazelton Avenue
Stockton, California 95205

Subject: Plan Review Process, Eastern San Joaquin Integrated Regional Water Management Plan

Dear Mr. Nakagawa:

Attached please find the Department of Water Resources (DWR) Draft Review of the Eastern San Joaquin IRWM Plan. DWR has determined that your IRWM Plan is consistent with the IRWM Planning Act and the related IRWM Plan Standards contained in the 2012 IRWM Grant Program Guidelines.

Pursuant to Appendix H of the Guidelines the public comment period for this review will begin on August 15, 2014. The Draft Review will be available for public comments for 30 calendar days on the following website:http://www.water.ca.gov/irwm/grants/prp.cfm.

We will inform you of any comments received. After the public comment period ends the link to the draft review will become inactive on the website. DWR will consider comments, and if necessary work with you on any resultant follow up action. DWR will finalize the review and send it to you prior to posting on our website. The final review cover letter will state the plan's applicability in satisfying existing grant agreement conditions and plan eligibility requirements for future IRWM grant solicitations.

The Draft Review consists of a summary of the overall review and an individual review form for each of the 16 Plan Standards. On the individual review forms locations in the plan are noted for applicable material. Although they may be found elsewhere in the plan, these are the locations of the requirements used to show sufficiency with a given standard.

If you have any questions, please contact Ted Daum at (916) 651-9264 or Theodore.Daum@water.ca.gov.

Sincerely,

Tracie L. Billington, P.E. Chief
Financial Assistance Branch
Division of Integrated Regional Water Management

2.3 2012 IRWM Plan Standards Review Form

Regional Acceptance Process	Eastern San Joaquin
Regional Water Management	Eastern San Joaquin County Groundwater Basin Authority
IRWM Plan Title:	Eastern San Joaquin Integrated Regional Water Management Plan Update

PLAN IS SUFFICIENT

IRWM Plan Standard	Overall Standard Sufficient	Requirement(s) Insufficient
Governance	Yes	
Region Description	Yes	
Objectives	Yes	
Resource Management Strategies	Yes	
Integration *	Yes	
Project Review Process	Yes	
Impact and Benefit	Yes	
Plan Performance and Monitoring	Yes	
Data Management	Yes	
Finance	Yes	
Technical Analysis	Yes	
Relation to Local Water Planning	Yes	
Relation to Local Land Use Planning	Yes	
Stakeholder Involvement	Yes	
Coordination	Yes	
Climate Change	Yes	

* If not included as an individual section use Governance, Project Review Process, and Data Management Standards per November 2012 Guidelines, p. 44.

Additional Comments:

While deemed consistent with the 2012 Guidelines Plan Standards, DWR recommends that the following be addressed in future IRWM Plan (Plan)updates: Governance: Not clear how the governance structure ensures a notice of intent to prepare/update the Plan and that the Plan is adopted in a public meeting. **Climate Change:** Section 16.2.5 includes a statement that greenhouse gasses (GHGs) will be evaluated, but it is unclear how it will be considered during the review process; adaptation partially addressed (Table 7-1) but limited to flood scenarios in the review process. **Region Description:** (1) Not clear that the IRWM Plan helps reduce dependence on the Delta. (2) Opportunities to maximize integration are not clearly addressed. **Objectives:** A discussion of the goals of the region is not presented. **Resource Management Strategies:** The RWMG conducted vulnerability analysis but the plan is not clear how these effects were considered in the selection of applicable Resource Management Strategies. **Project Review Process:** (1) Environmental Justice considerations are not included in the Project Review Process. (2) Project proponent's Plan adoption status is not considered in the Project Review Process. (3) Project's contribution to reducing reliance on the Delta is not considered in the Project Review Process. **Impact and Benefit**: A discussion of when a more detailed project-specific impact and benefit analysis will occur is not presented. **Data Management:** Data management Quality Assurance/Quality Control (QA/QC) measures are not discussed. **Stakeholder Involvement:** The Plan discusses disadvantaged communities (DAC) involvement and states that "No Tribal entities identified in the Plan area." However, the Plan does not state how they determined that tribal communities were not present in the region. **Climate Change:** Section 16.2.5 includes a statement that GHGs will be evaluated, but it is unclear how it will be considered during the review process; adaptation partially addressed (Table 7-1) but limited to flood scenarios in the review process.

IRWM Plan Standard: Governance					Overall Standard Sufficient	Yes
Requirement	**Included**		**Plan Standard Source**		**Evidence of Sufficiency**	**Sufficient**
Effective communication – both internal and external to the IRWM region.	**y/n/q**	y	**19/37-38**	2.6	Section 2.6 described the internal and external communication approaches. The GBA is funded by member contributions and through a special revenue fund that is established for purposes of water planning in the County. Steady funding provides continued support for the stakeholder and public outreach program.	y
Long term implementation of the IRWM Plan.	**y/n/q**	y	**19/38**	16.2, 16.2.3	The 57 actions listed in Section 16.2 constitute the GBA's plan and commitment to implement the 2014 IRWMP. Long-term planning includes Vulnerability Assessment, Review Land Use Plans, Identify Future Water Supplies and Regular Updates.	y
Coordination with neighboring IRWM efforts and State and federal agencies.	**y/n/q**	y	**19/38**	2.6.2, 14		y
The collaborative process(es) used to establish plan objectives.	**y/n/q**	y	**19/38**	2.3.3, 7.4	The Mission of the GBA is to employ a consensus-based approach to collaboratively develop stakeholder- supported projects and programs that mitigate and prevent the impacts of long-term groundwater supply-demand imbalance. Managing the underlying groundwater basin is critical in providing reliable water supplies, which are essential for the economic, social, and environmental viability of the San Joaquin Region. Developing an IRWMP is fundamental to carrying out this Mission. The objective for the IRWM Plan was developed by the GBA to address the underlying issues listed above, consistent with the Plan Purpose.	y

IRWM Plan Standard: Governance						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Regulatory and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
How interim changes and formal changes to the IRWM Plan will be performed.	**y/n/q**	y	**19/38**		16.2.3.4		y
Updating or amending the IRWM Plan.	**y/n/q**	y	**19/38**		16.2.3.4	GBA will perform a comprehensive review, revision, and adoption of the Integrated Regional Water Management Plan at least every 5 years. The performance of implemented projects will be compared to original project objectives to ensure objectives were met.	y
Publish NOI to prepare/update the plan; adopt the plan in a public meeting.	**y/n/q**	N	**35**	CWC §10543		Not clear how the governance structure ensures a notice of intent to prepare/update the plan and that the plan is adopted in a public meeting. Section 2.2 provides some history that a resolution to update the plan was approved at a public meeting in 2011. However, this statement is not clear on the use of an NOI prior to the public meeting and no other process to be used in future updates was found.	n

IRWM Plan Standard: Region Description						Overall Standard Sufficient	Yes
Requirement	**Included**		**Plan Standard Source**		**Evidence of Sufficiency**		**Sufficient**
From IRWM Guidelines	**y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.**		**2012 IRWM Grant Program Guidelines Source Page(s)**	**Legislative Support and/or Other Citations**	**Location of Standard in Grantee IRWM Plan**	**Brief Evaluation Narrative**	**y/n**
If applicable, describe and explain how the plan will help reduce dependence on the Delta supply regionally.	**y/n**	N	**20**	--		Based on Section 9.4.1 and 10.3.35, it is not clear that the IRWM Plan will help reduce dependence on the Delta for water supply.	N
Describe watersheds and water systems.	**y/n**	y	**19/39**	PRC §75026.(b)(1) and CWP Update 2009	4.1		y
Describe internal boundaries.	**y/n**	y	**19/39**	--	2.10.2, 2.11, 2.12, 4.1		y
Describe water supplies and demands for minimum 20-year planning horizon.	**y/n**	y	**19/39**	--	6.2, 6.3, 6.4.2		y
Describe water quality conditions	**y/n**	y	**19/40**	--	6.5.5, 6.5.6, 6.8, 8.1.6, 15.7		y
Describe social and cultural makeup, including specific information on DACs and tribal communities in the region and their water challenges.	**y/n/q**	Y	**19/40**	--	4.2., 5.1.1	Disadvantaged Community areas are located in major portions of Thornton and Walnut Grove; areas located in the central and eastern portions of the City of Lodi; neighborhoods in the City of Stockton mostly located in central and eastern regions; throughout eastern Lathrop; and southeastern Manteca. No mention of Tribal water challenges.	y
Describe major water related objectives and conflicts. *	**y/n/q**	y	**19/40**	§10541. (e)(3)	2.3.3, 3.3.1, 6.4.1		y

IRWM Plan Standard: Region Description					Overall Standard Sufficient		Yes
Requirement	**Included**		**Plan Standard Source**		**Evidence of Sufficiency**		**Sufficient**
Explain how IRWM regional boundary was determined and why region is an appropriate area for IRWM planning.	**y/n/q**	y	**19/40**	--	4.4.1	The region and its authority is determined by two factors: Magnitude of water supply and groundwater management challenges; Practical limit to a regional group.	y
Describe neighboring and/or overlapping IRWM efforts.	**y/n**	y	**19/40**	--	3.3, 4.5.2, 14		y
Explain how opportunities are maximized (e.g., people at the table, natural features, infrastructure) for integration of water management activities.	**y/n**	N	**38**	--		Opportunities to maximize integration are not clearly addressed.	N

* Requirement must be addressed.

IRWM Plan Standard: Objectives						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Qualitative Narrative	y/n
Through the objectives or other areas of the plan, the 7 items on pg. 41 of GL are addressed. *	y/n	y	20/40 - 41	§10540.(c)	7.4, 6.8	The Plan focuses on the 4 established objectives of GBA though all 7 items are considered in various sections of the Plan.	y
Describe the collaborative process and tools used to establish objectives: - How the objectives were developed - What information was considered (i.e., water management or local land use plans, etc.) - What groups were involved in the process - How the final decision was made and accepted by the IRWM effort	y/n	y	20/41	--	2.3, 7.4	The GBA has employed a consensus-based approach in its goal. It is not clear how the objectives of GBA, accepted as the IRWMP objectives, are vetted through public process involving non GBA members.	y
Identify quantitative or qualitative metrics and measurable objectives: Objectives must be measurable - there must be some metric the IRWM region can use to determine if the objective is being met as the IRWM Plan is implemented. Neither quantitative nor qualitative metrics are considered inherently better. *	y/n/q	y	20/41 - 42	10541.(e)	7.6, 7.7, 12.3, 12.4	Evaluation criteria (or "Performance Measures") were developed to screen and select the best combinations of projects and management actions that address key water issues using a systems approach for IRWMP implementation.	y
Explain how objectives are prioritized or reason why the objectives are not prioritized.	y/n/q	y	20/42-43	--	12.4.2	Prioritization was based on need of project, feasibility, readiness to proceed and public and stakeholder acceptance.	y
Reference specific overall goals for the region: RWMGs may choose to use goals as an additional layer for organizing and prioritizing objectives, or they may choose to not use the term at all.	y/n	N	43	--		A discussion of the goals of the region is not presented.	N

* Requirement must be addressed.

IRWM Plan Standard: Resource Management Strategies (RMS)						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Identify RMS incorporated in the IRWM Plan: Consider all California Water Plan (CWP) RMS criteria (29) listed in Table 3 of the CWP Update 2009. *	y/n	y	20/43	CWP Update 2009 Volume II; 10541(e)(1)	9.3	A list of RMS to be implemented by the Plan are defined in Table 9-1.	y
Consideration of climate change effects on the IRWM region must be factored into RMS.	y/n	N	20/43	--		The RWMG conducted vulnerability analysis but the plan is not clear how these effects were considered in the selection of applicable RMS.	N
Address which RMS will be implemented in achieving IRWM Plan Objectives.	y/n	y	44	--	9.3, 9.5	Table 9-3 provides a summary of projects, linkage to management objectives and RMS. The plan does not state how the management objectives link to IRWMP objectives.	y

* Requirement must be addressed.

IRWM Plan Standard: Integration							Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard		Evidence of Sufficiency			Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative		y/n
Contains structure and processes for developing and fostering integration[1]: - Stakeholder/institutional - Resource - Project implementation	y/n/q	y	20/44 - 45	§10540.(g); §10541.(h)(2)	14	Chapter 14 discussed inter-regional coordination and collaboration with Mokelumne River Basin, Sacramento County and Stanislaus County stakeholders		y

IRWM Plan Standard: Project Review Process							Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard		Evidence of Sufficiency			Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed		2012 IRWM Grant Program Guidelines Source Page(s)	Regulatory and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative		y/n
Process for projects included in IRWM Plan must address 3 components: - procedures for submitting projects - procedures for reviewing projects - procedures for communicating lists of selected projects	y/n	y	20/45	§75028.(a)	9.5 and 12.4			y
Does the project review process in the plan incorporate the following factors:								
• How a project contributes to plan objectives.	y/n	y	20		7.4, 7.6, 9.5, 12.3	Performance measures are not directly linked to Plan objectives.		y

IRWM Plan Standard: Project Review Process						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard		Evidence of Sufficiency		Sufficient
• How a project is related to Resource Management Strategies identified in the plan.	y/n	y	20		9.3, 9.5, 10		y
• The technical feasibility of a	y/n	y	20		9.5, 12.3.1		y
• A projects specific benefits to a DAC water issue.	y/n	y	20		5, 10		y
• Environmental Justice considerations.	y/n	n	20			Environmental Justice considerations are not included in the Project Review Process.	n
• Project costs and financing.	y/n	y	20		10, 11, 12.3		y
• Address economic feasibility.	y/n	y	21		10, 11, 12.3		y
• Project status.	y/n	y	21		10, 11, 12.3		y
• Strategic implementation of plan and project merit.	y/n	y	21/48		12.3, 12.4		y
• Project's contribution to climate change adaptation.	y/n	y	21		12.3, 15		y
• Contribution of project in reducing GHGs compared to project alternatives.	y/n	y	21		12.3		y
• Status of the Project Proponent's IRWM Plan adoption.	y/n	n	21			Project proponent's plan adoption status is not considered in the Project Review Process.	n
• Project's contribution to reducing dependence on Delta supply (for IRWM regions receiving water from the Delta).	y/n	n	21			Project's contribution to reducing reliance on the Delta is not considered in the Project Review Process.	n

IRWM Plan Standard: Impact and Benefit						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation		2012 IRWM Grant Program Guidelines Source	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Discuss potential impacts and benefits of plan implementation within IRWM region, between regions, with DAC/EJ concerns and Native American Tribal communities.	y/n	y	21	--	12.1, 12.2, 12.3	Described a modeling approach for comparing performance of projects and management alternatives.	y
State when a more detailed project-specific impact and benefit analysis will occur (prior to any implementation activity).	y/n	n	49	--		A discussion of when a more detailed project-specific impact and benefit analysis will occur is not presented.	n
Review and update the impacts and benefits section of the plan as part of the normal plan management activities.	y/n	y	50	--	16.2.3.4	Discussed Plan update every five years	y

IRWM Plan Standard: Plan Performance and Monitoring						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Contain performance measures and monitoring methods to ensure that IRWM objectives are met. *	y/n	y	21/53	PRC §75026.(a)	16.2.1, 16.2.3.4, ES. 16.3.1		y
Contain a methodology that the RWMG will use to oversee and evaluate implementation of projects.	y/n	y	21/53		16.2.1, 16.2.5, 16.2.6		Y

* Requirement must be addressed.

IRWM Plan Standard: Data Management						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation		2012 IRWM Grant Program Guidelines Source Page(s)	Regulatory and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Describe data needs within the IRWM region.	y/n	y	54	--	16.2.1		y
Describe typical data collection techniques.	y/n	y	54	--	16.2.1		y
Describe stakeholder contributions of data to a data management system.	y/n	y	54	--	16.2.1		y
Describe the entity responsible for maintaining data in the data management system.	y/n	y	54	--	4.3.4		y
Describe the QA/QC measures for data.	y/n	n	54	--		Data management QA/QC measures are not discussed.	N
Explain how data collected will be transferred or shared between members of the RWMG and other interested parties throughout the IRWM region, including local, state, and federal agencies. *	y/n	y	54	--	4.3.4		y
Explain how the Data Management System supports the RWMG's efforts to share collected data.	y/n	y	54	--	16.2.1.7		y
Outline how data saved in the data management system will be distributed and remain compatible with State databases including CEDEN, Water Data Library (WDL), CASGEM, California Environmental Information Catalog (CEIC), and the California Environmental Resources Evaluation System (CERES).	y/n	y	54	--	16.2.1		y

* Requirement must be addressed.

IRWM Plan Standard: Finance						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Include a programmatic level (i.e., general) plan for implementation and financing of identified projects and programs* including the following:	y/n	y	21	§10541.(e)(8)	2.9, 16.2.7, 16.4		y
List known, as well as, possible funding sources, programs, and grant opportunities for the development and ongoing funding of the IRWM Plan.	y/n	y	21		16.2.7		y
List the funding mechanisms, including water enterprise funds, rate structures, and private financing options, for projects that implement the IRWM Plan.	y/n	y	21		16.4		y
An explanation of the certainty and longevity of known or potential funding for the IRWM Plan and projects that implement the Plan.	y/n	y	21		16.4		y
An explanation of how operation and maintenance (O&M) costs for projects that implement the IRWM Plan would be covered and the certainty of operation and maintenance funding.	y/n	n	21			A discussion of O&M funding is not presented.	N

* Requirement must be addressed.

IRWM Plan Standard: Technical Analysis						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Document the data and technical analyses that were used in the development of the Plan *	y/n	y	22	--	1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 8.4, 9.4, 10, 11, 12.2, 13, 15, 17		y

* Requirement must be addressed.

IRWM Plan Standard: Relation to Local Water Planning						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation		2012 IRWM Grant Program Guidelines Source	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Identify a list of local water plans used in the IRWM Plan.	y/n	y	22	§10540.(b)	1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 9.4, 10, 11, 12.2, 14, 17		y
Discuss how the Plan relates to these other planning documents and programs.	y/n	y	22		1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 9.4, 10, 11, 12.2, 14, 17		y

IRWM Plan Standard: Relation to Local Water Planning						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
Describe the dynamics between the IRWM Plan and other planning documents.	y/n	y	22		1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 9.4, 10, 11, 12.2, 14, 17		y
Describe how the RWMG will coordinate its water management planning activities.	y/n	y	58		16.2.1.3, 16.2.3		y

IRWM Plan Standard: Relation to Local Land Use Planning						Overall Standard Sufficient	Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Document current relationship between local land use planning, regional water issues, and water management objectives.	y/n	y	22/59 - 62	--	2.6.1.4, 2.11, 2.12, 3.5, 4.2.1, 6.2, 6.3, 11.2, 16.2.1.3, 16.2.1.4, 16.2.3.2, 16.2.4.3		y
Document future plans to further a collaborative, proactive relationship between land use planners and water managers.	y/n	y	22/59 - 62	--	2.6.1.4, 2.11, 2.12, 3.5, 4.2.1, 6.2, 6.3, 11.2, 16.2.1.3, 16.2.1.4, 16.2.3.2, 16.2.4.3		y

IRWM Plan Standard: Stakeholder Involvement					Overall Standard Sufficient		Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Contain a public process that provides outreach and opportunity to participate in the IRWM Plan. *	y/n	y	22/63	§10541.(g)	2.1, 2.5, 2.6, 3.3, 3.4, 4.5.1, 5, 7.4, 8.1, 9.5, 11, 1, 12.2, 12.3, 13.1, 14.1.4, 14.1.9, 16.2.6, 16.2.8		y
Identify process to involve and facilitate stakeholders during development and implementation of plan regardless of ability to pay; include barriers to involvement. *	y/n	y	64	§10541.(h) (2)	2.1, 2.5, 2.6, 3.3, 3.4, 4.5.1, 5, 7.4, 8.1, 9.5, 11, 1, 12.2, 12.3, 13.1, 14.1.4, 14.1.9, 16.2.6, 16.2.8	Chapter 5 identifies a method for involving DACs in the IRWM process although it does not specifically identify barriers or complications with ability to pay although contributions are voluntary according to Section 2.5.2.	y
Discuss involvement of DACs and tribal communities in the IRWM planning effort.	y/n	y	23	--	5	The plan discusses DAC involvement and states that "No Tribal entities identified in the Plan area". However, the plan does not state how they determined that tribal communities were not present in the region.	N
Describe decision-making process and roles that stakeholders can occupy.	y/n	y	23	--	2.5.2, 2.6, 3.3, 9.5, 14.1.4, 14.1.9, 16.2.6, 16.2.8	Stakeholders can participate via their local agencies in the decision-making process.	Y
Discuss how stakeholders are necessary to address objectives and RMS.	y/n	y	23	--	2.3.3, 16.2.6		y
Discuss how a collaborative process will engage a balance in interest groups.	y/n	y	23	--	2.1, 2.3.3, 2.5, 4.5, 7.4, 9.1, 14		y

* Requirement must be addressed.

IRWM Plan Standard: Governance						Overall Standard Sufficient	Yes
Requirement	**Included**		**Plan Standard Source**		**Evidence of Sufficiency**		**Sufficient**
From IRWM Guidelines	**y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.**		**2012 IRWM Grant Program Guidelines Source Page(s)**	**Regulatory and/or Other Citations**	**Location of Standard in Grantee IRWM Plan**	**Brief Evaluation Narrative**	**y/n**
Document a governance structure to ensure updates to the IRWM Plan							
The name of the RWMG responsible for implementation of the IRWMP.	**y/n**	y	**18/35**	CWC §10539	2.1.1		y
A description of the IRWM governance structure.	**y/n**	y	**19/36**		2.5		y
A description of how the chosen form of governance **addresses** and **ensures**:							
Public outreach and involvement processes.	**y/n/q**	y	**19/36-37**	§10540, §10541	2.6, 5.3	Section 2.6.1.1 described various public outreach avenues through GBA. On a regular basis, meeting agendas and minutes are distributed to interested parties, regular attendees and the public via U.S. mail and email. The notifications are also published on the GBA website. Section 5.3 described the DAC outreach strategies and approach.	y
Effective decision making.	**y/n/q**	y	**19/37**		2.5.2	The GBA Joint Exercise of Powers Agreement calls for a majority vote of a quorum. A quorum is defined as a majority of the appointed GBA Board of Directors.	y
Balanced access and opportunity for participation in the IRWM process.	**y/n/q**	y	**19/37**		2.5.1	The governance of this IRWM group is based on the existing GBA structure and governance. JPA and membership fees help the mutual interest-based groups to achieve their objectives.	y

IRWM Plan Standard: Coordination					Overall Standard Sufficient		Yes
Requirement	Included		Plan Standard Source		Evidence of Sufficiency		Sufficient
From IRWM Guidelines	y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed.		2012 IRWM Grant Program Guidelines Source Page(s)	Legislative Support and/or Other Citations	Location of Standard in Grantee IRWM Plan	Brief Evaluation Narrative	y/n
Identify the process to coordinate water management projects and activities of participating local agencies and stakeholders to avoid conflicts and take advantage of efficiencies. *	y/n	y	23/65	§10541.(e)(13)	2.1, 2.5, 2.6, 4.5.1		y
Identify neighboring IRWM efforts and ways to cooperate or coordinate, and a discussion of any ongoing water management conflicts with adjacent IRWM efforts.	y/n	y	23/65	--	2.6.2, 4.5.2, 14		y
Identify areas where a state agency or other agencies may be able to assist in communication or cooperation, or implementation of IRWM Plan components, processes, and projects, or where state or federal regulatory decisions are required before implementing the projects.	y/n	y	23	--	2.6.2, 10, 11, 12		y

* Requirement must be addressed.

IRWM Plan Standard: Climate Change						Overall Standard Sufficient	Yes
Requirement	**Included**		**Plan Standard Source**		**Evidence of Sufficiency**		**Sufficient**
From IRWM Guidelines	**y/n - Present/Not Present in the IRWMP. If y/n/q qualitative evaluation needed**		**2012 IRWM Grant Program Guidelines Source Page(s)**	**Legislative Support and/or Other Citations**	**Location of Standard in Grantee IRWM Plan**	**Brief Evaluation Narrative**	**y/n**
Evaluate IRWM region's vulnerabilities to climate change and potential adaptation responses based on vulnerabilities assessment in the DWR Climate Change Handbook for Regional Water Planning. *	**y/n**	y	**23/66 - 73**	Climate Change Handbook vulnerability assessment: http://www.water.ca.gov/climatechange/CCHandbook.cfm; November 2012 Guidelines Legislative and Policy Context, p. 66 §10541.(e)(11)	Vulnerabilities in Section 15.7 Adaptation in Section 16.2.9 & ES 17.2		y
Provide a process that considers GHG emissions when choosing between project alternatives. *	**y/n**	y	**23/68**		Section 16.2.5 and 16.2.9	While sufficiently addressed, the plan would benefit from a more robust discussion of how a GHG emissions as part of the project selection process.	Y
Include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.	**y/n**	y	**23/66 - 73**		Section 15.7		y
Contain a plan, program, or methodology for further data gathering and analysis of prioritized vulnerabilities.	**y/n**	y	**23/66 - 73**		Section 16.2.9		y
Include climate change as part of the project review process.	**y/n**	n	**23/68**			Section 16.2.5 includes a statement that GHGs will be evaluated, but it is unclear how it will be considered during the review process; adaptation partially addressed (Table 7-1) but limited to flood scenarios in the review process.	n

Regulatory Citation	Link	Notes
IRWM Prop 84 and 1E Guidelines (2012)	http://www.water.ca.gov/irwm/grants/docs/Guidelines/GL_2012_FINAL.pdf	DWR November 2012 Guidelines – Final. This link is no longer active on the State website, so see the following link for a copy of the 2012 IRWMP Guidelines: https://www.mywaterplan.com/files/dwr-irwm-guidelines-11-2012.pdf
2016 IRWM Grant Program Guidelines	https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/IRWM-Grants/Files/Prop-1-Implementation/2016Prop1IRWMGuidelines_FINAL_07192016_a_y19.pdf	July 2016, Proposition 1
2019 IRWM Grant Program Guidelines	https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/IRWM-Grants/Files/P1-Guidelines/2019-IRWM-Grant-Program-Guidelines122319ay19.pdf?la=en&hash=731812CDA4515E09FA7A3A614D6F240DC9147260&hash=731812CDA4515E09FA7A3A614D6F240DC9147260	April 2019, Proposition 1
CWC §10539	http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=10001-11000&file=10532-10539	
CWC §10540, §10541	http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=10001-11000&file=10540-10543	
CWC §10543	http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=10001-11000&file=10540-10543	
PRC §75026, §75028, California Water Plan (CWP) Update 2009, and California Watershed Portal	http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=75001-76000&file=75020-75029.5	DWR shall give preference to proposals that satisfy the criteria specified in PRC §75026.(b)(1). §75028.(a) – DWR shall defer to approved local project selection, and review projects only for consistency with the purposes of Section 75026.
	http://www.waterplan.water.ca.gov/cwpu2009/index.cfm	2009 CWP Volumes I and II
	http://www.conservation.ca.gov/dlrp/watershedportal/Pages/Index.aspx	California Watershed Portal
§10541. (e)(3)	http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=10001-11000&file=10540-10543	

3.0 Conformance To 2012 IRWM Guidelines

Table 3-1 provides a cross-reference to sections of the adopted 2014 IRWM Plan mapped to DWR's November 2012 Integrated Regional Water Management Guidelines. Table 3-1 uses Strikeout/Underline where the 2014 IRWMP is corrected or updated. The following sections provide updated information for standards. Please note that Table 3-1 is specific to corrections and updates to bring the 2014 IRWMP to compliance with 2012 Guidelines, while Table 4-1 is specific to corrections and updates to bring the 2014 IRWMP to compliance with 2016 Guidelines.

Table 3-1. Updates to Address 2012 Plan Standards

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Governance				
Document a governance structure to ensure updates to the IRWM Plan.			**See changes to RWMG Governance in Section 3.1**	
The name of the RWMG responsible for implementation of the IRWMP.	18/35	CWC §10539	2.1.1	The 2007 and 2014 Eastern San Joaquin IRWMPs were prepared under direction of the GBA. In early 2019, the Region began discussing options for updating the IRWMP for the ESJ Planning Region. As a result of these discussions, the GBA was replaced with the GSJCRWCC as the Regional Water Management Group.
A description of the IRWM governance structure.	19/36		2.5	The GSJCRWCC was formed using a Memorandum of Understanding Agreement.
A description of how the chosen form of governance addresses and ensures:				
Public outreach and involvement processes.	19/36-37	§10540, §10541	2.6, 5.3	Public meetings with agendas and minutes, website, disadvantaged communities (DACs), and specialty agency outreach. See changes to DAC Outreach in Section 4.6
Effective decision making.	19/37		2.5.2	Majority vote of membership
Balanced access and opportunity for participation in the IRWM process.	19/37		2.5.1, 16.2.8	Actively and successfully seeking out and recruiting membership.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Effective communication – both internal and external to the IRWM region.	19/37-38		2.6.1, 2.6.2, 5.3, 11.2, 14	Public meetings with published agendas and minutes, website, flood control coordination, DACs, local and regional agencies and organizations, adjacent IRWM Regions.
Long term implementation of the IRWM Plan.	19/38		16.2, 16.2.5	Management Actions to guide long-term implementation; Prioritized project list.
Coordination with neighboring IRWM efforts and state and federal agencies.	19/38		2.6.2, 14	Groundwater Management Plan, Mokelumne Forum, federal advocacy, USGS joint study, focus groups, Mokelumne Watershed Interregional Sustainability Evaluation (MokeWISE), GSP.
The collaborative processes used to establish Plan objectives.	19/38		2.3.3, 7.4	Consensus-based approach; Objectives established as part of Groundwater Management Plan, Countywide Water Management Plan, and Mokelumne Aquifer Recharge and Storage Project, Eastern San Joaquin Groundwater Subbasin GSP; Objectives reviewed and updated in stakeholder workshop for the Lower San Joaquin RFMP.
How interim changes and formal changes to the IRWM Plan will be performed.	19/38		16.2.3.4	Biennial review and update as necessary; minor changes adopted by GBA Board; Comprehensive review and update every 5 years.
Updating or amending the IRWM Plan.	19/38			
Publish Notice of Intent to prepare/update the Plan; adopt the Plan in a public meeting.	35	CWC §10543	2.2, 2.6.2	Public hearing to adopt a resolution of intent to update IRWMP held 12/14/11. Notice of Intent to Update 2014 IRWMP (2019) in Appendix C. Government Code 6066 notification requirements will be complied with for publication of notifications.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Region Description				
If applicable, describe and explain how the Plan will help reduce dependence on the Delta supply regionally.	20	--	9.4.1, 10.3.35	City of Stockton developed the Delta Water Supply Project to make use of its Delta water rights and has begun taking transfer water from the Mokelumne River. Stockton's Section 1725 water rights allows Delta diversions equivalent to its treated wastewater discharges. Reduction of dependence on Delta water supply is also addressed in Section 4.1 – Region Description and in Section 4.7.12 Project contribution to reducing dependence on Delta Water Supply.
Describe watersheds and water systems.	19/39	PRC §75026.(b)(1) and CWP Update 2009	4.1, 6.4.2, 11.2	Watersheds include the Cosumnes, Mokelumne, Calaveras and Stanislaus rivers and the Delta; Region overlies portions of the Cosumnes and ESJ groundwater sub-basins; Tabulated surface water rights; Flood management infrastructure.
Describe internal boundaries.	19/39	--	2.10.2, 2.11, 2.12, 4.1	Groundwater Management Plans; Municipalities; Land use authorities; Water districts.
Describe water supplies and demands for minimum 20-year planning horizon.	19/39	--	6.2, 6.3, 6.4.2	Planning horizon 2010-2035; Urban demand projected to grow 53% but with lower per capita use; Agricultural demands projected to decrease 6%.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Describe water quality conditions.	19/40	--	6.5.5, 6.5.6, 6.8, 8.1.6, 15.7	Overall good water quality; Saline water migration; USGS/DWR/GBA joint study; Surface water quality; Groundwater quality monitoring; Climate change risk.
Describe social and cultural makeup, including specific information on DACs and tribal communities in the region and their water challenges.	19/40	--	4.2, 5.1.1	Demographics, employment, disadvantaged communities.
Describe major water related objectives and conflicts *	19/40	§10541 (e)(3)	2.3.3, 3.3.1, 6.4.1	Objectives; Mokelumne River conflict resolution; Water rights conflicts.
Explain how IRWM regional boundary was determined and why region is an appropriate area for IRWM planning.	19/40	--	2.2.1, 4.4.1	Manageable number of political jurisdictions centered on ESJ Sub-basin.
Describe neighboring and/or overlapping IRWM efforts.	19/40	--	3.3, 4.5.2, 14	American River RWMG (South Sacramento County); Mokelumne/ Amador/ Calaveras RWMG; Tracy sub-basin; South Area Water Council; Stanislaus County; Inter-Regional collaboration.
Explain how opportunities are maximized (e.g., people at the table, natural features, infrastructure) for integration of water management activities.	38	--	2.2.1, 4.4.1	Water supply, demand management, and flood water management best performed at regional level; Integration of existing agencies working toward these objectives.
Objectives				
Through the objectives or other areas of the Plan, address: • Protection and improvement of water supply reliability, including identification of feasible agricultural and urban water use efficiency strategies Identification and	20/40-41	§10540.(c)	2.3.3, 7.4 3.1.4, 9.5.2 6.8, 8.1.3 2.6.2, 6.5.5, 6.5.6 2.6.2, 6.5.5, 6.5.6 3.4, 10.5, 10.7.1 16.2.1.2, 16.2.4	Objectives: • Water use efficiency • Drinking water quality • Water quality protection and improvement • Threats from groundwater overdraft • Resource stewardship

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
consideration of the drinking water quality of communities within the area of the Plan. • Protection and improvement of water quality within the area of the Plan consistent with relevant basin plan. • Identification of any significant threats to groundwater resources from overdrafting. • Protection, restoration, and improvement of stewardship of aquatic, riparian, and watershed resources within the region. • Protection of groundwater resources from contamination. • Identification and consideration of water-related needs of disadvantaged communities in the area within the boundaries of the Plan.*			5	• Groundwater resource protection • Water-related DAC needs

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Describe the collaborative process and tools used to establish objectives: • How the objectives were developed. • What information was considered (i.e., water management or local land use plans, etc.). • What groups were involved in the process. • How the final decision was made and accepted by the IRWM effort.	20/41		2.3.3, 7.4	Consensus-based approach; Objectives established as part of Groundwater Management Plan, Countywide Water Management Plan, and Mokelumne Aquifer Recharge and Storage Project; Objectives reviewed and updated in stakeholder workshop for the Lower San Joaquin RFMP also used. (https://www.sjafca.com/lsjrdsrfmp.php).
Identify quantitative or qualitative metrics and measurable objectives: Objectives must be measurable - there must be some metric the IRWM region can use to determine if the objective is being met as the IRWM Plan is implemented. Neither quantitative nor qualitative metrics are considered inherently better. *	20/41-42	10541.(e)	7.6, 7.7, 12.3, 12.4	Performance Measures; Prioritization Criteria.
Explain how objectives are prioritized or reason why the objectives are not prioritized.	20/42-43	--	12.4.2	Overall ranking does not change significantly when weighting criteria are changed.
Resource Management Strategies (RMS)				
Identify RMS incorporated in the IRWM Plan: Consider all CWP RMS criteria (29) listed in Table 3 of the CWP Update 2009. *	20/43	CWP Update 2009 Volume II; 10541(e)(1)	9.3	All RMS were considered.
Consideration of climate change effects on the IRWM region must be factored into RMS.	20/43	--	15.4, 15.7	Projected range of impacts under various climate change scenarios; Water supply vulnerabilities. See Section 4.5 for updates.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Integration				
Contains structure and processes for developing and fostering integration:[1] Stakeholder/institutional Resource Project implementation.	20/44-45	§10540.(g); §10541. (h)(2)	2.1.1, 4.4.1, 4.5, 8.7, 9.3, 14	Internal and external integration of stakeholders, resources, and projects.
Project Review Process				
Process for projects included in IRWM Plan must address 3 components: procedures for submitting projects; procedures for reviewing projects; and procedures for communicating lists of selected projects.	20/45	§75028.(a)	9.5	Projects included in 2007 IRWMP were updated; Active project solicitation was posted on gbawater.org and emailed to stakeholders internal and external to GBA; A sub-committee rates and ranks projects; All submitted projects are listed in the IRWMP.
Does the project review process in the plan incorporate the following factors?				
How a project contributes to plan objectives.	20	§75028.(a)	7.4, 7.6, 9.5, 12.3	Performance Measures are derived from Plan Objectives. See Sections 4.4, 4.7, and 4.8.
How a project is related to RMS identified in the Plan.	20		9.3, 9.5, 10	All projects are identified by their Primary Management Objective and Resource Management Strategy; Projects with detailed information are identified by secondary and potential Resource Management Strategy.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
The technical feasibility of a project.	20		9.5, 12.3.1	All projects are characterized by the quality of information available; Technical Feasibility is a Performance Measure grouped within Implementability.
A projects specific benefits to a DAC water issue.			5, 10	Projects benefiting DAC areas are identified both by mapped project location and in individual project descriptions.
Environmental Justice considerations.	20		5	Environmental Justice considerations included as part of DAC outreach.
Project costs and financing.	20		10, 11, 12.3	Project costs supplied by project proponents or independently estimated are included; Identified financing is Prioritization Criterion grouped under Readiness.
Address economic feasibility.	21		10, 11, 12.3	Economics are evaluated by life-cycle cost, unit cost or B:C ratio, and power cost sensitivity; Flood damage reduction estimates are in being developed in other processes and are mostly not yet available.
Project status.	21		10, 11, 12.3	Project status is reported in each project description; Readiness to Proceed is based on a status assessment of water rights, engineering, financing, and environmental documentation.
Strategic implementation of plan and project merit.	21/48		12.3, 12.4	Readiness to Proceed criteria include Project Need, Technical Feasibility, Ability to Phase, Readiness to Proceed, and Public and Stakeholder Acceptance.
Project's contribution to climate change adaptation.	21		12.3, 15	Shift in rainfall/runoff to winter from spring/summer can be mitigated by buffering supplies in groundwater storage.
Contribution of project in reducing greenhouse gasses (GHGs) compared to	21		12.3	Assumed proportional to energy use.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Status of the Project Proponent's IRWM Plan adoption.	21		2.2	Project proponents will adopt plan subsequent to GBA Board (now GSJCRWCC Board) adoption.
Project's contribution to reducing dependence on Delta supply (for IRWM regions receiving water from the Delta).	21		9.4.1, 10.3.35	City of Stockton developed the Delta Water Supply Project to make use of its Delta water rights and has begun taking transfer water from the Mokelumne River; Other projects do not take water from the Delta. Consideration in Project Review Process is addressed in Section 4.7.12 Project contribution to reducing dependence on Delta Water Supply.
Impact and Benefit				
Discuss potential impacts and benefits of plan implementation within IRWM region, between regions, with DAC/EJ concerns and Native American Tribal communities.	21	--	12.3, 13	Impact and benefit assessed using Performance Measures and groundwater modeling. See updates to Native American Tribal Community involvement in Section 3.7.4.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
State when a more detailed project-specific impact and benefit analysis will occur (prior to any implementation activity).	49	--	12.4.2, 16.2.5	An estimated schedule for project development, water rights and engineering, environmental documentation, financing and construction is presented. Estimated schedules for project development, water rights and engineering, environmental documentation, financing and construction and project impacts and benefits will be prepared to support the project review process as described in Section 4.7.14 Impact and Benefit.
Review and update the impacts and benefits section of the plan as part of the normal plan management activities.	50	--	16.2.3.4	GBA will produce a biennial report summarizing progress and adjusting assumptions, operations, actions, impacts and benefits, as necessary.
Plan Performance and Monitoring				
Contain performance measures and monitoring methods to ensure that IRWM objectives are met. *	21/53	PRC §75026.(a)	16.2.1, 16.2.3.4	GBA will continue monitoring activities to improve methodologies to quantify water budget components and ensure water level and other targets are being met. GBA will produce a biennial report summarizing progress and adjusting assumptions, operations, actions, impacts and benefits, as necessary. See Sections 4.4 and 4.8.
Contain a methodology that the RWMG will use to oversee and evaluate implementation of projects.	21/53		16.2.1, 16.2.5	GBA will continue monitoring activities to improve methodologies to quantify water budget components and ensure water level and other targets are being met.
Data Management				

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Describe data needs within the IRWM region.	54	--	4.3.4, 16.2.1	Groundwater levels and water quality; Water budget components; Population growth; Water conservation; Evapotranspiration; Data management systems. QA/QC of data is coordinated as described in Section 4.13 Data Management and Quality Assurance / Quality Control.
Describe typical data collection techniques.	54	--	16.2.1	Water level measurement; Water quality sampling; Surface and groundwater modelling; Review of UWMPs and other reports; State DOF and United States Census population estimates; CIMIS.
Describe stakeholder contributions of data to a data management system.	54	--	16.2.1	Engineer's reports; Environmental documentation; UWMPs and other documents; Water level and water quality measurements
Describe the entity responsible for maintaining data in the data management system.	54	--	4.3.4, 16.2.1	The County Flood Control and Water Conservation District maintains the data management system
Describe the quality assurance and quality control (QA/QC) measures for data.	54	--	4.3.4, 6.5, 16.2.1	Water level data contouring; Trend analysis.
Explain how data collected will be transferred or shared between members of the RWMG and other interested parties throughout the IRWM region, including local, State, and federal agencies*	54	--	4.3.4, 16.2.1.7	The county Flood Control and Water Conservation District maintains the data management system and publicly posts data on the Groundwater Data Center at SJWater.org; Water level data is also reported to the state California Statewide Groundwater Elevation Monitoring program (CASGEM) system
Explain how the Data Management System supports the RWMG's efforts to share collected data.	54	--		

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Outline how data saved in the data management system will be distributed and remain compatible with state databases including California Environmental Data Exchange Network, Water Data Library, CASGEM, California Environmental Information Catalog, and the California Environmental Resources Evaluation System.	54	--		
Finance				
Include a programmatic level (i.e., general) plan for implementation and financing of identified projects and programs* including the following: List known, as well as, possible funding sources, programs, and grant opportunities for the development and ongoing funding of the IRWM Plan.				GBA (now the GSJCRWCC) currently funded through Water Investigation Zone 2 and local contributions; Zone 2 expires June 2015; Comprehensive listing of funding sources and mechanisms; Local sponsoring agencies would fund and maintain projects, potentially with special zones established for projects of general benefit.
List the funding mechanisms, including water enterprise funds, rate structures, and private financing options, for projects that implement the IRWM Plan.	21	§10541. (e)(8)	2.6.3, 16.2.7, 16.4	
An explanation of the certainty and longevity of known or potential funding for the IRWM Plan and projects that implement the Plan.				
An explanation of how operation and maintenance (O&M) costs for projects that implement the IRWM Plan would be covered and the certainty of O&M funding.				

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Technical Analysis				
Document the data and technical analyses that were used in the development of the plan. *	22	--	1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 8.4, 9.4, 10, 11, 12.2, 13, 15, 17	Existing IRWMP, UWMPs, and local planning documents; Project engineering reports; County Groundwater Data Center; USGS/DWR/GBA Joint Water Quality Study; DYNFLOW Groundwater Model; Draft Regional Flood Management Plan; Central Valley Flood Protection Plan (CVFPP).
Relation to Local Water Planning				
Identify a list of local water plans used in the IRWM Plan.	22	§10540.(b)	1.1.1, 2.10, 3.1, 3.3, 3.4, 4.2, 6, 9.4, 10, 11, 12.2, 14, 17	Existing IRWMP, UWMPs, and local planning documents; Project engineering reports; Draft Regional Flood Management Plan; MokeWISE inter-regional study.
Discuss how the Plan relates to these other planning documents and programs.	22			
Describe the dynamics between the IRWM Plan and other planning documents.	22			
Describe how the RWMG will coordinate its water management planning activities.	58			
Relation to Local Land Use Planning				
Document current relationship between local land use planning, regional water issues, and water management objectives.	22/59 - 62	--	2.6.1.4, 2.11, 2.12, 3.5, 4.2.1, 6.2, 6.3, 11.2, 16.2.1.3,	Existing and projected land use; General Plans; San Joaquin Area Flood Control Agency and CVFPP Flood Management Plans, Land use authorities, Population and

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Document future plans to further a collaborative, proactive relationship between land use planners and water managers.	22/59 - 62	--	16.2.1.4, 16.2.3.2, 16.2.4.3	demographics, Urban and agricultural land use, Water supply measurement, Population growth and development, Protection of recharge areas; Compatibility with existing land uses.
Stakeholder Involvement				
Contain a public process that provides outreach and opportunity to participate in the IRWM plan *	22/63	§10541.(g)	2.1, 2.5, 2.6, 3.3, 3.4, 4.5.1, 5, 7.4, 8.1, 9.5, 11,1, 12.2, 12.3, 13.1, 14.1.4, 14.1.9, 16.2.6, 16.2.8	RWMG; GBA membership and governance; Stakeholder outreach and coordination; Participation in other planning efforts; Flood management stakeholders; Regional and inter-re4gional integration; DAC outreach and stakeholder identification; Objective setting; Groundwater management planning efforts; Project solicitation and stakeholder review; Alternative formulation and selection; Development of Evaluation and Prioritization Criteria; Long-term public participation and community outreach.
Identify process to involve and facilitate stakeholders during development and implementation of plan regardless of ability to pay; include barriers to involvement*	64	§10541.(h)(2)		
Discuss involvement of DACs and tribal communities.	23	--	5	DAC Outreach Plan and results; No tribal entities in Plan area. See Section 3.7.4 for clarification.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Describe decision-making process and roles that stakeholders can occupy.	23	--	2.5.2, 2.6, 3.3, 9.5, 14.1.4, 14.1.9, 16.2.6, 16.2.8	Decision-making process; Stakeholder outreach and coordination; Regional and intra-Regional stakeholder forums; Project identification and stakeholder review; Governance; Public participation and community outreach.
Discuss how stakeholders are necessary to address objectives and RMS.	23	--	2.3.3, 16.2.6	Objectives; Governance.
Discuss how a collaborative process will engage a balance in interest groups.	23	--	2.1, 2.3.3, 2.5, 4.5, 7.4, 9.1, 14	Governance; Objectives; Regional Integration; Integrated Conjunctive Use Program; Inter-Regional Coordination.
Coordination				
Identify the process to coordinate water management projects and activities of participating local agencies and stakeholders to avoid conflicts and take advantage of efficiencies. *	23/65	§10541.(e)(13)	1.1.2; 2.1, 2.3.3, 2.5, 4.5.1, 7.4, 9.1	Integrated Conjunctive Use Program; Objective Setting; GBA Governance; Intra-Regional Coordination.
Identify neighboring IRWM efforts and ways to cooperate or coordinate, and a discussion of any ongoing water management conflicts with adjacent IRWM efforts.	23/65	--	2.1, 2.3.3, 2.6.2, 4.5.2, 14	Inter-Regional Coordination and Integration.
Identify areas where a state agency or other agencies may be able to assist in communication or cooperation, or implementation of IRWM Plan components, processes, and projects, or where state or federal regulatory decisions are required before implementing the projects.	23	--	2.6.2, 10, 11, 12	State and federal regulatory processes and decisions.

Requirement from IRWM Guidelines	Plan Standard Source		Evidence of Sufficiency	
	2012 IRWM Grant Program Guidelines Source Pages	Regulatory and/or Other Citations	IRWM Plan Sections	Key Points or Descriptors
Climate Change				
Evaluate IRWM region's vulnerabilities to climate change and potential adaptation responses based on vulnerabilities assessment in the DWR Climate Change Handbook for Regional Water Planning. *	23/66-73	Climate Change Handbook vulnerability assessment[1][2]	15.7	Climate change vulnerabilities.
Provide a process that considers GHG emissions when choosing between project alternatives. *	23/68	Guidelines Legislative and Policy Context, p.66, §10541. (e)(11)	16.2.5, 16.2.9	Implementation and Climate Change actions. See Sections 4.7.6 – 4.7.9 and 4.12.1 for analysis.
Include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.	23/66-73		15.7	Prioritized climate change vulnerabilities.
Contain a plan, program, or methodology for further data gathering and analysis of prioritized vulnerabilities.	23/66-73		16.2.9	Climate change management actions.
Include climate change as part of the project review process.	23/68			

* Requirement must be addressed.

[1] If not included as an individual section use Governance, Project Review Process, and Data Management per November 2012 Guidelines, p. 44. Standards.

[2] https://www.esf.edu/glrc/library/documents/ClimateChangeHandbookforRegionalWaterPlanning_EPA_2011.pdf .

3.1 Governance

The ESJ IRWM Planning Region geography, geology, and historic circumstance place it in a vortex of state water planning issues. The situation is a complex mix of issues that might be intractable at a broader scale. Independently, agencies in Planning Region have found it difficult to wield the political and financial power necessary to mitigate historical overdraft. Regional water interests have come to

realize that a regional consensus-based approach to water resources planning and conjunctive water management increases the chance for success.

In 2001, an 11-member Joint Powers Authority was formed, formally named the ESJ County GBA.[4] The GBA employed a consensus based approach in its goal to develop "…locally supported conjunctive use projects that improve water supply reliability in San Joaquin County…and provide benefits to project participants as a whole."[5] In addition to groundwater management activities, the GBA was also responsible for preparing and submitting IRWM Plans and seeking funding under the state's IRWM grant program as the RWMG for the Region.

Over its lifetime, the GBA has become the regional groundwater management and water resources planning agency for the Basin. In 2004, the GBA completed and adopted the ESJ Groundwater Management Plan, compliant with Senate Bill 1938 and CWC Section 10750 et seq., as a step toward implementing an overall integrated conjunctive use program. The 2014 IRWMP Update (GBA, 2014) was a logical step for the GBA on its way to implementation of this program. The GBA's success was attributed to its commitment to the consensus-based approach to water supply planning, significant local, state, and federal support and its ability to speak with one voice on water issues.

The 2007 and 2014 Eastern San Joaquin IRWMPs were prepared under direction of the GBA. In early 2019, the Region began discussing options for updating the IRWM governance structure for the ESJ Planning Region. As a result of these discussions, the GBA has been replaced with the GSJCRWCC as the Regional Water Management Group.

3.1.1 Groundwater Sustainability Plan

In 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) in response to continued overdraft of California's groundwater resources. The ESJ Groundwater Subbasin is one of 21 basins and sub-basins identified by the DWR as being in a state of critical overdraft. SGMA requires preparation of a GSP to address measures necessary to attain sustainable conditions in the Subbasin. Within the framework of SGMA, sustainability is generally defined as long-term reliability of the groundwater supply and the absence of undesirable results.

The Eastern San Joaquin Groundwater Authority (ESJGWA) was formed in 2017 in response to SGMA. A Joint Exercise of Powers Agreement establishes the ESJGWA, which is composed of 16 Groundwater Sustainability Agencies (GSAs):

- Central Delta Water Agency
- Central San Joaquin Water Conservation District

[4] Formerly the Northeastern San Joaquin County Groundwater Banking Authority

[5] Northeastern San Joaquin County Groundwater Banking Authority, June 27, 2001, Amended and Restated Joint Exercise of Powers Agreement

- City of Lodi
- City of Manteca
- City of Stockton
- Eastside San Joaquin GSA (Eastside GSA) (composed of Calaveras County Water District, Stanislaus County, and Rock Creek Water District)
- Linden County Water District
- Lockeford Community Services District
- North San Joaquin Water Conservation District
- Oakdale Irrigation District
- San Joaquin County No. 1
- San Joaquin County No. 2 (with participation from California Water Service Company Stockton District [California Water Service])
- South Delta Water Agency
- South San Joaquin GSA (composed of South San Joaquin Irrigation District including Woodward Reservoir, city of Ripon, and city of Escalon)
- Stockton East Water District
- Woodbridge Irrigation District

The ESJGWA is governed by a 16-member Board of Directors (ESJGWA Board), with one representative from each GSA. The ESJGWA Board is guided by an Advisory Committee, also with one representative from each GSA, that is tasked with making recommendations to the ESJGWA Board on technical and substantive matters.

SGMA requires development of a GSP that achieves groundwater sustainability in the Subbasin by 2040. The GSP outlines the need to reduce overdraft conditions and has identified 23 projects for potential development that either replace groundwater use (offset) or supplement groundwater supplies (recharge) to meet current and future water demands. Although current analysis indicates that groundwater pumping offsets and/or recharge on the order of 78,000 acre-feet per year (AF/year) may be required to achieve sustainability, additional efforts are needed to confirm the level of pumping offsets and/or recharge required to achieve sustainability. These efforts include collecting additional data and a review of the Sub-basin groundwater model, along with other efforts as outlined in the GSP.

A Public Draft GSP was prepared and made available for public review and comment on July 10, 2019 for a period of 45 days ending on August 25, 2019. The ESJGWA received numerous comments from the public, reviewed and prepared responses to comments, and revised the Draft GSP. The Final GSP

includes those edits and revisions[6] and was submitted to DWR in January 2020, meeting the legislative deadline.

3.1.2 Land Use Authorities

There are seven incorporated cities within San Joaquin County; Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy. The San Joaquin County General Plan provided the basis for land use decisions outside of the cities. The San Joaquin County Council of Governments, the region's local transportation agency, has been designated the Metropolitan Planning Agency and is required by federal law to periodically develop population projections for the region. Actual and updated projected population for years 2000 through 2040 are presented in Table 3-2 and Figure 3-1.

Table 3-2. Actual and Projected Population 2000-2040

	2000	2005	2010	2015	2020	2025	2030	2035	2040
Escalon[1]	5,963	6,712	7,100	8,800	7,612	7,889	8,168	8,501	8,878
Lathrop[2]	10,278	12,768	17,945	21,131	28,896	35,475	42,109	50,007	58,969
Lodi[3]	56,999	60,913	63,549	66,791	69,219	73,397	77,610	82,626	88,317
Manteca[4]	49,258	63,389	67,100	79,800	77,018	82,912	88,855	95,930	103,958
Ripon[5]	10,146	13,047	14,300	18,100	16,525	17,850	19,186	20,777	22,582
Stockton[6]	243,771	292,503	291,707	325,220	329,729	352,239	374,939	401,961	432,627
Tracy[7]	56,447	78,546	82,484	89,503	91,601	96,542	101,483	106,423	111,364
Subtotal	**432,862**	**527,878**	**544,185**	**609,345**	**620,600**	**666,304**	**712,350**	**766,225**	**826,695**
Unincorporated[8]	134,891	107,817	142,466	129,879	175,351	196,120	219,408	245,532	274,855
Total	**567,753**	**635,695**	**686,651**	**739,224**	**795,951**	**862,424**	**931,758**	**1,011,757**	**1,101,550**

Sources, 2000-2015:

[1] SSJID 2010 UWMP

[2] City of Lathrop 2012 Water Supply Master Plan.

[3] City of Lodi 2010 Urban Water Management Plan (UWMP)

[4] Based on 2010 SSJID 2010 UWMP

[5] City of Ripon 2010 Municipal Services Review

[6] City of Stockton 2010 Urban Water Management Plan, California Water Service Company - Stockton District 2010 Urban Water Management Plan

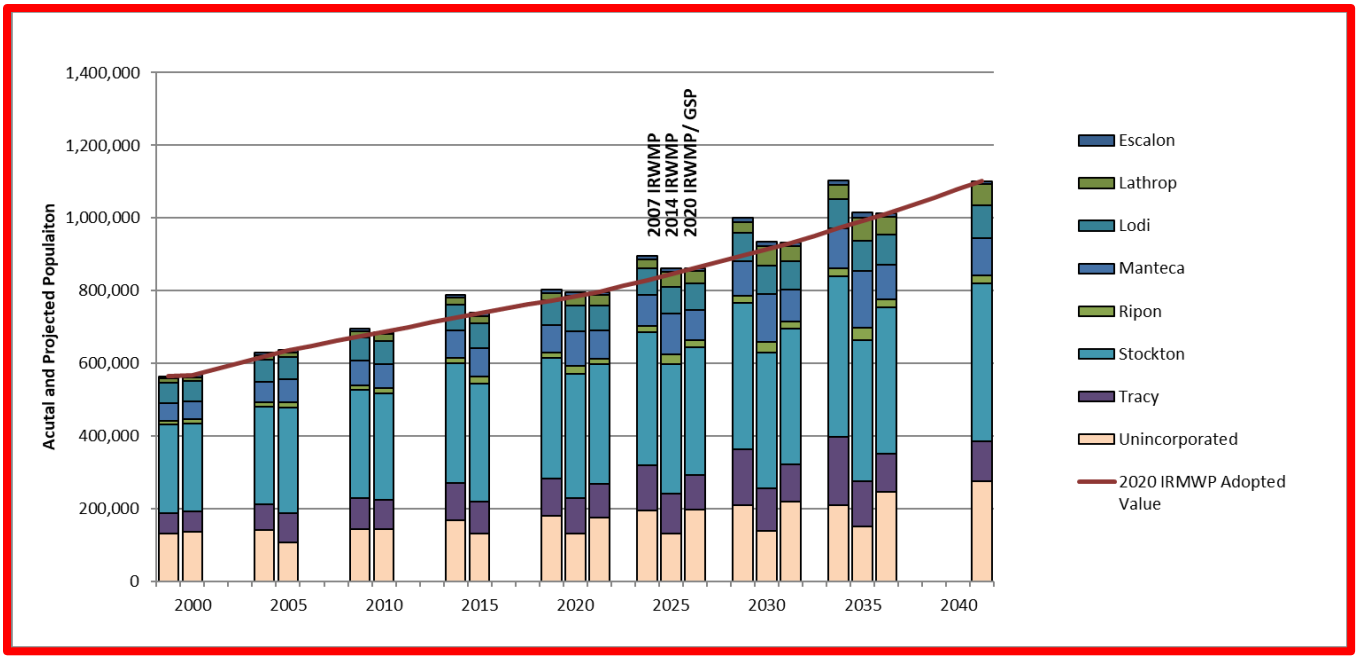
[7] City of Tracy on 2010 UWMP

[8] Difference between the 2010 Department of Finance Projections and the total population of all cities above.

Sources, 2020-2040: 2019 GSP

[6] 2019 ESJ GSP,p.ES-1

Figure 3-1. Actual and Projected Population 2000-2040.



The following section briefly describes each land use authority.

3.1.2.1 City of Escalon

The city of Escalon is located in the southeastern part of San Joaquin County and has a population of approximately 7,600. The Escalon General Plan was updated and adopted in 2004 and limits the amount of new building permits to 75 per year. The population is projected to increase to 8,900 persons by 2040. The city of Escalon has been historically dependent entirely on groundwater for all potable and non-potable demands. However, Escalon is a partner in Phase II of the South County Surface Water Supply Project and began receiving up to 2,800 acre-feet of treated Stanislaus River water in 2012.

3.1.2.2 City of Lathrop

The city of Lathrop has a population of 28,900 and is located south of Stockton along the San Joaquin River. The Lathrop General Plan was amended in 2004 and provides for new development on Stewart Tract west of the San Joaquin River; a.k.a. River Islands. The population is projected to more than double to 59,00 persons by 2040. Lathrop began receiving treated surface water from the South County Surface Water Supply Project in 2005 and will ultimately be allocated up to 10,000 AF/year in Phase II of the Project.

3.1.2.3 City of Lodi

The city of Lodi is located northeast of Stockton along the south bank of the Mokelumne River astride Highway 99. Lodi has an estimated 2020 population of 69,200. The Lodi General Plan was last updated in April 2010 and projects modest development in comparison to other cities in the county and the Central Valley. In 2040, the projected population is expected to increase 28 percent to 88,300 persons.

Lodi has relied entirely upon groundwater; however, under a long-term water purchase from the Woodbridge Irrigation District, Lodi is entitled to 6,000 AF/year of Mokelumne River water. The Lodi Surface Water Treatment Plant was completed in 2012.

3.1.2.4 City of Manteca

The city of Manteca is located south of Stockton and east of Lathrop along Highway 99 and has a population of approximately 77,000. The Manteca General Plan was updated in 2020. The projected population is expected to increase 35 percent to 104,000 by 2040. Manteca began receiving treated surface water from the South County Surface Water Supply Project in 2005 to augment groundwater supplies and will ultimately be allocated up to 16,400 AF/year in Phase II of the Project.

3.1.2.5 City of Ripon

The city of Ripon is located in south San Joaquin County along the north bank of the Stanislaus River straddling Highway 99. Ripon has an approximate population of 16,500. The Ripon General Plan was updated in 2006. The projected population is expected to increase 37 percent to 22,600 by 2040. Ripon relies entirely upon groundwater for all potable and non-potable demands.

3.1.2.6 City of Stockton

The city of Stockton is the 12th largest city in the state and the 4th largest in the Central Valley. Stockton has an estimated population of 329,700 in 2020 which is projected to increase 31 percent to 432,600 by 2040. The Stockton General Plan was updated in 2018. For IRWM Planning purposes, the city of Stockton Metropolitan Area is considered to include areas outside of the city limits in the California Water Service Company. service area and County Service Areas within the Stockton sphere of influence.

3.1.2.7 City of Tracy

The city of Tracy is located in Southwest San Joaquin County nestled along interstates 5, 205, and 580 just east of the Altamont Pass on the way to the Bay Area. Tracy has an estimated 2020 population of 91,600. The Tracy General Plan was updated in 2011. The projected population is expected to increase 22 percent to 111,400 by 2040. Although outside of the ESJ Groundwater Management Area, Tracy receives treated Stanislaus River water through the South County Surface Supply Project and will be allocated up to 10,000 AF/year in Phase II of the Project.

3.2 Mokelumne River Forum

The eastern border of the East San Joaquin Region is near the western border of the Mokelumne-Amador-Calaveras (MAC) Region. The county line between Amador County and San Joaquin County, and the county line between Calaveras County, Stanislaus County, and portions of San Joaquin County, constitute the interface between the two regions. The two regions have remained separate IRWM regions because the water supply issues are significantly different (predominately groundwater in the East San Joaquin Region versus surface water in the MAC Region), the number of agencies and non-

governmental organizations interested in water resource issues is significant in both the valley and the foothills, and the travel distances between the outlying areas of the two regions are great and therefore would be an impediment to participation.

The MAC Region and the ESJ Region have been engaged in regular coordination and communication for more than 10 years. The Mokelumne River Forum, a facilitated discussion between agencies involved in both regions, was effective in developing improved understanding among the valley interests and the foothill interests. This improved understanding resulted in a four-party agreement between San Joaquin, Amador, and Calaveras counties and East Bay Municipal Utility District (EBMUD) to jointly investigate water supply and conjunctive use opportunities. That collaborative engagement resulted in formation of the Upper Mokelumne River Water Authority with the MAC and the ESJ GWA entering into an MOU in October 2012. The two regions received a $605,000 Prop 84 planning grant to fund the Mokelumne Watershed Interregional Sustainability Evaluation (MokeWISE) Program, which produced a report that assessed water supply, water quality and environmental resources and objectives in Amador, Calaveras and San Joaquin counties and in the service area of the East Bay Municipal Utility District (EBMUD). The program recommended interregional approaches to improve water management, and the final report was completed in June 2015.

3.3 Regional Water Management Group: GSJCRWCC

Prior to 2019, the GBA served as the RWMG for the ESJ Planning Region. The GSJCRWCC has now taken on the responsibility of being the RWMG for the Region. The GSJCRWCC meets DWR's definition of an RWMG as defined by CWC Section 10537.

The GSJCRWCC, unlike the GBA, is formed under an MOU with the goal of expanding membership and increasing consensus-building. This kind of collaboration amongst the GSJCRWCC member agencies has strengthened the potential for broad public support for groundwater management activities as well as the ability to leverage local, state, and federal funds. Table 3-3 lists the member agencies of GSJCRWCC as of March 2020. Like its predecessor, the GSJCRWCC is the RWMG responsible for developing and implementing the ESJ IRWMP.

Table 3-3. Member Agencies, Greater San Joaquin County Coordinating Committee

Catholic Charities of the Diocese of Stockton
Environmental Justice,
Central Delta Water Agency,
City of Lodi,
City of Stockton,
North San Joaquin Water Conservation District,
Reclamation District 2074,
San Joaquin County Flood Control and Water Conservation District,
Sierra Club, Delta-Sierra Group,
South Delta Water Agency,
South San Joaquin Irrigation District,
Stockton East Water District

In addition to developing and implementing an IRWMP that meets the requirements of CWC §10540 and §10541, the GSJCRWCC has also prepared the following problem statement, purpose statement, mission, and objectives to guide their work.

Chapter 4 of the 2014 IRWMP ("Region Description") shows and describes the boundaries of the member agencies of the GBA, which was the IRWM group at the time of that plan's adoption. This also

reflects the current boundaries of the GSJCRWCC. Thus, the boundary map as seen in the 2014 IRWMP is the most updated map of the IRWM boundaries.

3.3.1 GSJCRWCC Problem Statement and Purpose Statement

The following **Problem Statement**[7] is from the 2014 IRWMP:

> *Long-term groundwater overdraft due to lack of sufficient surface water supplies and long-term reliance on groundwater threatens the social, economic, and environmental viability of the San Joaquin Region. Stormwater and flood flows threaten life and property. Though conditions of overdraft may be decreasing, without action, depressed groundwater levels may result in saline groundwater migration from the west, reduction in groundwater quality due to elevated nitrates and salts, increased pumping costs, increased seepage losses from local rivers and streams, increased lateral inflow from neighboring sub-basins, and other potentially devastating groundwater and surface water impacts.*

The related **Purpose Statement**[8] states:

> *The Purpose of the Eastern San Joaquin IRWMP is to define and integrate key water resource strategies and to establish the protocols and course of action for implementation of the Eastern San Joaquin Integrated Regional Water Management Plan (IRWMP). The IRWMP is a comprehensive prioritized menu of projects and actions that fulfills the Mission of the GSJCRWCC and supports the ESJGWA.*

The GSJCRWCC has employed a consensus-based approach in its goal to develop "…locally supported conjunctive use projects that improve water supply reliability in San Joaquin County…and provide benefits to project participants as a whole."[9]

3.3.2 GSJCRWCC Mission and Objective

The mission of the GSJCRWCC is to employ a consensus-based approach to collaboratively develop stakeholder-supported projects and programs that mitigate and prevent the impacts of long-term groundwater supply-demand imbalance. Managing the underlying groundwater basin is critical in

[7] 2007 IRWMP p.5-1
[8] 2007 IRWMP p.5-2
[9] Northeastern San Joaquin County Groundwater Banking Authority, June 27, 2001, Amended and Restated Joint Exercise of Powers Agreement

providing reliable water supplies, which are essential for the economic, social, and environmental viability of the San Joaquin Region. Developing an IRWMP is fundamental to carrying out this Mission.

As described in Chapter 7 of the IRWMP, the objective for the IRWM Plan was developed by the GSJCRWCC to address the underlying issues listed above, consistent with the Plan Purpose. The Objective statement adopted by the GSJCRWCC is as follows:

It is the Objective of the GSJCRWCC to ensure the long-term sustainability of water resources in the San Joaquin Region while:

- Equitably distributing benefits and costs;
- Minimizing adverse impacts to agriculture, communities, and the environment;
- Maximizing efficiency and beneficial use of supplies;
- Managing stormwater and providing flood protection; and,
- Protecting and enhancing water rights and supplies.

3.4 Governance Structure

As described above, the GSJCRWCC replaced the GBA, which directed the preparation of the 2007 and 2014 ESJ IRWMPs, as the RWMG for the ESJ Planning Region. The GSJCRWCC is the decision-making authority, and is supported by the Project Management Team (*see* Section 3.4.3) and various Work Groups that perform specific functions and report to the Project Management Team and GSJCRWCC. Figure 3-2 illustrates the governance structure of the ESJ Planning Region.

Figure 3-2. Mutual Interest-based Governance Model.

In 1986, the San Joaquin County Board of Supervisors adopted a Water Policy and later a Water Implementation Plan along with an expansion of the District Advisory Water Commission (AWC) and

the establishment of the Water Resources Coordinator position. These steps toward greater water management were in direct response to growing concerns regarding the County's ability to sustain its water supply as it faced increased demands in response to increased urbanization and development in addition to continued agricultural activities. At the time, studies indicated that a lack of sufficient surface water supplies led to increased groundwater pumping, which strained regional aquifers. The associated depletion of these groundwater supplies created a heightened concern of increased salinity of groundwater due to salt-water intrusion.

Water Investigation Zone No. 2 (Zone 2) was established as a countywide zone in 1989 with an accompanying assessment. On June 20, 2000, the Board of Supervisors approved the Annual Engineer's Report setting forth the assessment apportionment to all benefiting properties within Zone 2 for 15 years, commencing in Fiscal Year 2000-2001, and ending after Fiscal Year 2014-2015.

The San Joaquin County Board of Supervisors conducted a Proposition 218 process, and on May 1, 2015, San Joaquin County property owners approved a property-related fee in support of the water management efforts funded by Zone 2. This fee is used to support efforts to carry out the "Strategic Plan to Meet Water Needs" adopted by the Board of Supervisors, which includes the following goals and objectives: Preserve water rights; Manage groundwater in Eastern San Joaquin County; Protect water quality; Maintain and enhance southwest County water supplies; Develop funding programs; and Support watershed education programs. The GSJCRWCC is funded by this fee. San Joaquin County Public Works Department provides staff support for the GSJCRWCC.

3.4.1 Memorandum of Understanding and Decision-Making Charter

In late summer 2019, the final MOU forming the GSJCRWCC was released and made available for signature by organizations with an interest in integrated regional water management planning. A subsequent Decision-Making Charter was developed by the signatories and released in late 2019. Combined, these documents outline the governance structure for the GSJCRWCC.

Major topics addressed in the MOU include purpose and goals, membership, representation, joining and leaving, and financing. The MOU and any organization's participation in IRWM efforts is non-binding. Major topics addressed in the Decision-Making Charter include the decision-making process, stakeholder involvement, work groups, and adopting the IRWM Plan. The Decision-Making Charter also outlines the purpose, roles, and responsibilities of the Project Management Team.

3.4.2 Greater San Joaquin County Regional Water Coordinating Committee

The current role of the GSJCRWCC is to support the actions of its member agencies through continuing dialogue as a consensus-based organization, to serve as a regional voice when applying for grants and other funding opportunities and support inter-regional collaboration with other IRWM regions. Any qualifying entity that signs the MOU will become an official member of the GSJCRWCC.

In addition to serving as the primary governing and decision-making body, responsibilities of the GSJCRWCC include the following.

- Develop a comprehensive planning document to facilitate regional cooperation in providing water supply reliability, water recycling, water conservation, water quality improvement, stormwater capture and management, flood management, and environmental and habitat protection and improvement;
- Actively participate in the planning process by providing feedback on draft work products, approving final work products, and facilitate getting approval of the final IRWM Plan from their respective organizations;
- Foster coordination, collaboration, and communication between GSJCRWCC organizations and interested stakeholders;
- Communicate information to and from their agencies, organizations and/or constituencies;
- Support the procurement of state and federal grant funding; and
- Use consensus as a base for all decision-making.

Generally, the GSJCRWCC meets monthly. Each member organization is expected to identify a lead representative that will attend the GSJCRWCC meetings and make decisions on behalf of their organization. Member organizations may also choose to identify one alternate, in instances where the lead representative is unavailable to attend a meeting.

Any organization with an interest in integrated regional water management planning may join the GSJCRWCC. Members could include, but are not limited to, such organizations as: water agencies, conservation groups, agriculture representatives, community action groups, businesses, tribal groups, and land use entities. To join the GSJCRWCC, a prospective member must notify the GSJCRWCC of their intent to join, then sign the MOU. A prospective member may email GSJCRWCC@sjgov.org or visit the ESJ Region's webpage at www.esjirwm.org. To discontinue participation in the GSJCRWCC, a member may do so at any time by notifying the GSJCRWCC and signing the Notice of Withdrawal, which is included as a separate signature page attached to the MOU.

3.4.3 Project Management Team

The Project Management Team, outlined in the Decision-Making Charter, is a sub-set of GSJCRWCC members that work with consultant team(s), as necessary, to perform administrative duties. As such, the Project Management Team serves purely in an advisory role to the GSJCRWCC. The Project Management Team is comprised of a Chair, Vice-Chair, and Secretary, and the GSJCRWCC is responsible for electing these officers.

Should the Chair resign, the Vice-Chair shall assume the office until such a time that a new Chair can be elected by the Coordinating Committee. Should the Vice-Chair or Secretary resign before new elections are held, the Committee shall elect another member to assume the office. The roles and responsibilities of the Project Management Team are defined below.

3.4.3.1 Chair

The Chair shall perform the following duties: 1) conduct and preside at all meetings; 2) keep order; 3) jointly develop agendas with the Vice-Chair and Secretary; 4) oversee the posting of notices of meetings and agendas; 5) bring relevant updates to the attention of the Committee; and 6) call for and schedule special meetings of the Committee, as needed.

3.4.3.2 Vice-Chair

The Vice-Chair shall perform the following duties: 1) assume the duties of the Chair in the event of the Chair's absence or disability; 2) jointly develop agendas with the Chair and Secretary; and 3) represent the Chair in assigned duties.

3.4.3.3 Secretary

The Secretary shall perform the following duties: 1) preside over the Committee meetings when both senior officers are unavailable; 2) ensure the completion of meeting minutes; 3) ensure the Committee and other members of the community receive copies of the approved minutes upon request; 4) ensure the keeping of a register of the names, addresses, email addresses, and telephone numbers of each member of the Committee, and others with whom the Committee has regular dealings, as furnished by those persons; and 5) post or cause to be posted in prominent places the most recently approved Committee's minutes.

3.4.4 Disadvantaged Communities Task Force

With funding from the Disadvantaged Community Involvement Program (DACIP), the Coordinating Committee worked with the Environmental Justice Coalition for Water (EJCW) to outreach to DAC's in the Greater San Joaquin County IRWM Region. The purpose of the project was to increase DAC engagement in IRWM efforts by developing a DAC Task Force that could be incorporated into the Greater San Joaquin Region's governance structure. The project, conducted over a period of 4 months from April 2020 to July 2020, was organized into six phases – initial outreach, discussion sessions, water leadership trainings, water justice tours, creation of the DAC Task Force, and integrating the DAC Task Force into the IRWM governance structure.

Due to the COVID-19 pandemic, all outreach was conducted virtually. First, an outreach contact list was developed with input from existing environmental justice organizations, local public agencies, elected officials, and religious organizations. Initial outreach was conducted via e-mail, phone, social media, and in-person canvassing as allowed by local health regulations. In-person contacts were made at various mobile home parks, migrant centers, community centers, and other various locations in the identified DACs. Bilingual postcards were available inviting interested parties to the virtual webinars. Two discussion sessions were held to inform interested parties of the IRWM structure and recruit participants in the water leadership training. Tours were given to interested parties to educate participants on water-related issues and how partnerships could be formed to advance solutions. In all, seven meetings were held to support the outcomes of this work. Flyers prepared for these meetings are included in Appendix D.

After the series of meetings and continued outreach, interested community members were asked to fill out a DAC Task Force application. Thirteen applications were received and accepted to the DAC Task Force. The first DAC Task Force meeting was held on July 13, 2020. The purpose of this first meeting was to introduce the Task Force to their role in the Region's governance structure, help them understand state grant funding sources for IRWM work, and prepare them for the August Task Force Meeting which was held on August 17, 2020. The purpose of the August meeting was to help them understand the DAC project scoring process and criteria, discuss submitted DAC projects, and prepare recommendations to the Coordinating Committee on how to allocate available funding to DAC projects. The DAC Task Force funding recommendations were taken to the Coordinating Committee at their August 19, 2020 where they were unanimously accepted.

3.4.5 Workgroups

The GSJRWCC may choose to create Workgroups to advance specific tasks outside of regular GSJCRWCC meetings. When these groups are formed, a clear purpose with expected products and completion dates will be defined. Workgroups could be formed around particular topic areas that would provide input and recommendations to the GSJCRWCC. In these cases, all decisions would be approved by the GSJCRWCC as a whole.

3.5 Decision Making Process

The GSJCRWCC bases all its decision-making on consensus, which is defined by agreement among all active members. Active participation means regular attendance at GSJCRWCC meetings; and reviewing planning and other written documents before discussions or decisions will be made. It is understood that occasionally GSJCRWCC members may need to miss a meeting. If there is a question as to whether a GSJCRWCC member should be considered "active" for purposes of decision-making, the GSJCRWCC will make that determination by communicating with the member or determining whether the stakeholder is active or not based on recent participation.

In reaching consensus, some GSJCRWCC members may strongly endorse a particular proposal while others may accept it as "workable." Others may be only able to "live with it." Still others may choose to "stand aside" by verbally noting a disagreement yet allowing the group to reach a consensus without them if the decision does not affect them or compromise their interests. Any of these actions still constitutes consensus.

The GSJCRWCC shall not limit itself to strict consensus if 100 percent agreement among all participants cannot be reached after all interests and options have been thoroughly identified, explored, discussed, and considered. Less-than-consensus decision-making shall not be undertaken lightly. If, after full exploration and discussion, the GSJCRWCC cannot come to consensus as defined above, it will use the less-than-consensus decision-making protocol. The Project Management Team will determine if 100 percent consensus is not reached, and the less-than-consensus decision-making protocol will be exercised.

If the GSJCRWCC cannot come to a decision by consensus, the less-than-consensus decision-making protocol will be employed. In these cases, a decision must be endorsed by 75 percent of the total number of GSJCRWCC members present. In other words, the decision cannot be opposed by more than 25 percent of the total number of GSJCRWCC members present.

GSJCRWCC organization representatives are encouraged to understand and make decisions that align with the values and interests of the organization they are representing. However, GSJCRWCC members understand that unless a vote of a member is either pre-approved or ratified by the members' governing body, namely its city council or board, the effect of the member's vote does not bind that member to the decision.

3.6 Eastern San Joaquin Integrated Regional Water Management Plan

The ESJ IRWMP covers the non-Delta portion of San Joaquin County and seeks to integrate water management activities and align supply and restore basin groundwater elevations to levels that provide sustainable supplies for meeting conditions of drought or supply outage.

The first IRWMP was adopted in 2007, and a program environmental document was prepared. The program Environmental Impact Report was not updated as part of this 2014 IRWMP Update.

The 2014 IRWMP Update includes floodwater and stormwater projects, climate change adaptation, and updates and expands the prioritized project list.

3.7 Communication Internal to the IRWM Region

The GSJCRWCC has made a concerted effort to reach out and involve stakeholders and the public in its IRWM Plan Update activities including:

- The GSJCRWCC itself is a forum to find mutually beneficial solutions to the area's water problems
- Coordination with DACs and partner organizations to foster capacity-building and IRWM engagement within DACs
- All GSJCRWCC planning efforts are open to the public, with agendas and meeting minutes published on the internet
- IRWM planning activities were regularly reported to the county-wide Advisory Water Commission
- San Joaquin County has dedicated staff and financial resources for this high-priority effort
- GSJCRWCC staff participate in other regional planning activities such as those related to the SGMA

3.7.1 Public Outreach

The GSJCRWCC regularly provides information to stakeholders and the general public through many avenues. On a regular basis, meeting agendas and minutes are distributed to interested parties, regular attendees and the public via United States Mail and email. The notifications are also published on the internet at www.ESJIRWM.org. Besides the GSJCRWCC website, other avenues of public outreach include newsletters, frequent mailing of complete agenda packets, distribution of press releases, and DACIP outreach and task force.

3.7.2 GSJCRWCC Website

The ESJ Planning Region website has been online since early 2006 and continues to be maintained on a regular basis. In 2019, it was migrated from its original location on www.gbawater.org to www.esjirwm.org. It contains an introduction of the Mission and Member Agencies with links and meeting information. There are detailed sections for projects, education materials, and detailed meeting notices with the accompanying minutes. As a major purpose in creating accessible information online, there is a section devoted to press releases, newsletters, public notices and other major events and accomplishments. As distribution of information to the public and interested parties is important, there is also an area to access the complete project reports relative to the GSJCRWCC and its member agencies. Contact information is readily available for interested parties to communicate with GSJCRWCC members and staff.

3.7.3 Regular GSJCRWCC Meetings

The GSJCRWCC convenes on the third Wednesday of the month and met every month during IRWM Plan development to provide beneficial interaction. Some meetings were held via teleconference due to coronavirus concerns. When the June and July GSJCRWCC meetings were not held, staff reports were provided by the Project Team. At these meetings, key discussion points and decisions are debated and finalized by the GSJCRWCC and incorporated into the IRWMP by the Project Management Team.

This draft IRWMP Addendum was also presented to and commented on by the GSJCRWCC. The GSJCRWCC was regularly updated on the activities of the IRWM Plan at their regular meetings on the third Wednesday of the month. The agenda for each meeting was set as appropriate to discuss the current activities of the active elements. All GSJCRWCC meetings are open to the public with agendas published on the internet and distributed to the regular mailing list as well as posted on a bulletin board inside the San Joaquin County Public Works Department.

3.7.4 Native American Communities in San Joaquin County

The 2016 DWR Guidelines for the IRWMP state the following as related to Native American Communities:

- Plan Performance and Monitoring: Discuss specific benefits to critical water issues for Native American Tribal communities.

- Stakeholder Involvement: It should be noted that Tribes are sovereign nations, and as such coordination with Tribes is on a government-to-government basis.

Within San Joaquin County, there are no federally recognized Native American reservations or significant formalized concentrations of Native American communities, and thus the above requirements are technically not applicable for this IRWMP Addendum. This can be confirmed in the California State Water Resources Control Board (SWRCB) Regions and California Tribal Homelands and Trust Lands Map.

Discussions with the Environmental Coalition for Water Justice (EJCW) – a statewide coalition of grassroots groups and intermediary organizations focusing on underserved and low-income communities' access to water – point to a more complex description of Native American representation in San Joaquin County. There are many residents in San Joaquin County whose lineages collectively connect to many of the Native American tribes throughout the Western United States. These tribes are recognized both within and outside of the state of California's boundaries. The residents form informal communities within their families and direct lineages, and within committees representing the mutual interests of several tribal entities. Multiple issues present significant challenges to these groups in their attempts to improve engagement within the Native American communities of San Joaquin County, including (but not limited to):

1. The absence of Native American reservations in the county and subsequent lack of official and focused centers for residents to seek kinship, strengthen identity, and build community bonds.

2. Generational disparities which reduce the impact of certain methods of communication and outreach. For example, older community members tend to become more engaged when reached out to in-person, while younger generations are often more connected to social media and virtual outreach.

3. Lack of engagement from younger residents of Native American lineage due to issues with blood quantum – which defines Native American identity by percentages of ancestry – since they may not be able to register with the government as tribal members.

The EJCW has recommended measures to mitigate these obstacles and better ensure that the interests of residents of Native American descent in San Joaquin County are not overlooked in the management of water resources and implementation of associated projects. The most crucial elements in any of these recommendations are Engagement and Inclusivity. The EJCW suggests that taskforces, notably the existing DAC Taskforce (*see* Section 3.4.4 of this IRWMP Addendum for further information) work to formally include at least one representative from the county that is an active member of the Native American Community and is able to speak to the issues concerning these groups. Furthermore, all residents of these communities should be encouraged to connect with this taskforce to make their needs heard, which will involve both in-person and virtual outreach efforts for constant and sustained engagement of these communities. The DAC taskforce should thus be preserved even beyond serving its initial purpose due to its ability to adapt and expand to meet needs such as these.

4.0 Conformance to 2016 IRWM Guidelines

Table 4-1 provides a cross-reference to sections of the adopted 2014 IRWM Plan mapped to DWR's 2016 Integrated Regional Water Management Guidelines. Table 4-1 uses Strikeout/Underline where the 2014 IRWMP is corrected or updated.

Table 4-1. DWR Plan Review Table

Additional 2016 IRWM Requirements	IRWM 2016 Plan Standards: Updates to 2012 IRWM Plan Standards	IRWM 2016 Guidelines Page Number	Location in 2014 IRWMP	Location in 2020 IRWMP
Region Description				
	2012 Guidelines (GL) Requirement (if applicable): Describe and explain how the plan will help reduce dependence on the Delta supply regionally. Updated code citation for the requirement: Public Resources Code §29700-29716.	37	9.4.1, 10.3.35	4.1,4.7, 4.7.12
1a	2012 GL Requirement: Describe water quality conditions. Same requirement with the following additional detail pertaining to AB 1249: "If the IRWM region has areas of nitrate, arsenic, perchlorate, or hexavalent chromium contamination, the Plan must include a description of location, extent, and impacts of the contamination; actions undertaken to address the contamination, and a description of any additional actions needed to address the contamination (CWC §10541.(e)(14))."	37	6.5.5, 6.5.6,6.8, 8.1.6, 15.7	4.1, 4.2
1b	Additional requirement, not in 2012 GL: Describe likely Climate Change impacts on the region as determined from the vulnerability assessment 1.	42	--	
Plan Objectives				
2a	Additional requirement, not in 2012 GL: Address adapting to changes in the amount, intensity, timing, quality and variability of runoff and recharge.	38, 42	--	4.4
2b	Additional requirement, not in 2012 GL: Consider the effects of sea level rise (SLR) on water supply conditions and identify suitable adaptation measures.	38, 42	--	4.4.1.3
2c	Additional requirement, not in 2012 GL: Reducing energy consumption, especially	38, 42	--	4.7.9

Additional 2016 IRWM Requirements	IRWM 2016 Plan Standards: Updates to 2012 IRWM Plan Standards	IRWM 2016 Guidelines Page Number	Location in 2014 IRWMP	Location in 2020 IRWMP
	the energy embedded in water use, and ultimately reducing GHG emissions.			
2d	Additional requirement, not in 2012 GL: In evaluating different ways to meet IRWM Plan objectives, where practical, consider the strategies adopted by CARB in its AB 32 Scoping Plan.	38, 42	--	4.4, 4.7.6-4.7.9, 4.12.1
2e	Additional requirement, not in 2012 GL: Consider options for carbon sequestration and using renewable energy where such options are integrally tied to supporting IRWM Plan objectives.	38, 42	--	4.4, 4.7.6-4.7.9, 4.12.1
Resource Management Strategies (RMS)				
	2012 GL Requirement: Consider all 29 CWP RMS criteria listed in Table 3 from the CWP Update 2009. Identify RMS incorporated in the IRWM Plan.		9.3	
3a	Same requirement with the following updates: CWP Update 2013 referred to instead of 2009. Additional RMS's in the 2013 update are Sediment Management, Outreach and Engagement, and Water and Culture (for a total of 32 requirements).	38	--	4.5.1, 4.5.2, 4.5.3
	2012 GL Requirement: Consideration of climate change effects on the IRWM region must be factored into RMS.	38, 42	15.4, 15.7	
	Same requirement with the following additional detail:			
3b	Identify and implement, using vulnerability assessments and tools such as those provided in the Climate Change Handbook, RMS and adaptation strategies that address region-specific climate change impacts.		--	4.5, 4.7, 4.12
3c	Demonstrate how the effects of climate change on its region are factored into its RMS.		--	4.5
3d	Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions.		--	4.7.9
3e	An evaluation of RMS and other adaptation strategies and ability of such strategies to eliminate or minimize those vulnerabilities, especially those impacting water infrastructure systems.		--	4.5, 4.7
Project Review Process				
	2012 GL Requirement: Project's contribution to climate change adaptation.	37, 43	12.3, 15	

Additional 2016 IRWM Requirements	IRWM 2016 Plan Standards: Updates to 2012 IRWM Plan Standards	IRWM 2016 Guidelines Page Number	Location in 2014 IRWMP	Location in 2020 IRWMP
	Same requirement with the following additional detail:			
4a	Include potential effects of Climate Change on the region and consider if adaptations to the water management system are necessary.		--	4.7.2
4b	Consider the contribution of the project to adapting to identified system vulnerabilities to climate change effects on the region.		--	4.7.3
4c	Consider changes in the amount, intensity, timing, quality and variability of runoff and recharge.		--	4.7.4
4d	Consider the effects of SLR on water supply conditions and identify suitable adaptation measures.		--	4.7.5
	2012 GL Requirement: Contribution of project in reducing GHGs compared to project alternatives. Same requirement with the following additional detail:	39, 42	12.3	4.7.7
4e	Consider the contribution of the project in reducing GHG emissions as compared to project alternatives		--	4.7.6
4f	Consider a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over the 20-year planning horizon.		--	4.7.8
4g	Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions.		12.3	4.7.9
Plan Performance and Monitoring				
5a	Additional requirement, not in 2012 GL: Specific benefits to critical water issues for Native American Tribal communities.	52	-	3.7.4
5b	Additional requirement, not in 2012 GL: Contain policies and procedures that promote adaptive management and, as more effects of Climate Change manifest, new tools are developed, and new information becomes available, adjust IRWM Plans accordingly.	39, 43	--	4.8.2
	2012 GL Requirement: Discuss how the plan relates to these other planning documents and programs.	62		
	Same requirement with the following additional detail:			
5c	"It should be noted that CWC § 10562 (b)(7) (i.e. SB 985) requires the development of a stormwater resource plan and compliance with these provisions to receive grants for		--	4.8.3, 4.9.2

Additional 2016 IRWM Requirements	IRWM 2016 Plan Standards: Updates to 2012 IRWM Plan Standards	IRWM 2016 Guidelines Page Number	Location in 2014 IRWMP	Location in 2020 IRWMP
	stormwater and dry weather runoff capture projects. Upon development of the stormwater resource plan, the RWMG shall incorporate it into IRWM Plan. The IRWM Plan should discuss the processes that it will use to incorporate such plans. This requirement does not apply to DACs with a population of 20,000 or less and that is not a co-permittee for a municipal separate stormwater system national pollutant discharge elimination system permit issued to a municipality with a population greater than 20,000." Minor wording differences - e.g., GSP example in the 2016 Guidelines instead of Groundwater Management Plan in the 2012 Guidelines.			
Local Water Planning				
6	Additional requirement, not in 2012 GL: Consider and incorporate water management issues and climate change adaptation and mitigation strategies from local plans into the IRWM Plan.	41, 43	--	4.9
Local Land Use Planning				
7	Additional requirement, not in 2012 GL: Demonstrate information sharing and collaboration with regional land use planning in order to manage multiple water demands throughout the state, adapt water management systems to climate change, and potentially offset climate change impacts to water supply in California.	30, 43	--	4.10
Stakeholder Involvement				
	2012 GL Requirement: Contain a public process that provides outreach and opportunity to participate in the IRWM Plan.	40	2.1, 2.5, 2.6, 3.3, 3.4, 4.5.1, 5, 7.4, 8.1, 9.5, 11.1, 12.2, 12.3 13.1, 14.1.4, 14.1.9, 16.2.6, 16.2.8	
8	Same requirement with the following additional detail: “Native American Tribes – It should be noted that Tribes are sovereign nations, and as such coordination with		-	3.7.4

Additional 2016 IRWM Requirements	IRWM 2016 Plan Standards: Updates to 2012 IRWM Plan Standards	IRWM 2016 Guidelines Page Number	Location in 2014 IRWMP	Location in 2020 IRWMP
	Tribes is on a government-to-government basis."			
Climate Change				
	2012 GL Requirement: Evaluate IRWM region's vulnerabilities to climate change and potential adaptation responses based on vulnerabilities assessment in the DWR Climate Change Handbook for Regional Water Planning	42, 69 - 71	15.7	
9a	Same requirement with the following additional detail: "***At a minimum***, the vulnerability evaluation must be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning, Section 4 and Appendix B."		--	4.12
	2012 GL Requirement: Provide a process that considers GHG emissions when choosing between project alternatives.	39, 66 - 68	16.2.5, 16.2.9	
9b	Same requirement with the following additional detail: "At a minimum, that process must determine a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over a 20-year planning horizon and consider energy efficiency and reduction of GHG emissions when choosing between project alternatives."		--	4.12.1.1
	2012 GL Requirement: Include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.	40, 42 – 43, 54	15.7	4.12.1.2
9c	Same requirement with the following additional detail: "A list of prioritized vulnerabilities which includes a determination regarding the feasibility for the RWMG to address the priority vulnerabilities."		--	
9d	Additional requirement, not in 2012 GL: Address adapting to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.	38 – 39, 42 - 43	--	4.12.1.3
9e	Additional requirement, not in 2012 GL: Areas of the state that receive water imported from the Sacramento-San Joaquin River Delta, the area within the Delta, and areas served by coastal aquifers must also consider the effects of SLR on water supply conditions and identify suitable adaptation measures.	42	--	4.12.1.4

4.1 Region Description

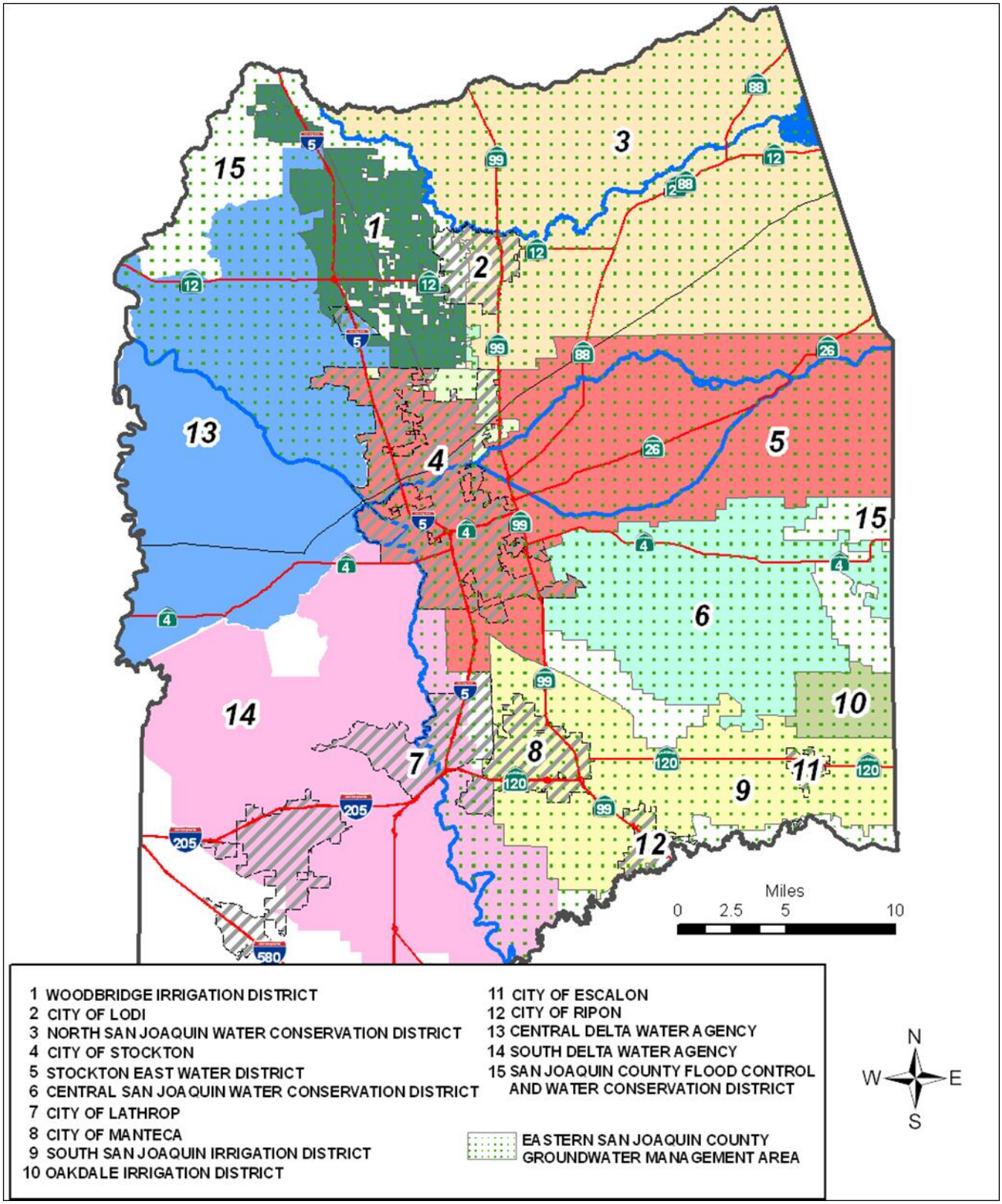
For the purposes of this IRWMP, the ESJ Regional Planning Area is defined as that portion of the San Joaquin region which overlies the ESJ Subbasin (*see* Figure 4-1), which coincides with the adopted GMA. The GMA and the overlying agencies are depicted in Figure 4-1. To ensure that every parcel in the GMA is represented, all unorganized areas are included in the San Joaquin County Flood Control and Water Conservation District.

The ESJGWA was formed in 2017 to prepare a GSP pursuant to the SGMA. A Joint Exercise of Powers Agreement established the ESJGWA, composed of 16 GSAs and is governed by its board (*refer to* Section 3.1.1).[10]

For information related to drinking water quality violations in small water systems, *see* Section 4.9.5 of this IRWMP Addendum. There are no issues related to nitrate, perchlorate, or hexavalent chromium contamination, but Sunny Road Water System (PWSID: CA3901213) has had 29 violations related to arsenic levels since 2012. This is considered a "very small" community, with a population of 30 and only 15 service connections, and thus has minimal extent and impact. Regarding addressing this contamination, this community is receiving financial assistance to mitigate this issue, so far $75,826 according to the SWRCB's Drinking Water Systems with Violations Tool, as of July 2020.

[10] 2019 GSP, p.ES-1

Figure 4-1. Overlying Agencies within the Regional Planning Area.



Source: California Spatial Information Library at: http://www.gis.ca.gov/

In this IRWM planning process, the GSJCRWCC has sought out opportunities to integrate a variety of water management strategies including Sacramento-San Joaquin Delta issues, flood management, stormwater management issues, environmental issues, groundwater management, conservation, reclamation, recycling, water supply and conjunctive use, climate change, and inter-regional issues all of which may benefit a wide variety of regional interests. Among the broad objectives of the Plan is to apply practices including water conservation, groundwater recharge, recycling and storm water management to improve water supply reliability while reducing regional dependence on the Delta. The incorporation of and sensitivity towards these issues and other water management strategies are the focus of this IRWMP with an overall objective to improve and enhance water resources within the GSJCRWCC's adopted IRWM Planning Region. This area includes a diverse range of water-related interests and objectives and was considered initially by the GSJCRWCC as a suitable practical limit, which would maximize the level of regional integration. It is envisioned that the GSJCRWCC will be expanded in the future to be coincident with the GSP boundaries and that the existing and future composition of the GSJCRWCC's membership, by representing a broad range of interests will encourage integration of water management objectives and activities.

Accommodating planned growth in San Joaquin County is a huge challenge for land use entities throughout the Regional Planning Area. The current population of San Joaquin is expected to increase by approximately 47 percent by 2040 from nearly 690,000 to over 1.1 million (*refer to Table 3-2 and Figure 3-1*) Land use in the ESJ Regional Planning Area is summarized based on GIS mapped urban areas, the latest DWR land use survey completed in 1996, and the projected urban spheres of influence as reported in adopted or draft general planning documents.

For the purposes of this IRWMP, the "current" planning level is assumed to be 2020 for urban and water use while "future" conditions assume a 2040 planning horizon. The IRMWP assumes that urban growth will occur as either infill or entirely within spheres of influence delineated in the latest General Plan revisions. To account for the loss of agricultural production, it is assumed that existing agricultural irrigation within the spheres of influence will be entirely replaced with urban uses by 2040. Figures 4-4 and 4-5 depict the 2020 and projected 2040 urban footprints.

Water use within the urban areas of the Regional Planning Area is summarized based on current Urban Water Management Plans, water production data obtained from water service providers, or other general planning documents. Table 4-2 summarizes the current water demands, urban footprint acreage. It should be noted that Table 4-2 summarizes data for the ESJ IRWMP area, while other data from the GSP (e.g., water budget tables) also includes the Eastside GSA in Stanislaus and Calaveras counties.

The net increase in annual urban demand from 2020 to 2040 is estimated to be approximately 72,000 acre-feet as shown in Table 4-3. Urban areas are projected to expand, and population is projected to grow, but overall use per capita is projected to decline. Several agencies are aggressively implementing many of the best management practices and demand management measures recommended by the California Urban Water Conservation Council. In many cases, the 2040 demands reflect reductions attributed to the implementation of current and future conservation programs. Changes in

population density, infill development, subsequent general plan revisions, and increased water conservation may affect the accuracy of the projected water demand.

Urban and industrial groundwater use was estimated in the 2019 GSP using the Eastern San Joaquin Water Resources Model (ESJWRM) based on the need for additional water to meet remaining demands after surface water deliveries occur. Urban and industrial groundwater use is estimated as 63,000 af/yr under current conditions, and 121,000 af/yr under future conditions,[11] an increase of 58,000 af/yr. Table 4-3 presents the average annual groundwater budget for current and future conditions.

A description of likely Climate Change impacts on the region as determined from the vulnerability assessment is found in Section 4.5 and Table 4-14 of this IRWMP Addendum.

[11] GSP Table 2-15

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Table 4-2. Summary of Current Land and Water Use

Groundwater Sustainability Agency	Gross Acreage	Ag Area	Urban Area	Developed Acreage	Ag Demand	Ag GW Pumping	Ag SW Deliveries	Total Ag Use	Ag Surplus (Shortage)	Urban Demand	Urban GW Pumping	Urban SW Deliveries	Total Urban Use	Urban Surplus (Shortage)	Total Demand	Total Pumping	Total Surface Water Use	Total Water Use (GW+SW)	Total Surplus (Shortage)
	(ac)	(ac)	(ac)	(ac)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)	(af/yr)
San Joaquin County #1	49,714	39,415	3,602	43,016	131,285	72,388	60,140	132,529	(1,243)	3,064	2,060	1,479	3,539	(474)	134,349	74,448	61,619	136,067	(1,718)
Central Delta WA	52,394	35,372	6,067	41,439	93,254	8,479	85,483	93,962	(708)	4,258	1,131	4,944	6,075	(1,817)	97,512	9,611	90,426	100,037	(2,525)
Lodi	9,167	48	8,933	8,981	123	22	136	158	(35)	20,379	14,498	5,880	20,379	1	20,502	14,520	6,016	20,536	(34)
North San Joaquin WCD	148,885	61,366	9,106	70,472	150,937	139,754	11,393	151,147	(211)	6,874	6,404	513	6,917	(43)	157,810	146,158	11,906	158,064	(253)
Lockeford CSD*	923	0	469	469	0	0	0	0	(0)	1,153	1,153	-	1,153	-	1,153	1,153	-	1,153	-
Stockton	40,007	0	39,408	39,408	0	0	0	0	(0)	65,010	23,035	62,182	85,218	(20,208)	65,010	23,035	62,182	85,218	(20,208)
Stockon East WD	99,816	56,475	16,233	72,708	192,562	159,111	36,206	195,317	(2,755)	11,964	5,914	9,274	15,188	(3,224)	204,526	165,025	45,479	210,504	(5,979)
Central San Joaquin WCD	72,973	53,374	9,570	62,944	161,427	135,259	26,198	161,457	(30)	6,936	3,550	5,205	8,756	(1,819)	168,363	138,809	31,403	170,213	(1,849)
San Joaquin County #2	6,713	0	6,645	6,645	0	0	0	0	(0)	11,170	8,183	2,983	11,166	4	11,170	8,183	2,983	11,166	4
Manteca	13,596	0	13,378	13,378	0	0	0	0	(0)	27,738	18,985	8,753	27,738	(0)	27,738	18,985	8,753	27,738	-
South San Joaquin GSA	63,270	39,372	19,682	59,054	140,346	34,530	107,909	142,439	(2,093)	27,211	25,501	1,891	27,392	(181)	167,557	60,031	109,800	169,831	(2,274)
Linden CWD*	650	0	650	650	0	0	0	0	(0)	485	485	-	485	-	485	485	-	485	-
Oakdale ID	31,785	20,625	2,899	23,524	78,900	37,598	41,321	78,919	(18)	2,354	2,354	-	2,354	-	81,255	39,952	41,321	81,273	(18)
South Delta WA	18,062	14,628	1,539	16,167	31,673	3,580	28,775	32,355	(682)	1,230	952	322	1,274	(43)	32,904	4,532	29,097	33,629	(725)
Woodbridge ID GSA	30,378	22,002	4,417	26,419	50,988	29,199	24,653	53,852	(2,864)	3,103	2,039	1,508	3,548	(445)	54,091	31,238	26,162	57,400	(3,308)
Total ESJ IRWM Region	638,334	342,678	142,596	485,274	1,031,496	619,920	422,213	1,042,134	(10,638)	192,930	116,246	104,934	221,180	(28,250)	1,224,426	736,167	527,147	1,263,314	(38,888)
Eastside SJ GSA	126,689	15,069	7,086	22,155	61,831	60,415	1,565	61,980	(149)	5,084	3,084	2,000	5,084	(43)	66,916	63,500	3,500	67,065	(149)
Total GSP	765,023	357,748	149,682	507,430	1,093,327	680,336	423,778	1,104,114	(10,787)	198,014	119,331	106,934	226,264	(28,293)	1,291,342	799,666	530,647	1,330,378	(39,037)
*Edited at request of GSAs																			

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Table 4-3. Water Budget Tabulations from GSP

	2010	2015	2020	2025	2030	2035	2040
Urban							
Urban Area (acres)	93,400	98,700	104,900	114,000	123,100	132,200	141,300
Urban Demand (AFY)	807,600	764,400	954,600	1,072,300	1,167,100	1,357,800	1,448,300
Urban GW Pumping (AFY)	594,800	630,000	669,100	771,600	850,500	1,049,700	1,089,900
Urban SW Deliveries (AFY)	216,500	137,100	307,500	324,700	339,400	334,900	389,300
Urban Surplus (AFY)	-3,600	-2,800	-22,000	-24,000	-22,800	-26,700	-30,900
Agricultural							
Ag Area (acres)	384,900	380,900	376,100	367,900	359,700	351,500	343,300
Ag Demand (AFY)	8,194,300	9,763,900	8,346,100	8,066,000	7,456,700	8,068,800	7,387,600
Ag GW Pumping (AFY)	6,597,200	8,577,400	6,794,700	6,540,300	5,946,300	6,714,700	5,863,400
Ag SW Deliveries (AFY)	1,606,300	1,189,300	1,558,500	1,532,400	1,520,400	1,358,100	1,538,800
Ag Surplus (AFY)	-9,200	-2,800	-7,100	-6,700	-10,000	-4,000	-14,600
Total							
Total Area (acres)	478,300	479,600	481,000	481,900	482,800	483,700	484,500
Total Demand (AFY)	9,001,900	10,528,200	9,300,700	9,138,400	8,623,800	9,426,600	8,835,900
Total GW Pumping (AFY)	7,192,000	9,207,400	7,463,900	7,312,000	6,796,800	7,764,500	6,953,400
Total SW Deliveries (AFY)	1,822,700	1,326,400	1,865,900	1,857,100	1,859,800	1,692,900	1,928,000
Total Surplus (AFY)	-12,900	-5,500	-29,200	-30,700	-32,800	-30,700	-45,500

Table 4-4. Average Annual Water Groundwater Budget (AF/year)

Component	**Historical Calibration (AF/year)**	**Current Conditions (AF/year)**	**Projected Conditions (AF/year)**
Hydrologic Period	**Water Years 1996-2015 (20-Year period)**	**Water Years 1969- 2018 (50-Year period)**	**Water Years 1969- 2018 (50-Year period)**
Inflows			
Deep Percolation[1]	218,000	272,000	266,000
Precipitation	61,000	68,000	66,000
Applied Surface Water – Agricultural	59,000	65,000	64,000
Applied Surface Water – Urban and	7,000	10,000	15,000
Applied Groundwater – Agricultural	82,000	119,000	102,000
Applied Groundwater – Urban and	9,000	10,000	18,000
Stream Seepage[2]	262,000	317,000	317,000
Dry Creek	12,000	14,000	14,000
Mokelumne River	114,000	124,000	122,000
Calaveras River	91,000	105,000	102,000
Stanislaus River	13,000	35,000	39,000
San Joaquin River	28,000	36,000	36,000
Local Tributaries[3]	3,000	3,000	2,000
Other Recharge[4]	160,000	158,000	164,000

Component	Historical Calibration (AF/year)	Current Conditions (AF/year)	Projected Conditions (AF/year)
Hydrologic Period	**Water Years 1996-2015 (20-Year period)**	**Water Years 1969- 2018 (50-Year period)**	**Water Years 1969- 2018 (50-Year period)**
Subsurface Inflow[5]	171,000	212,000	192,000
Cosumnes Subbasin	32,000	38,000	37,000
Sierra Nevada Mountains	55,000	58,000	59,000
Modesto Subbasin	25,000	41,000	33,000
South American Subbasin	4,000	4,000	3,000
Solano Subbasin	15,000	15,000	13,000
East Contra Costa Subbasin	6,000	7,000	7,000
Tracy Subbasin	35,000	48,000	41,000
Total Inflow[7]	***811,000***	***959,000***	***939,000***
Outflows			
Groundwater Outflow to Streams[2]	107,000	109,000	114,000
Dry Creek[8]	-	1,000	1,000
Mokelumne River	14,000	22,000	24,000
Calaveras River	14,000	15,000	16,000
Stanislaus River	41,000	31,000	29,000
San Joaquin River	29,000	30,000	30,000
Local Tributaries[3]	8,000	11,000	14,000
Groundwater Pumping[6]	692,000	851,000	801,000
Agricultural	624,000	788,000	680,000
Urban and Industrial	68,000	63,000	121,000
Subsurface Outflow[5]	53,000	47,000	58,000
Cosumnes Subbasin	18,000	15,000	18,000
Modesto Subbasin	19,000	18,000	25,000
South American Subbasin[8]	-	-	-
Solano Subbasin	4,000	4,000	4,000
East Contra Costa Subbasin	2,000	2,000	2,000
Tracy Subbasin	9,000	8,000	8,000
Total Outflow[7]	***852,000***	***1,007,000***	***973,000***
Change in Groundwater Storage (Inflows Minus Outflows)			
Change in Groundwater Storage[7]	***(41,000)***	***(48,000)***	***(34,000)***

Notes:

1 Deep percolation is the amount of infiltrated water ultimately reaching the groundwater aquifer. The source of the water may be from precipitation, as well as either applied surface water or groundwater used for agricultural or urban and industrial purposes. Differences between scenarios are related to differences between these sources of water and differences in urban versus agricultural land use totals.

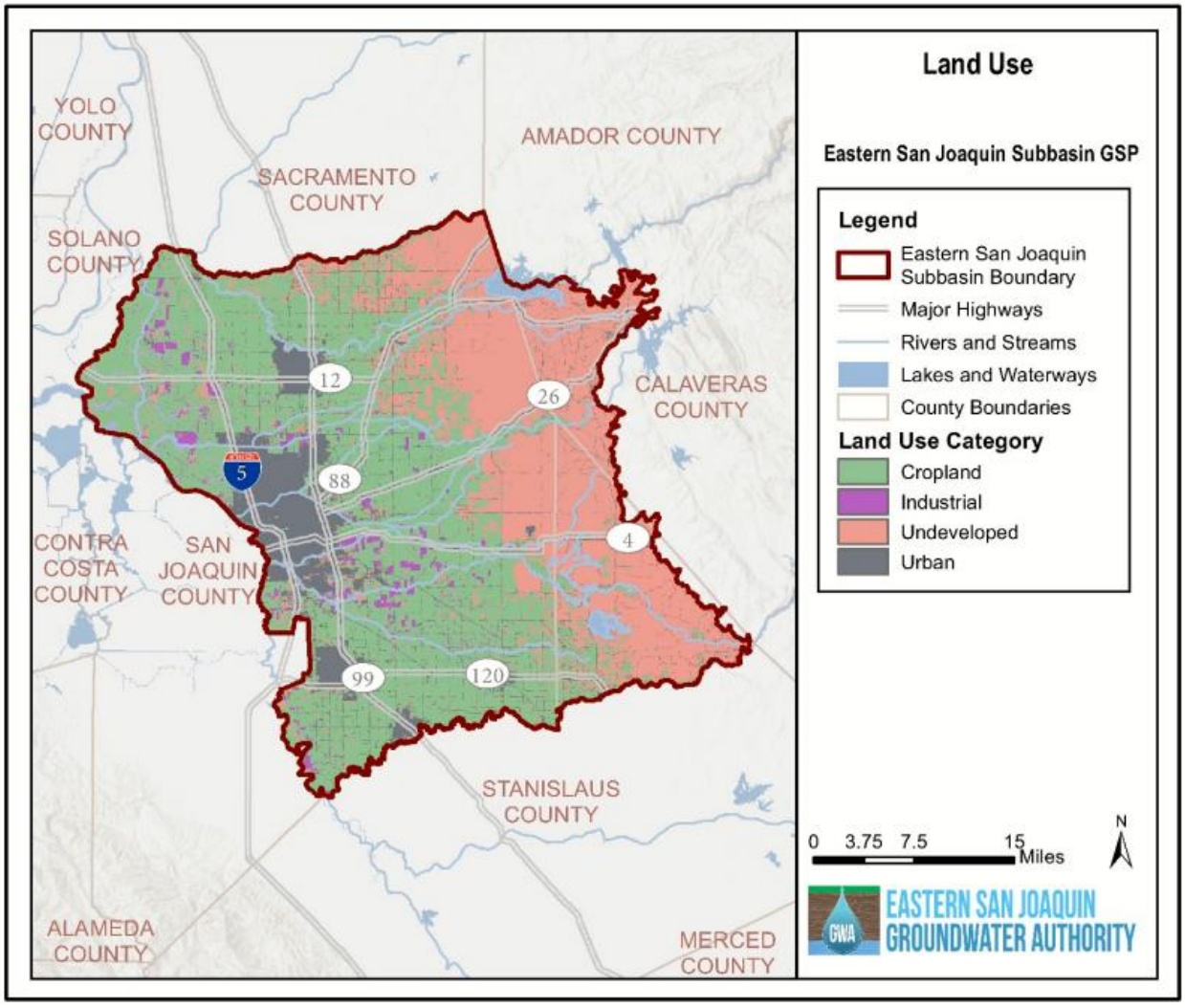
2 Stream gain from groundwater and stream seepage represent the interaction of surface water and groundwater. Differences between the scenarios are related to differences in streamflows and long-term average groundwater elevations.

3 Local Tributaries include Bear Creek and related streams, Little Johns Creek, Duck Creek, and Lone Tree Creek.

4 Other Recharge includes unlined canals/reservoir seepage, local tributaries seepage, and MAR projects.
5 The goal of projecting inter-basin flows is to maintain a reasonable balance between the neighboring groundwater subbasins
The resulting projected conditions scenario flows are within 10-15% of historical calibration flows, considered a reasonable range given the availability of projected land use, population, surface water delivery, and groundwater production data from areas outside of the Eastern San Joaquin Subbasin. Continuing inter-basin coordination may refine these numbers.
6 Groundwater pumping is estimated by the ESJWRM based on the need for additional water to meet remaining demands after surface water deliveries occur. Differences in demand largely drive the amount of groundwater pumped.
7 Summations in table may not match the numbers in the table. This is due to the rounding of model results.
8 Values smaller than 500 AF/year are represented by a dash (-).
Source: GSP 2019, Table 2-15

Figure 4-2 shows a map of land use in the Eastern San Joaquin Subbasin across four general categories: cropland, industrial, undeveloped, and urban. These categories were mapped based on categories provided by 2015 land use from the United States Department of Agriculture's CropScape 2015 dataset. Land use patterns in the Eastern San Joaquin Subbasin are dominated by agricultural uses, including nut and fruit trees, vineyards, row crops, grazing, and forage. Both agricultural and urban land use rely on a combination of surface water and groundwater, with some agricultural lands using recycled or reusing water. Land use is primarily controlled by local agencies. Land use patterns in the low foothills to the east are dominated by native vegetation and unirrigated pasture lands.

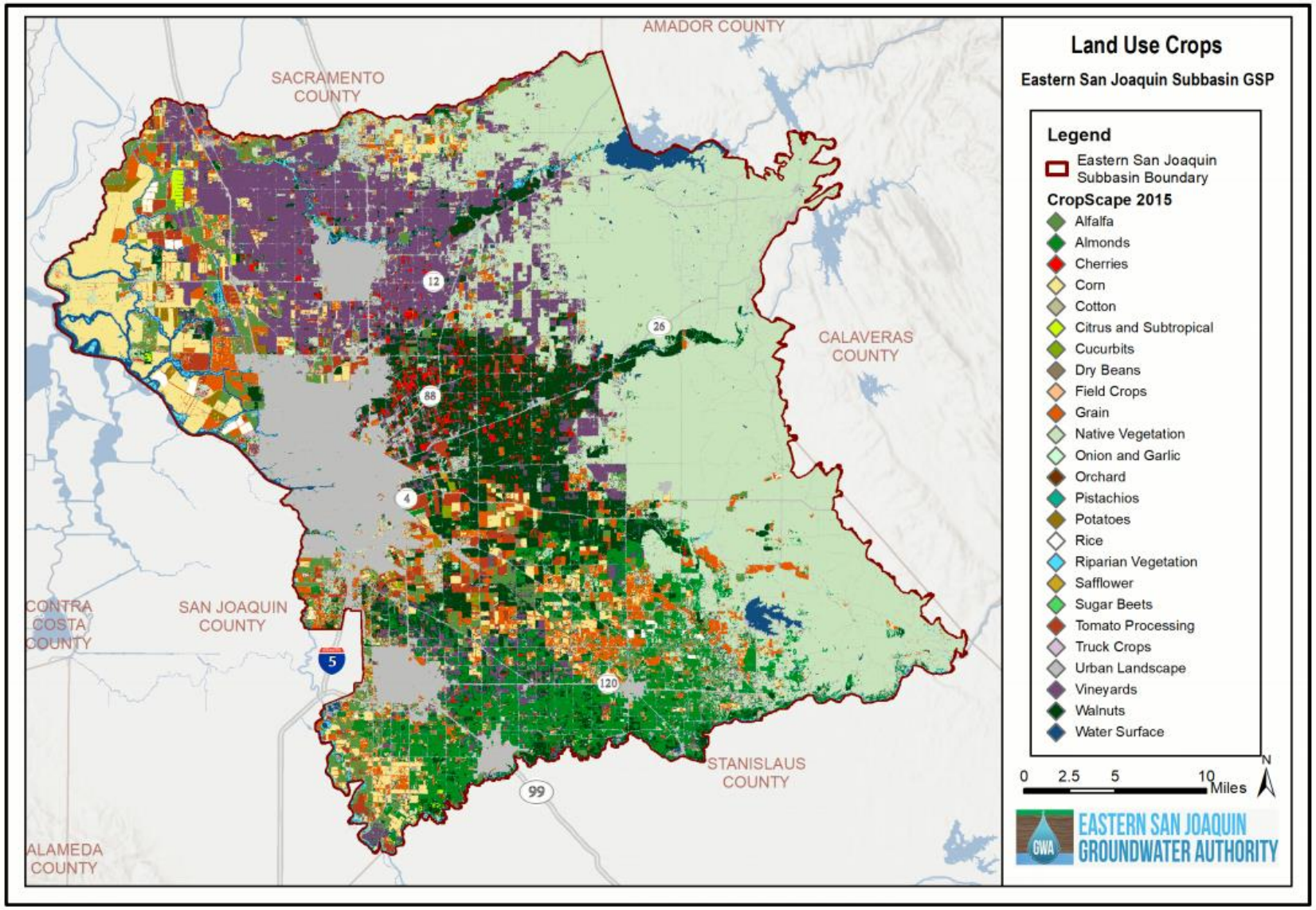
Figure 4-2. ESJ Land Use (2019).



Source: Figure 1-9 of ESJ GSP, November 2019.

Crop type varies by region, with fruit and nut trees and vine crops comprising the majority of agriculture in the Subbasin. Almond orchards dominate the southern portion of the Subbasin, cherry and walnut orchards dominate the central portion of the Subbasin, and vineyards dominate the northern portion (Figure 4-3). Irrigated crop acreage in the Subbasin are 37 percent fruit and nut trees, 24 percent vineyards, and 11 percent alfalfa and irrigated pasture.

Figure 4-3. ESJ Land Use Crops (2019).



Source: Figure 1-10 of ESJ GSP, November 2019.

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Figure 4-4. 2020 City Limits and Land Use Map.

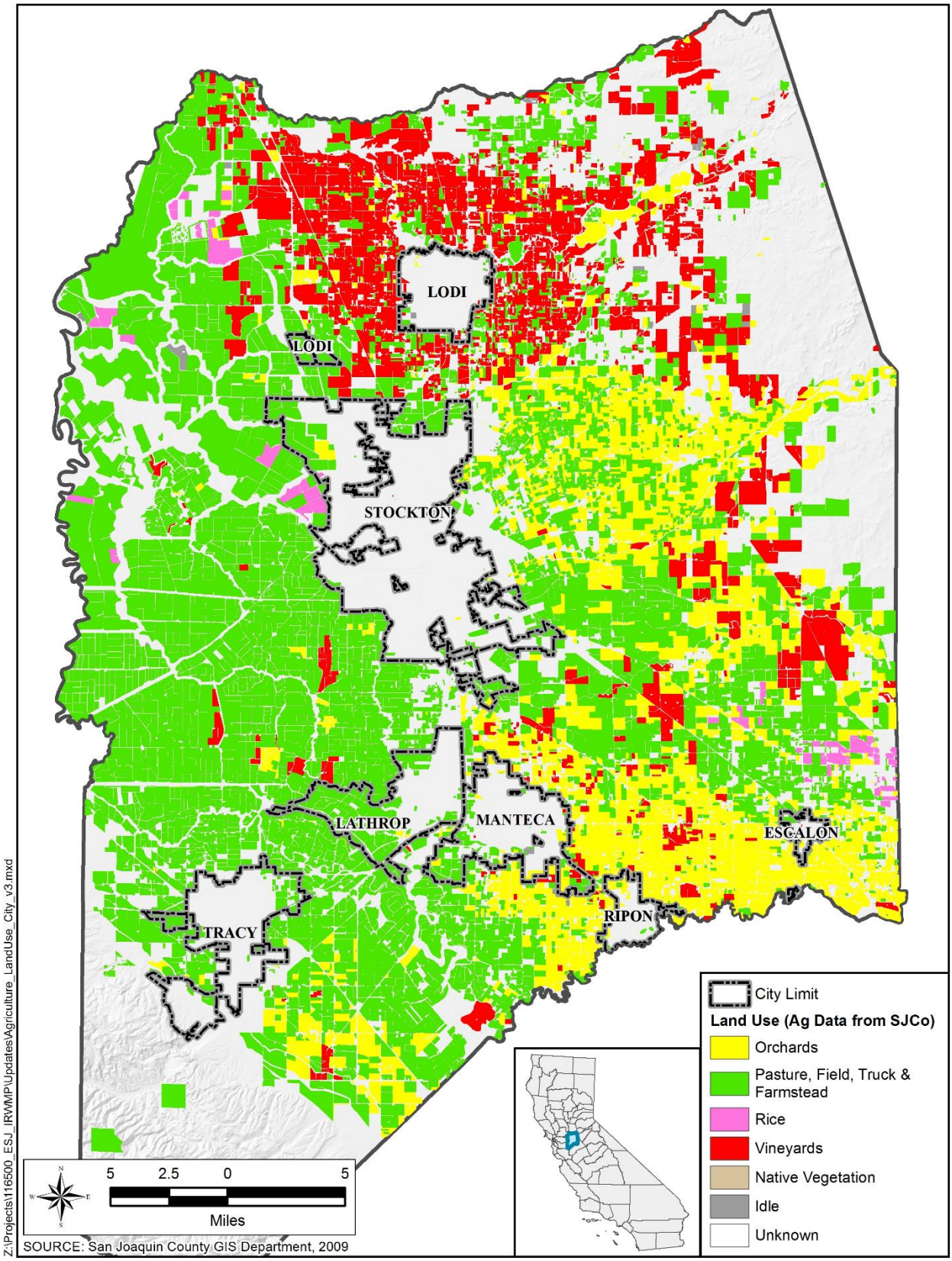
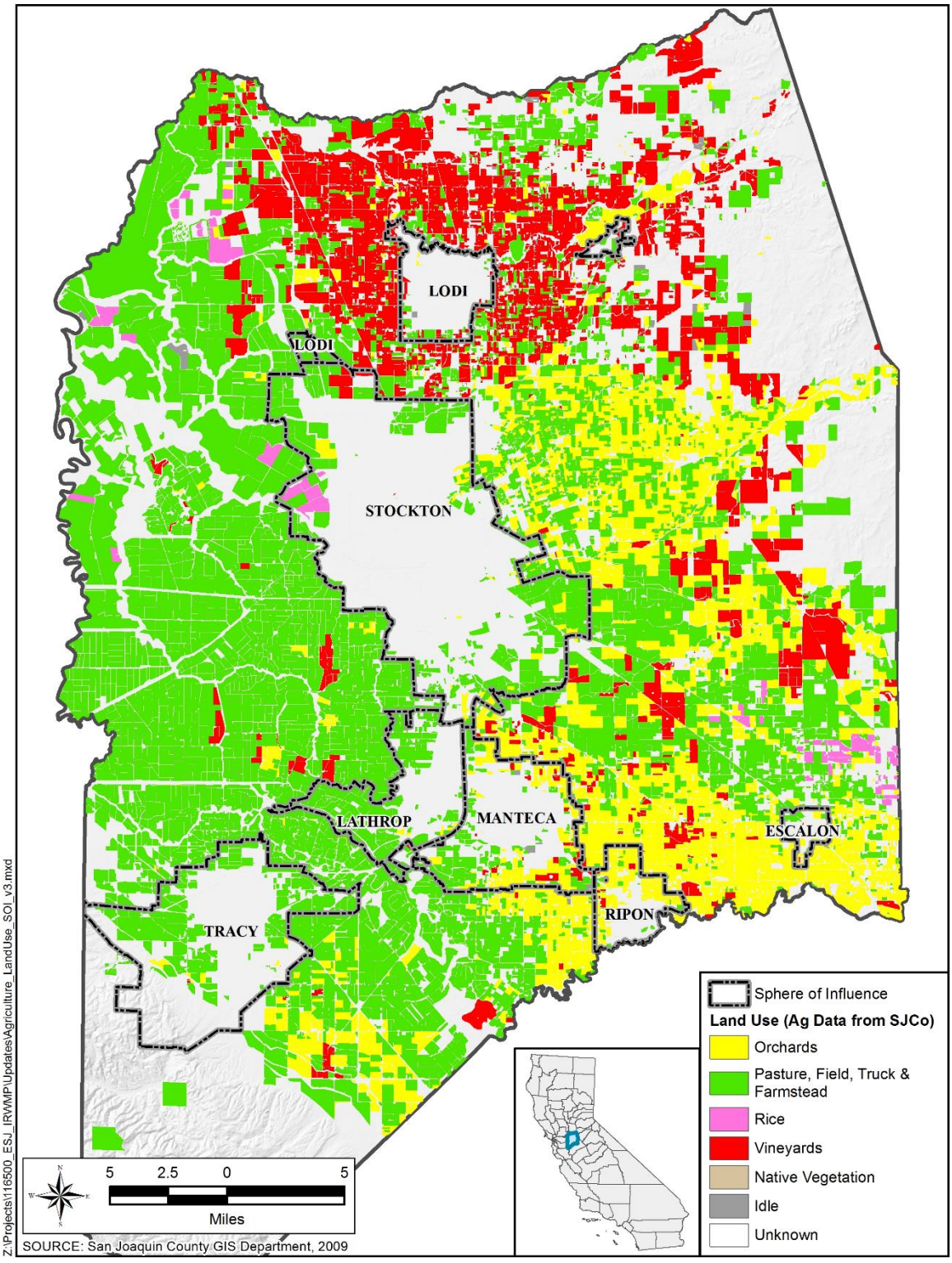


Figure 4-5. 2040 Urban Spheres of Influence and Land Use Map.



Agricultural groundwater use was estimated in the 2019 GSP using the ESJWRM based on the need for additional water to meet remaining demands after surface water deliveries occur. Agricultural groundwater use is estimated as 788,000 af/yr under current conditions, and 680,000 af/yr under future conditions,[12] a decrease 108,000 af/yr.

Total groundwater pumping estimated by the ESJWRM is 851,000 af/yr under current conditions, and 801,000 af/yr under projected future conditions, a decrease of 50,000 af/yr.[13]

Groundwater overdraft estimated by the ESJWRM is 48,000 af/yr under current conditions, and 34,000 af/yr under projected future conditions, a decrease of 14,000 af/yr.[14]

The demand for water in San Joaquin County appears to have peaked in the 1990s and is projected to continue to decline as more efficient urban and irrigation practices are adopted.[15] Long-term groundwater elevations (*refer to* Section 6.5.3 of the GSP) suggest water level recovery in some areas. Once rapid saline water migration appears to have slowed significantly. Recent estimates developed for the ESJ GSP project overdraft of 34,000 af/year, and a sustainable yield of 724,000 AF/year (78,000 AF/year less than present groundwater production).

4.2 Groundwater Quality

This section is taken from Section 2.2.4 of the 2019 GSP.

While groundwater quality in the ESJ Subbasin is generally sufficient to meet beneficial uses, a number of constituents of concern are either currently impacting groundwater use or have the potential to impact it in the future. Depending on the water quality constituent, the source may be anthropogenic in origin or naturally occurring, and the issue may be widespread or localized.

The primary naturally occurring water quality constituents of concern are salinity and arsenic, while primary water quality constituents are related to human activity include nitrates, salinity, and various point-source contaminants.

The sections herein provide information on the historical and current groundwater quality conditions for constituents including:

- Salinity (Section 2.2.4.1 of the GSP)
- Nitrate (Section 2.2.4.2 of the GSP)

[12] GSP Table 2-15

[13] GSP Table 2-15

[14] GSP Table 2-15

[15] The Draft GSP states historical water demand as 1,194,000 acre-feet per year.

- Arsenic (Section 2.2.4.3 of the GSP)
- Point-source contamination (Section 2.2.4.4 of the GSP), which includes petroleum hydrocarbons, solvents, and emerging contaminants

California Code of Regulations Title 22 located at the following link (https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Lawbook.html) establishes water quality standards for drinking water contaminants. A primary maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) is defined for a variety of parameters. For the purposes of this GSP, comparing parameter concentrations to their MCL or SMCL is used as the basis for describing groundwater quality concerns in the ESJ Subbasin.

Comparisons to the MCL or SMCL must be considered in context as the measured concentrations represent raw water that may be treated or blended prior to delivery to meet the standard or may not be used for potable uses. Water quality is generally not known to have significantly adversely affected beneficial uses of groundwater in the ESJ Subbasin.

4.2.1 Salinity

As identified in prior planning efforts, and as referenced in Section 2.2 of the GSP (Current and Historical Groundwater Conditions), localized salinity issues are a concern for some areas of the San Joaquin Subbasin. Pumping in excess of recharge has resulted in declining groundwater levels that have contributed to an increase of salinity in groundwater wells since the 1950s. As identified through isotopic typing, elevated salinity concentrations in the Subbasin are the result of natural processes and overlying land use activities (O'Leary et al., 2015). Within the Subbasin, there are three primary sources of salinity:

1. **Delta Sediments** – Evaporation of groundwater in discharge areas introduces naturally occurring soluble salts into Delta sediments.
2. **Deep Deposits** – Saline groundwater in the Subbasin is principally the result of the migration of a naturally occurring deep saline water body which originates in regionally deposited marine sedimentary rocks that underlie the San Joaquin Valley. This results in a saline aquifer underlying the freshwater aquifer, and well pumping can result in upwelling saline brines into the freshwater aquifer.
3. **Irrigation Return Water** – Irrigation return water is excess applied water that percolates into the groundwater system or flows to the stream system from an irrigated field following the application of irrigation water. Return water may include contaminants typical of agricultural practices (e.g., pesticides, herbicides) and can concentrate salts due to evapotranspiration. The return water may act as a conduit delivering these contaminants to the surrounding watershed or underlying groundwater aquifer. Areas in the Subbasin with salinity resulting from irrigation return water do not commonly exceed chloride concentrations of 100 milligrams per liter (mg/L) (O'Leary et al., 2015).

Salinity is a measure of the mass of dissolved particles and ions in a volume of water. salinity includes many different ions, including nitrate, but the most common are sodium, calcium, magnesium, chloride, bicarbonate, and sulfate.

Chloride and Total Dissolved Solids (TDS) are two common ways to measure and analyze salinity. Each is described separately in the sections below.

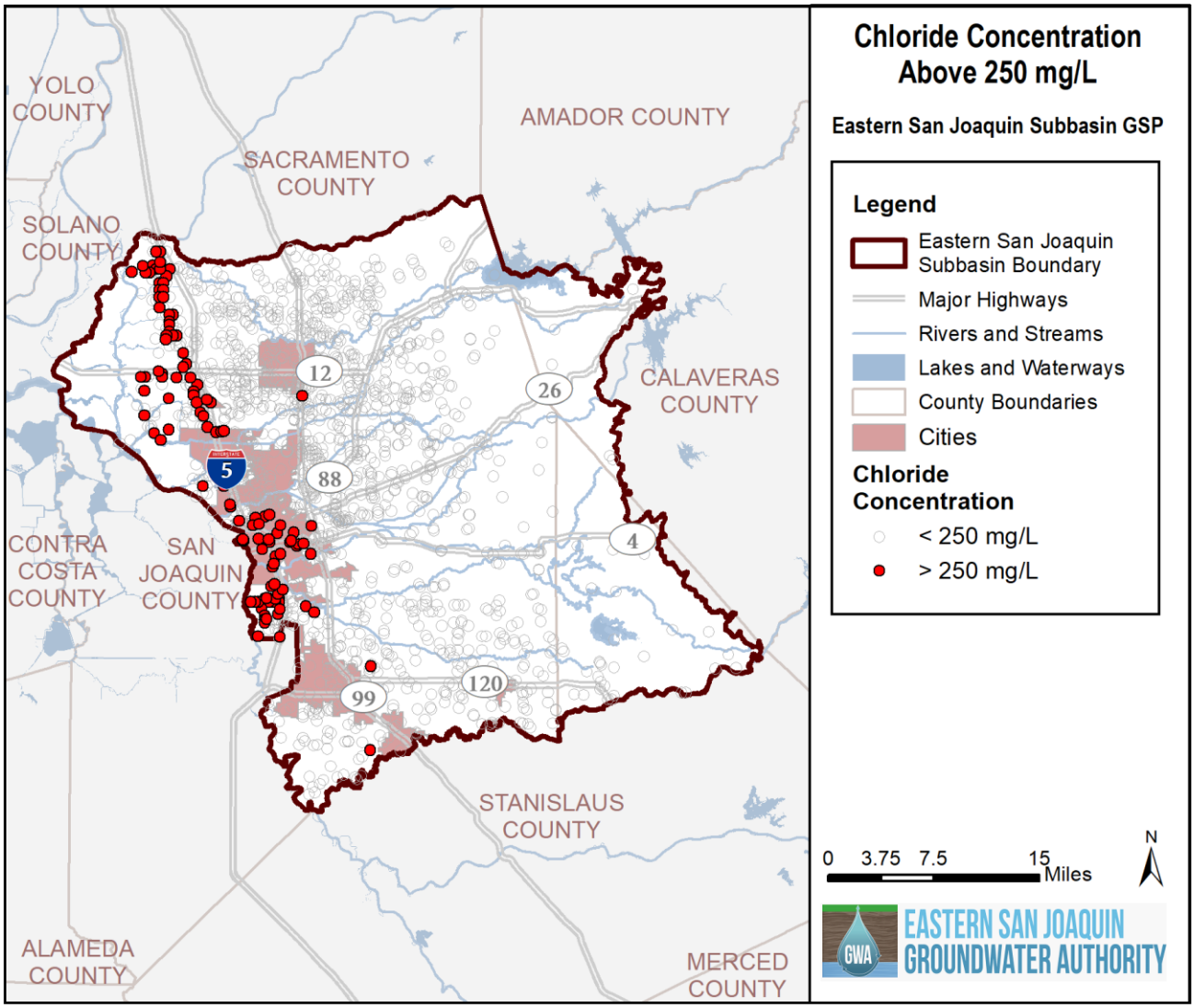
4.2.1.1 Chloride

Chloride is one way to measure salinity and is reported as a concentration of the Cl^- ion that originates from the dissociation of salts in water. The California Department of Drinking Water (DDW) SMCL of 250 mg/L for chloride is a common approach to identifying water quality concerns for this constituent. The SMCL is a secondary drinking water standard that is established for aesthetic reasons such as taste, odor, and color and is not based on public health concerns. The 250 mg/L value is "recommended" by SWRCB as a threshold below which chloride concentrations are desirable for a higher degree of consumer acceptance of drinking water. An "upper" limit of 500 mg/L is used to define a range above the "recommended" value where chloride concentration is acceptable if it is neither reasonable nor feasible to provide more suitable waters (SWRCB, 2006). Comparisons to the SMCL must be considered in context as the measured concentrations represent raw water, which may be treated or blended prior to delivery to meet the standard or may not be used for potable uses.

As shown in Figure 4-6, the majority of observed chloride concentrations above 250 mg/L occur on the western side of the Subbasin. As shown in Figure 4-7, the number of measurements with observed concentrations above 250 mg/L has decreased since the 1970s.

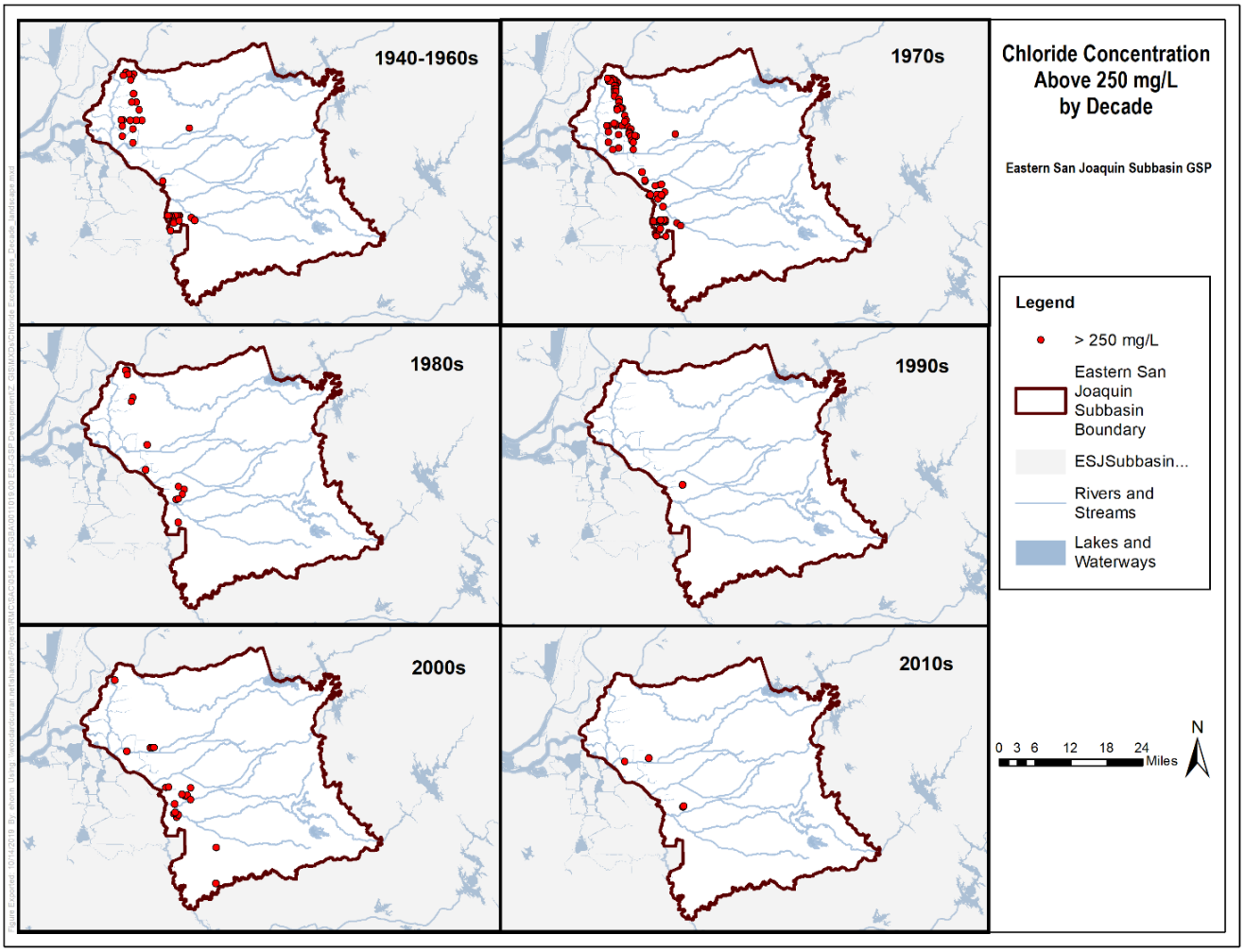
The Groundwater Ambient Monitoring and Assessment Program (GAMA) dataset was used for analysis.

Figure 4-6. Maximum Chloride Concentration Greater Than 250 mg/L (1940s-2010s).



Source: Figure 2-58, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-7. Maximum Chloride Concentration Above 250 mg/L by Decade.



Source: Figure 2-59, from the ESJ Groundwater Subbasin GSP (November 2019)

Table 4-5 shows occurrence of chloride measurements greater than 250 mg/L by decade. Chloride records have been observed above 250 mg/L both historically and recently. Sampling frequencies increased in the 1970s and 2000s.

Table 4-5. Summary of Chloride Data by Decade

Decade	Measurement Above 250 mg/L?		Range of Values (mg/L)				Total Number of Samples
	No	Yes	Minimum	Average	Median	Maximum	
1940	98%	2%	7.0	45.2	20.0	975	180
1950	93%	7%	2.3	89.4	25.0	3,750	699
1960	90%	10%	0.0	115.0	17.0	1,960	312
1970	90%	10%	1.8	85.9	19.0	3,310	1,780
1980	97%	3%	0.0	45.4	20.5	630	858
1990	99%	1%	0.0	31.2	19.0	533	663
2000	95%	5%	0.0	59.6	35.0	2,050	1,453
2010	98%	3%	0.0	34.8	39.0	2,050	986

Source: Table 2-6, from the ESJ Groundwater Subbasin GSP (November 2019)

Table 4-6 shows chloride occurrences of concentrations greater than 250 mg/L by well depth. The highest proportion of readings above 250 mg/L occur in the shallowest wells, less than 100 feet deep (8%). The highest maximum value also occurred at this depth range (up to 2,050 mg/L).

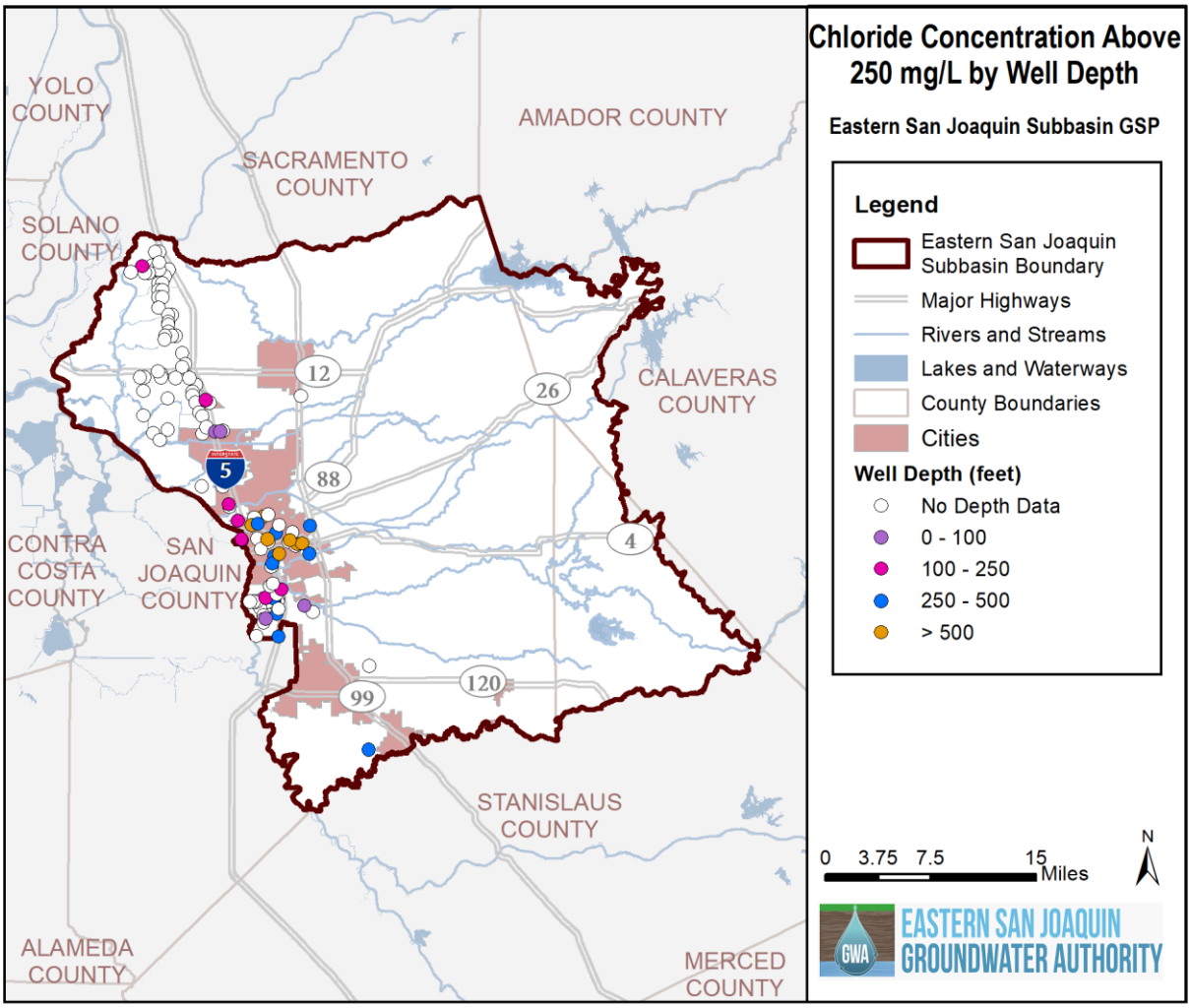
Figure 4-8 shows the spatial distribution of chloride occurrences greater than 250 mg/L by well depth within the Subbasin.

Table 4-6. Summary of Chloride Data by Depth (1940s-2010s)

Depth (feet)	Measurement Above 250 mg/L?		Range of Values (mg/L)				Total Number of Samples
	No	Yes	Minimum	Average	Median	Maximum	
No Depth Data	92%	8%	0.0	82.5	20.0	3,750	3,566
0 - 100	92%	8%	0.8	73.5	60.0	2,050	239
100 - 250	97%	3%	1.0	44.2	36.0	1,400	1,215
250 - 500	98%	2%	0.0	32.4	16.0	1,100	1,487
> 500	95%	5%	2.7	62.1	15.6	1,940	424

Source: Table 2-7, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-8. Maximum Chloride Concentration Above 250 mg/L by Well Depth (1940s-2010s).



Source: Figure 2-60, from the ESJ Groundwater Subbasin GSP (November 2019)

A lack of depth information presents a challenge to analyzing the vertical distribution of chloride measurements which would inform identification of chloride sources. Examples of depth information include total well construction depth or screened interval depths, which vary between wells. Some wells have total depth but not screened interval depth, or vice versa. For this analysis, screened interval depth was used first, and if this information was not available, total depth was used. Approximately 4,600 of the almost 13,000 chloride measurements in the ESJ Subbasin are from wells lacking any construction or screen depth information. Roughly half of the measurements above 250 mg/L occur in the wells lacking depth data, which also show the highest range in values occurring above 250 mg/L.

Identifying the source of high-chloride water in wells of various depths over time requires further analysis of geochemical data; depth-specific water quality was identified as a data gap in the Hydrogeologic Conceptual Model (HCM).

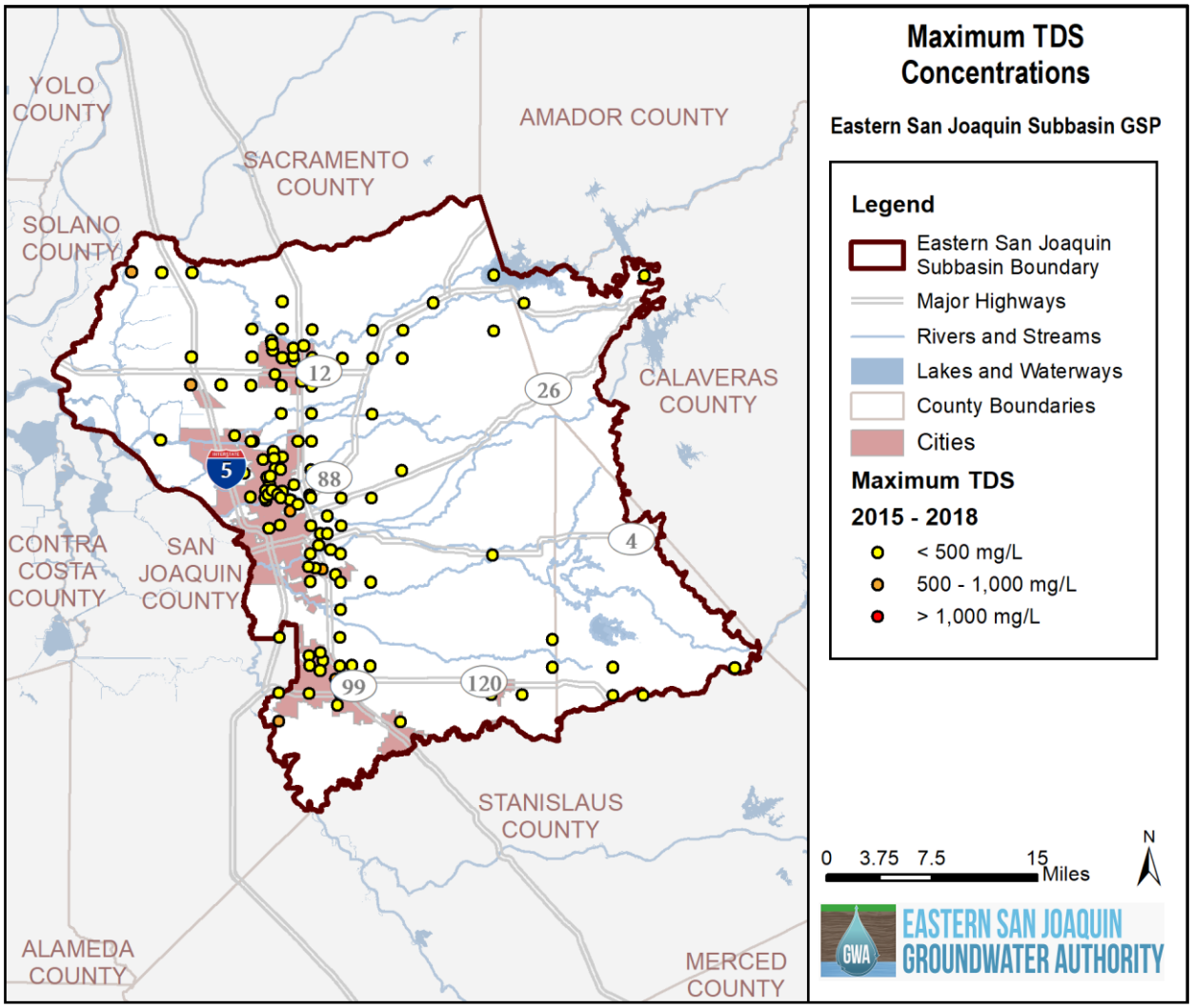
4.2.1.2 Total Dissolved Solids

TDS, which is a measure of all inorganic and organic substances present in a liquid in molecular, ionized, or colloidal suspended form, is commonly used to measure salinity. Recent TDS sample results show trends that match closely with the overall historical trends for chloride and highlight areas with elevated salinity concentrations in more recent years. TDS concentrations in the ESJ Subbasin ranged from 35 to 2,500 mg/L between 2015 and 2018. Spatially, the highest concentrations of TDS are found along the western margin of the Subbasin and the San Joaquin River and decrease significantly to the east, to typically less than 500 mg/L. TDS measurements, like chloride levels, are elevated near the cities of Stockton and Manteca, and in the Lodi GSA near the White Slough Water Pollution Control Facility.

Figure 4-9 shows the maximum while Figure 4-10 shows the average TDS concentrations from 2015 to 2018 as compared to the SMCL lower limit of 500 mg/L and upper limit of 1,000 mg/L. The GAMA dataset was used for analysis.

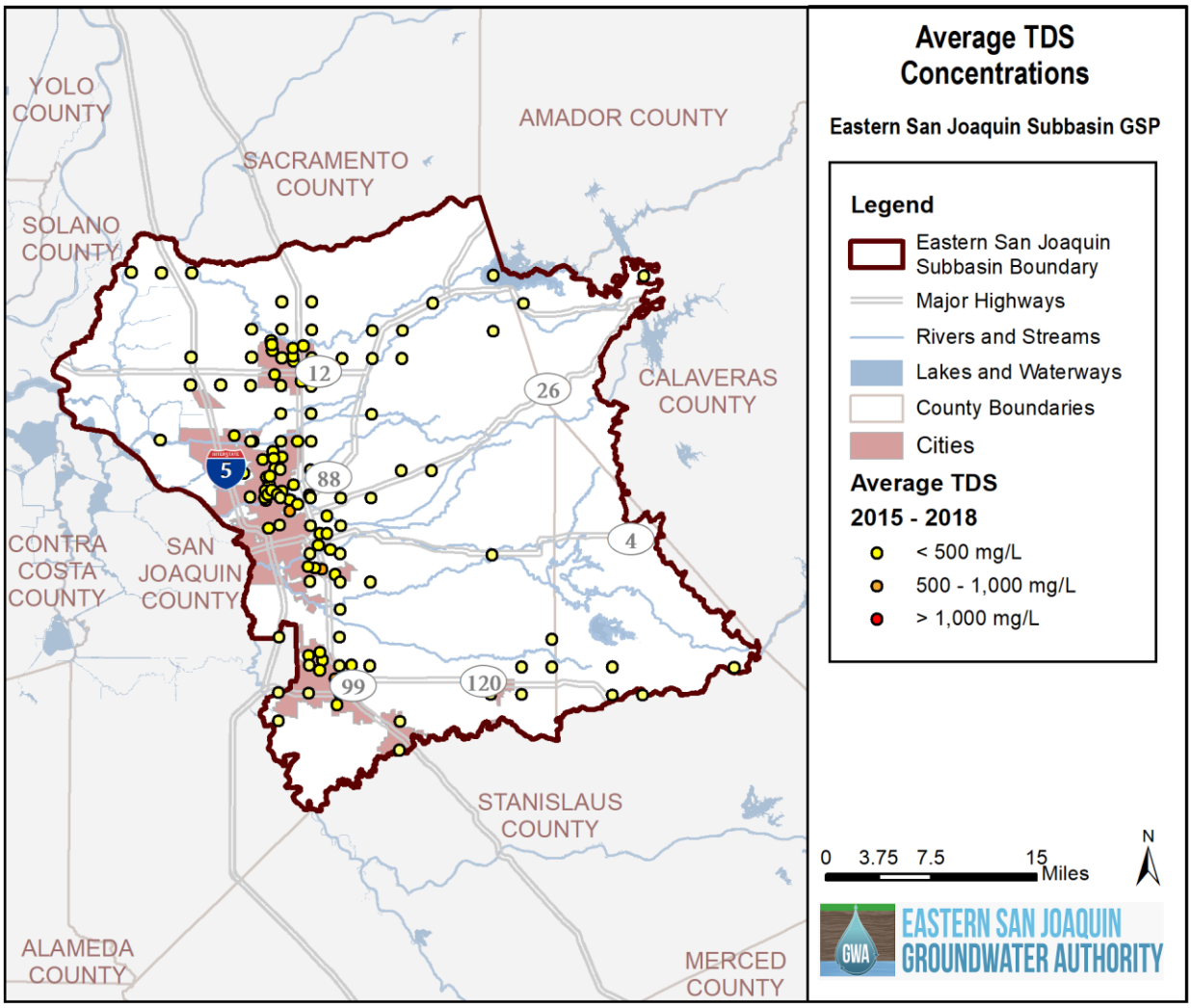
The SMCL is a secondary drinking water standard that is established for aesthetic reasons such as taste, odor, and color and is not based on public health concerns. The 500 mg/L value is "recommended" by SWRCB as a threshold below which TDS concentrations are desirable for a higher degree of consumer acceptance of drinking water. The "upper" limit is used to define a range above the "recommended" value where TDS concentration is acceptable if it is neither reasonable nor feasible to provide more suitable waters (SWRCB, 2006). Comparisons to the SMCL must be considered in context as the measured concentrations represent raw water, which may be treated or blended prior to delivery to meet the standard or may not be used for potable uses.

Figure 4-9. Maximum TDS Concentrations 2015-2018.



Source: Figure 2-61, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-10. Average TDS Concentrations 2015-2018.



Source: Figure 2-62, from the ESJ Groundwater Subbasin GSP (November 2019)

Elevated TDS concentrations are apparent in very shallow groundwater in close proximity to the San Joaquin River, while deep wells (depths greater than 200 feet) typically have TDS concentrations below 500 mg/L. TDS trends by depth are summarized in Table 4-7.

Figure 4-11 shows the maximum TDS concentrations for shallow wells in the ESJ Subbasin from years 2015 to 2018, and Figure 4-12 shows the maximum TDS concentrations for deep wells in the same timeframe.

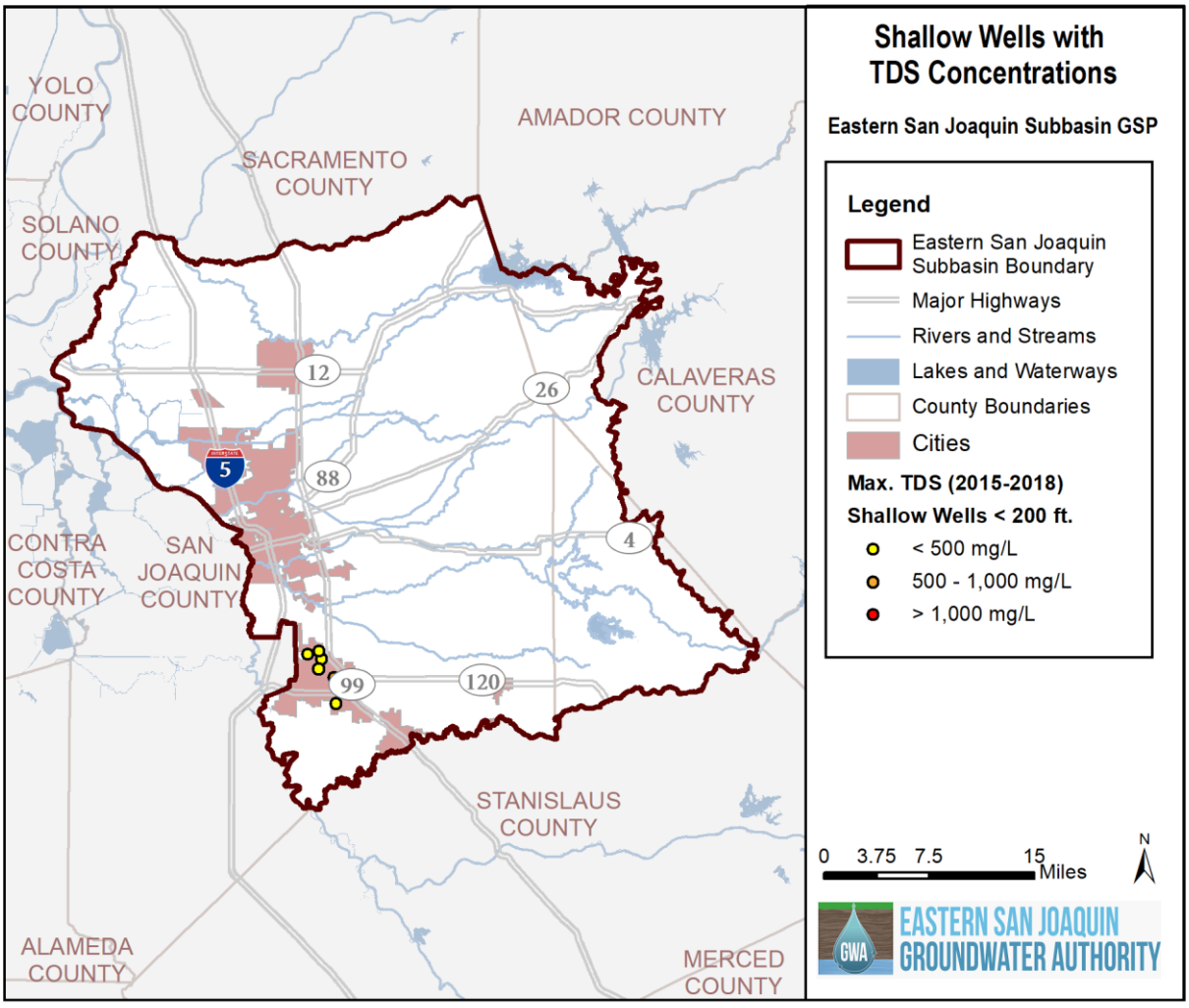
As with chloride measurements, depth-dependent TDS data are not widely available. It was identified as a data gap in the HCM and will be a focus of the monitoring network for water quality, as described in Chapter 4: Monitoring Networks of the GSP.

Table 4-7. Summary of TDS Data by Depth (2015-2018)

Depth (feet)	% Measurements in Range			Range of Values (mg/L)				Total Number of Samples
	< 500 mg/L	500 – 1000 mg/L	> 1,000 mg/L	Minimum	Average	Median	Maximum	
No Depth Data	90%	8%	2%	94	339	310	1,180	451
0 - 100	N/A							0
100 - 250	54%	46%	0%	280	438	480	540	13
250 - 500	93%	7%	0%	120	344	340	560	75
> 500	N/A							0

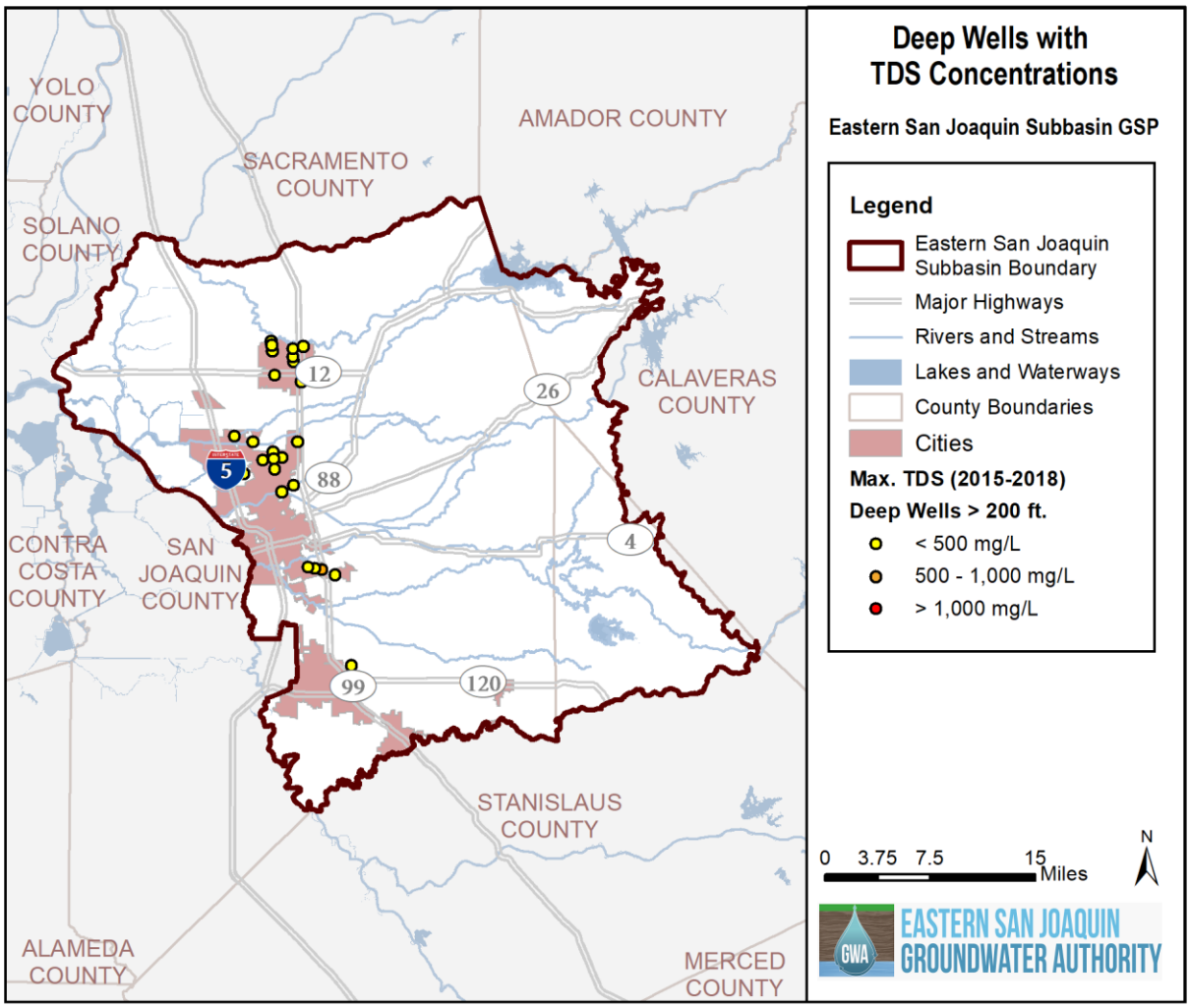
Source: Table 4-8, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-11. Maximum TDS Concentrations in Shallow Wells 2015-2018.



Source: Figure 2-63, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-12. Maximum TDS Concentrations in Deep Wells 2015-2018.



Source: Figure 2-64, from the ESJ Groundwater Subbasin GSP (November 2019)

4.2.2 Nitrate

Nitrate is both naturally occurring and can be contributed a result of human activity. Nitrate can cause adverse human health effects. Anthropogenic sources of nitrate include fertilizers, septic systems, and animal waste. The DDW's MCL of 10 mg/L for Nitrate as N delimits high levels of nitrate for drinking water use. Many measured concentrations are above this value, both historically and recently. Comparisons to the MCL must be considered in context as the

measured concentrations represent raw water, which may be treated or blended prior to delivery to meet the standard or may not be used for potable uses.

Table 4-8 provides the total number of nitrate values by decade and the percentage of those values greater than 10 mg/L. The total number of nitrate measurements has grown since 2000 as has the percentage of occurrences of concentrations greater than 10 mg/L. The GAMA dataset was used for analysis.

Table 4-8. Nitrate as N Concentrations by Decade

Decade	% of Samples		Number of Nitrate Samples
	<10 mg/L	>10 mg/L	
1940	88%	13%	8
1950	99%	1%	362
1960	99%	1%	240
1970	96%	4%	1,500
1980	95%	5%	420
1990	98%	2%	1,716
2000	87%	13%	9,679
2010	83%	17%	11,060

Source: Table 2-8, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-13 shows the historical spatial distribution of nitrate samples and detections by decade. During the 1940s, the earliest decade with nitrate measurements, very few records exist, and no significant conclusions can be made from this timeframe. The 1950s and 1960s have larger datasets, but measurements above 10 mg/L during these decades are sporadic and localized. Nitrate concentrations during the 1970s show a significant number of measurements above 10 mg/L in the northwest portion of the ESJ Subbasin, adjacent to Interstate 5.

The 1980s and 1990s show similar patterns, with areas measurements above 10 mg/L primarily around the cities of Stockton, Lodi, and Manteca. Nitrate as N measurements above 10 mg/L are also located near the southern edge of the ESJ Subbasin, close to Highway 120. Although a much greater number of records exists for the 1990s than the 1980s, these decades have approximately the same spatial distribution. One possible explanation is similar wells were sampled during the 1980s and 1990s, but much more frequently in the 1990s. The 2000s and 2010s had both the greatest number of nitrate measurements and the largest number of measurements above 10 mg/L. Measurements above 10 mg/L during these decades follow previous trends: they are primarily between Highway 99 and Interstate 5, from Ripon to near Lodi.

Recent nitrate measurements above the MCL correspond to the overall historical trends and highlight areas with elevated nitrate concentrations in more recent years. These areas include the cities of Stockton and Ripon, areas of the Lodi GSA near the White Slough Pollution Control Facility, the N.A. Chaderjian Youth Correctional Facility, Republic Services Landfill on South Austin Road, and the Kruger and Sons, Inc. site off Highway 4 outside Farmington.

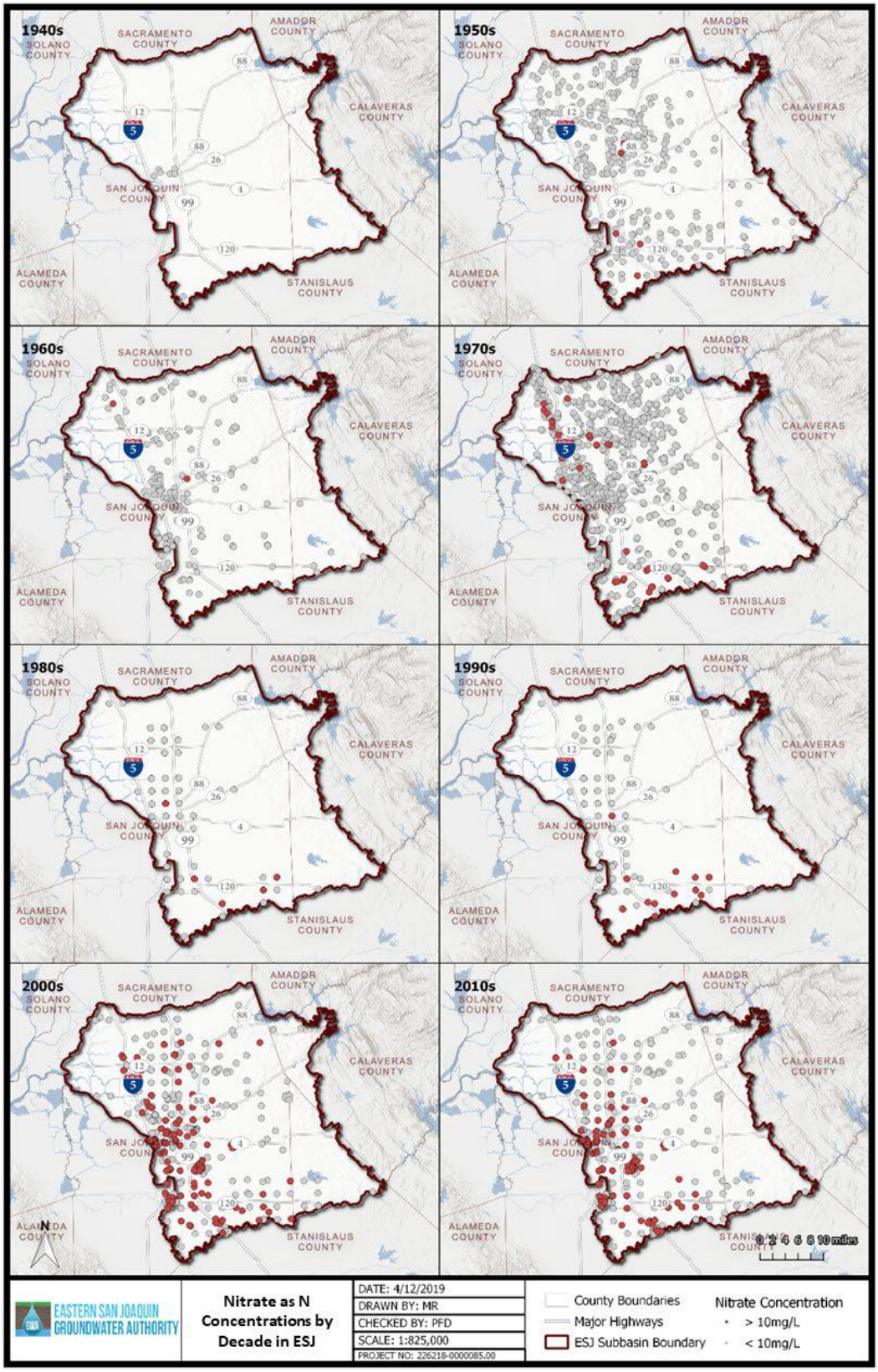
While the extent of groundwater quality impacts from nitrate is a data gap area, increased nitrate concentrations have not been found to have a causal nexus between SGMA-related groundwater management activities in the Subbasin.

The causal nexus reflects that the degraded water quality issues are associated with groundwater pumping and other SGMA-related activities rather than water quality issues resulting from land use practices, naturally occurring water quality issues, or other issues not associated with groundwater pumping. Additional monitoring conducted through the implementation of this GSP

will inform trends such that the ESJGWA can be informed to take action to address nitrite contamination if a causal nexus is identified.

Section 3.2.3.1.1 of the GSP discusses Irrigated Lands Regulatory Program (ILRP) and Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS), two existing regulatory programs for the monitoring and regulation of nitrate and salinity. Under the ILRP, the San Joaquin County & Delta Water Quality Coalition is required to test and potentially mitigate for nitrate in domestic wells. Additionally, the 2017 Salt and Nitrate Management Plan developed by CV-SALTS identifies long-term nitrate management practices (Central Valley Regional Water Quality Control Board [CVRWQCB], 2016).

Figure 4-13. Nitrate as N Concentrations by Decade.



Source: Figure 2-65, from the ESJ Groundwater Subbasin GSP (November 2019)

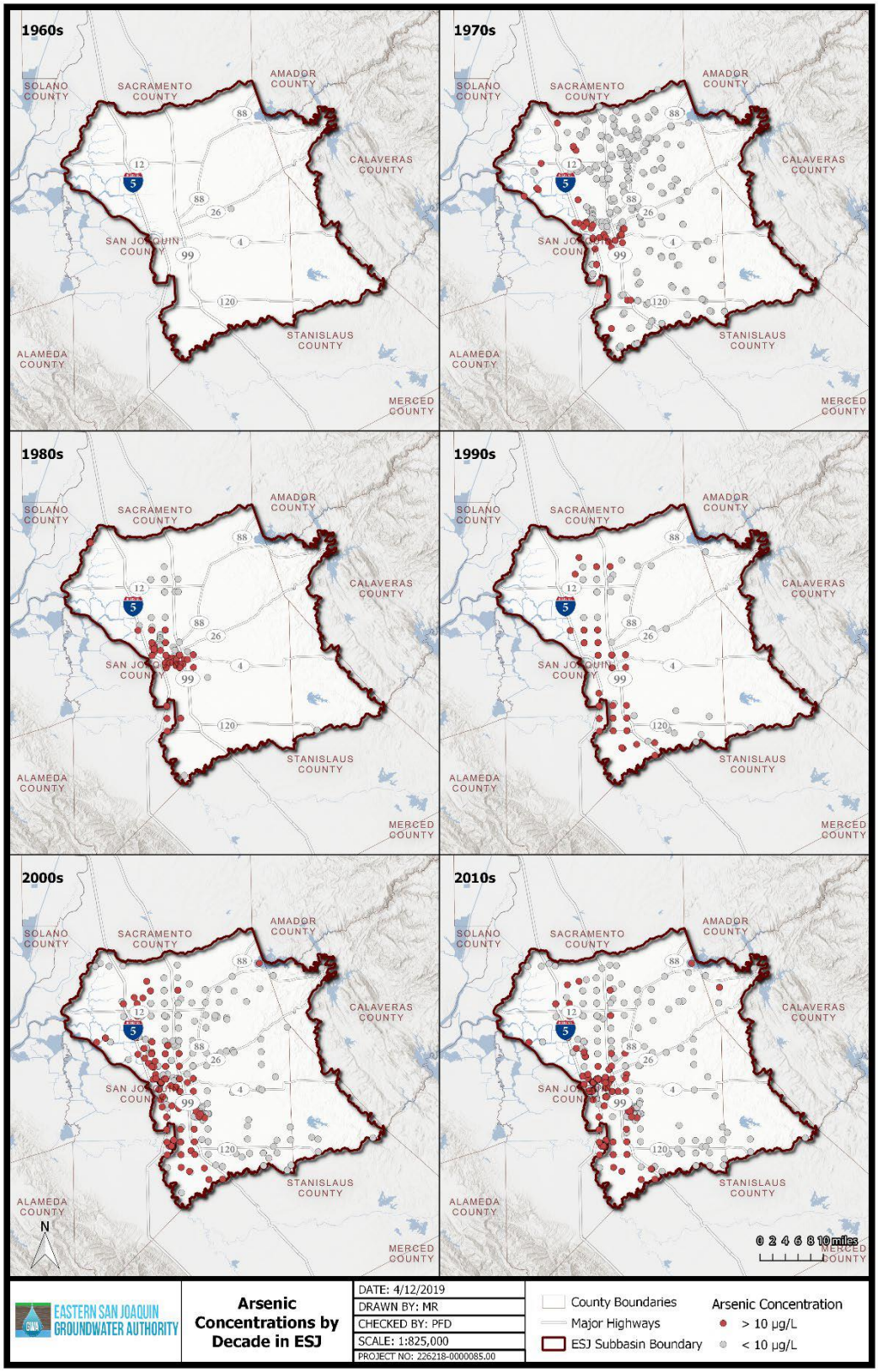
4.2.3 Arsenic

Arsenic is ubiquitous in nature and is commonly found in drinking water sources in California. Determining the source of arsenic in groundwater is difficult because arsenic is both naturally occurring and used in human activities such as agriculture. Public health concerns about arsenic in drinking water related to its potential to cause adverse health effects are addressed through DDW's MCL, established at 10 micrograms per liter (µg/L). California's revised arsenic MCL of 10 µg/L became effective on November 28, 2008. A 10-µg/L federal MCL for arsenic has been in effect since January 2006. Previous California and federal MCLs for arsenic were 50 µg/L.

Figure 4-14 shows the spatial distribution of arsenic concentrations contained in the GAMA database. From the 1970s to present, the total number and percentage of arsenic values above 10 µg/L has increased (Table 4-9). The spatial distribution of measurements above 10 µg/L is similar to nitrate, largely between Interstate 5 and Highway 99, from the cities of Manteca to Lodi. The increased arsenic concentrations near urban areas are not necessarily indicative of contamination from these areas and may partially be due to the fact that arsenic measurements are more abundant in these urban areas; GAMA water quality records are rarely evenly distributed throughout the Subbasin for any constituent. Recent arsenic samples show measurements above 10 µg/L similar to the overall trends (Figure 4-15).

Measurements above 10 µg/L in years 2015, 2016, 2017, and 2018 are primarily located in the cities of Stockton and Manteca, with fewer occurring around the city of Lodi. While the extent of groundwater quality impacts from arsenic is a data gap area, increased arsenic concentrations have not been found to have a causal nexus between SGMA-related groundwater management activities in the Subbasin. Additional monitoring conducted through the implementation of the GSP will inform trends such that the ESJGWA can be informed to take action to address arsenic contamination if a causal nexus is identified.

Figure 4-14. Arsenic Concentrations by Decade.



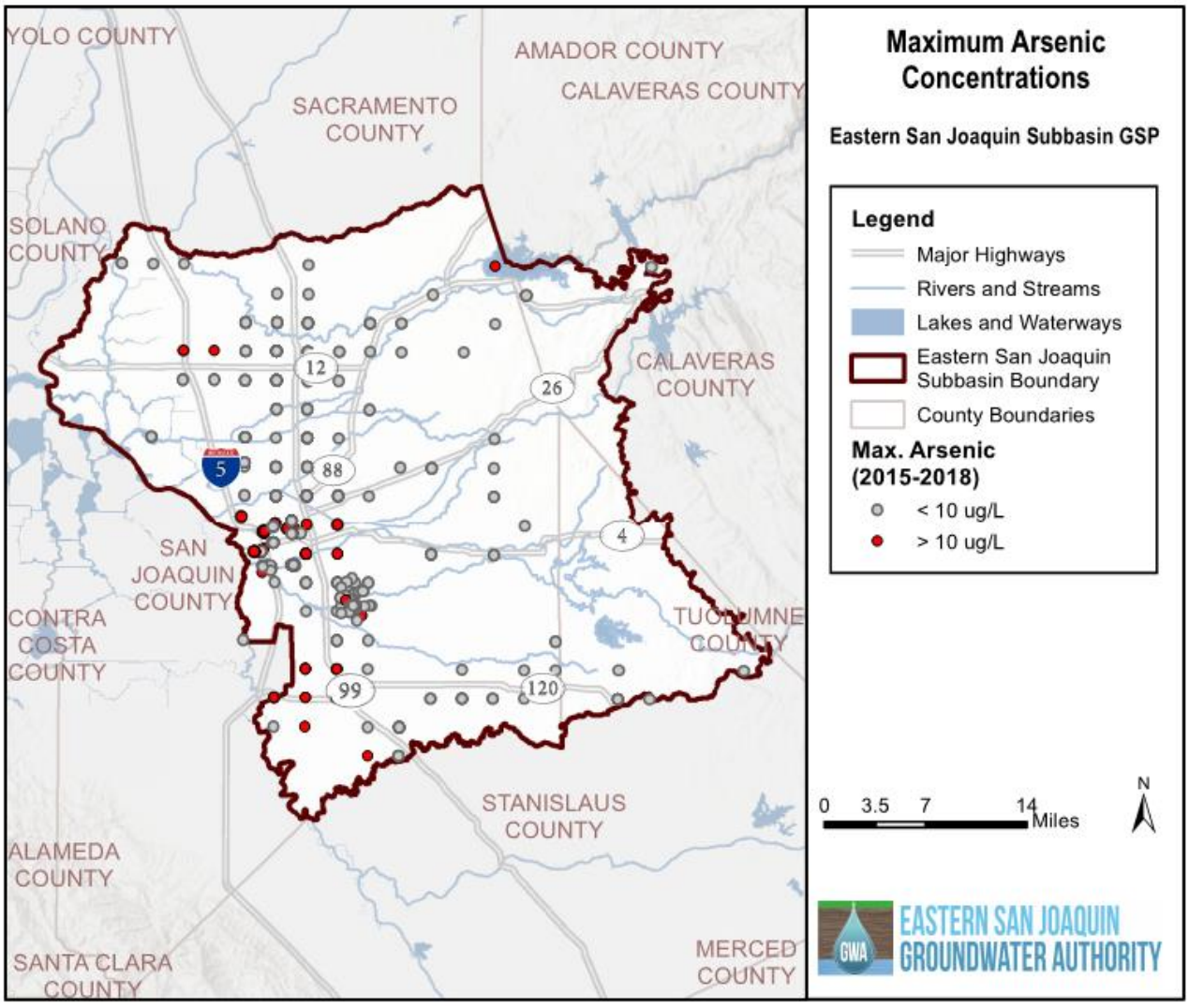
Source: Figure 2-66, from the ESJ Groundwater Subbasin GSP (November 2019)

Table 4-9. Arsenic Concentrations by Decade

Decade	% of Samples		Number of Arsenic Samples
	<10 µg/L	>10 µg/L	
1960	100%	0%	1
1970	86%	14%	339
1980	72%	28%	363
1990	72%	28%	645
2000	56%	44%	4,051
2010	48%	52%	5,109

Source: Table 2-9, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-15. Maximum Arsenic Concentrations 2015-2018.



Source: Figure 2-67, from the ESJ Groundwater Subbasin GSP (November 2019)

4.2.4 Point Sources

Point sources are discrete or discernable sources of pollutants which may introduce undesirable constituents into groundwater and may negatively impact water quality. In the ESJ Subbasin, point sources include leaking underground storage tanks, landfills, dry cleaners, and others. These sites are actively investigated and monitored within the ESJ Subbasin in response to these known or potential sources of groundwater contamination.

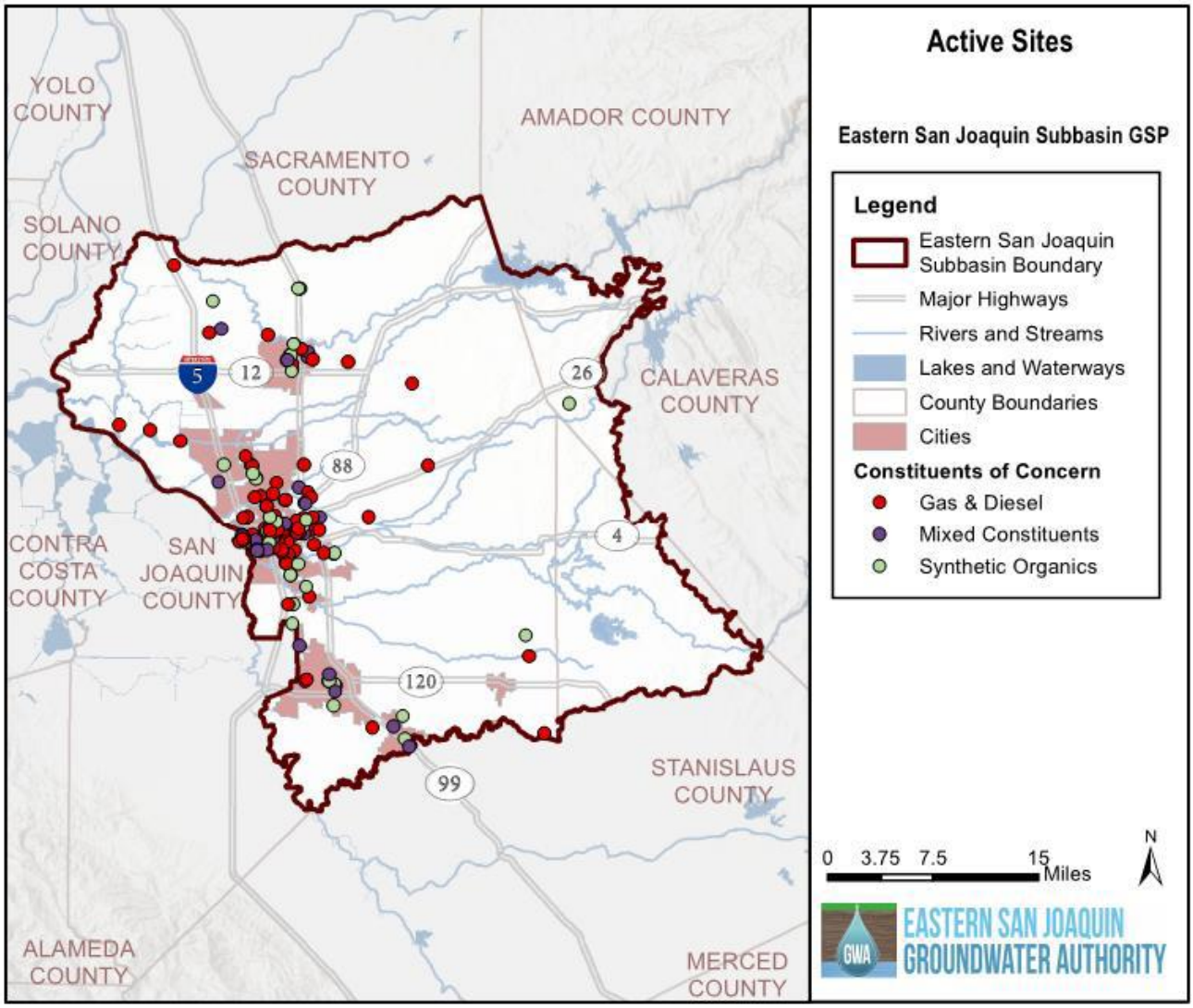
The Regional Water Quality Control Board (RWQCB), the Department of Toxic Substances Control (DTSC), and the United States Environmental Protection Agency (USEPA) provide oversight of point-source pollution through existing regulatory programs, including management of remedial action for point-source contamination sites. GeoTracker documents contaminant concerns that the RWQCB is or has been working with site owners to remediate while EnviroStor is the DTSC's data management system to track known contamination sites undergoing cleanup, permitting, enforcement, and investigation efforts. As shown in Figure 4-16, there are 258 active sites within the ESJ Subbasin which are color-coded based on the site's constituent(s) of concern: fuels (gasoline and/or diesel); synthetic organics (pesticides, herbicides, insecticides, etc.); or a mix of constituents (multiple constituents such as heavy metals and pesticides).

Most sites within the ESJ Subbasin are fuel sites (e.g., gasoline or diesel) that are under active investigation or remediation. Sites with the potential to cause plumes are mapped in Figure 4-17, which were identified by filtering for sites containing soluble and mobile constituents such as volatile organic compounds (VOCs); benzene, toluene, ethylbenzene, and xylenes (BTEX); and/or petroleum hydrocarbons (gasoline or diesel).

Sites with the potential to cause plumes are currently managed by existing regulatory programs through the RWQCB, DTSC, and USEPA, as described above. New projects undertaken by the GSAs as part of GSP implementation will evaluate contaminant plume movement in a California Environmental Quality Act (commonly known as) CEQA document.

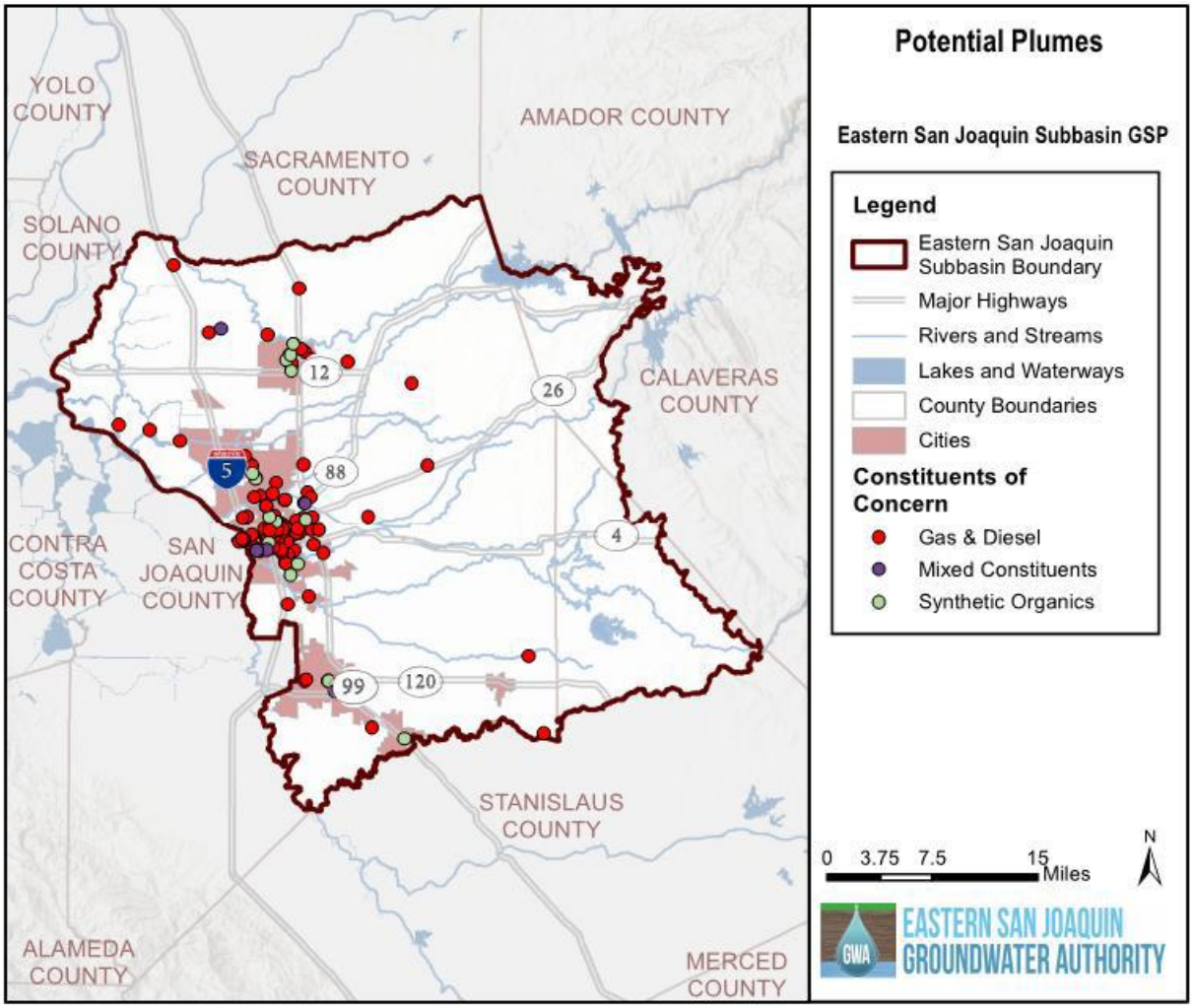
Specific point source sites and contaminants are discussed in the sections below.

Figure 4-16. Active Investigation and Remediation Sites.



Source: Figure 2-68, from the ESJ Groundwater Subbasin GSP (November 2019)

Figure 4-17. Active Sites with the Potential to Cause Plumes.



Source: Figure 2-69, from the ESJ Groundwater Subbasin GSP (November 2019)

4.2.4.1 Publicized Plumes in and near the Subbasin (Section 2.2.4.4.1 of the GSP)

As indicated above, the ESJ Subbasin has numerous open cleanup sites, including areas contaminated by chlorinated solvents, methyl tertiary-butyl ether (MtBE), pesticides and herbicides, and leaking underground storage tanks. Plume sites are often clustered around urban centers but are also found near sites where historical industrial or agricultural practices have released contaminants of concern. While other plumes exist in and around the Subbasin, three specific plumes have been highly publicized: the Lodi Plumes, the Sharpe Army Depot Plume, and the Occidental Chemical Corporation Plume.

In the late 1980s, the city of Lodi discovered the chlorinated solvents perchloroethylene (PCE) and trichloroethene (TCE) in drinking water supplies and pursued a groundwater investigation that revealed a series of five separate plume areas located in the northeastern portion of the city: the Northern, Western, Central, Southern, and Busy Bee plumes.

The Busy Bee plume, named after a dry cleaner business which previously operated on the site, now has regulatory closure, with cleanup moving toward completion under CVRWQCB oversite (SWRCB, 2011).

Groundwater contamination plumes in the city of Lathrop, located just outside the Subbasin boundary, include the Sharpe Army Depot and Occidental Chemical Corporation sites. Contamination of groundwater at the Sharpe Army Depot consists primarily of trichloroethene, tetrachloroethene, and cis-1,2-dichloroethene from historical industrial activities related to military activities. Due to concerns of potential contamination, the city of Lathrop abandoned their wells in the area. Three groundwater extraction and treatment systems are located at Sharpe Army Dept and are used to treat existing groundwater (EKI Environment & Water, 2015).

The Occidental Chemical Corporation Plume was discovered in the late 1970s and is the result of former leaking wastewater holding ponds containing pesticides and chemicals used for equipment cleaning by the Occidental Chemical Corporation. Contaminants of concern include the pesticides 1,2-dibromo-3-chloropropane (DBCP) and ethylene dibromide (EDB), lindane, 2,3,4,5-tetrahydrothiopene-1, 1-dioxide, sulfate, nitrate, chloride, and BHC (RWQCB, 2012).

Since the discovery of these plumes in the 1980s, groundwater monitoring and evaluation at point source locations has led to the implementation of remedial activities such as the installation of groundwater extraction and remedial systems, implementation of a Salinity Reduction Plan, and mandated waste discharge requirements (WDRs) (RWQCB, 2012).

4.2.4.2 Petroleum Hydrocarbons (Section 2.2.4.4.2 of the GSP)

Approximately 134 sites in the ESJ Subbasin are identified as actively investigating or remediating an unauthorized release of petroleum hydrocarbons, according to the GeoTracker and EnviroStor databases. At these sites, petroleum hydrocarbon constituents are most commonly fuels (diesel, gasoline, motor oil, or aviation fuel) and VOCs commonly added to fuels, including MtBE and BTEX constituents. Concentrations of petroleum hydrocarbons have not been modeled across the Subbasin; concentrations are local and site specific. A summary description of the aforementioned constituents is provided in Table 4-10 below:

Table 4-10. MCLs for Common Petroleum Hydrocarbons and MTBE

Constituent	Source	Primary MCL
MTBE	Oxygenate commonly added to gasoline	13 µg/L
BTEX		
Benzene	Industrial solvent added to crude oil paint, varnish, and lacquer thinner	1 µg/L
Toluene	Aromatic hydrocarbon used in industrial feedstock, as a solvent, and to produce benzene and added to gasoline	150 µg/L
Ethylbenzene	Used as a solvent and added to fuel, asphalt, and naphthalene	300 µg/L
Xylenes	Naturally occurring in petroleum, coal and wood tar	1.750 mg/L

Source: (SWRCB, 2018)

Source: Table 2-10, from the ESJ Groundwater Subbasin GSP (November 2019)

4.2.4.3 Synthetic Organics (Section 2.2.4.4.3 of the GSP)

Approximately 47 sites in the ESJ Subbasin are identified as actively investigating or remediating an unauthorized release of synthetic organics, according to the GeoTracker and EnviroStor databases. At these sites, pesticides, herbicides, fertilizer, and pesticides are the most common constituents. Other constituents include VOCs such as PCE and TCE. Concentrations of synthetic organics have not been modeled across the Subbasin; concentrations are local and site specific. For context, a brief description of the aforementioned VOCs is provided in Table 4-11.

Table 4-11. MCLs for Common Synthetic Organic Constituents

Constituent	Source	Primary MCL[1]
TCE	Used as a solvent in manufacturing facilities and dry cleaners	5 µg/L
PCE	Used as a solvent in manufacturing facilities, dry cleaners, printing shops, and auto repair facilities	5 µg/L

Note:
[1] Source: (SWRCB, 2018)

Source: Table 2-11, from the ESJ Groundwater Subbasin GSP (November 2019)

4.2.4.4 Mixed Constituents (Section 2.2.4.4.4 of the GSP)

Approximately 28 sites in the ESJ Subbasin are identified as actively investigating or remediating an unauthorized release of mixed constituents, according to the GeoTracker and EnviroStor databases. Sites with mixed constituents are those that include a release of more than one type of contaminant, such as a mix of heavy metals, diesel, inorganics, and/or organics. At these sites, the most common constituents include a mixture of heavy metals (chromium, arsenic, and lead), inorganics, and solvents. The sources and primary MCL for many contaminants found in the 'mixed constituents' classification have been discussed throughout Section 2.2.4 of the GSP.

4.2.4.5 Emerging Contaminants (Section 2.2.4.4.5 of the GSP)

Many chemical and microbial constituents that have not historically been considered as contaminants are occasionally, and in some cases with increasing frequency, detected in

groundwater. These newly recognized (or emerging) contaminants are commonly derived from municipal, agricultural, industrial wastewater, and domestic wastewater sources and pathways. These newly recognized contaminants are dispersed to the environment from domestic,

commercial, and industrial uses of common household products and include caffeine, artificial sweeteners, pharmaceuticals, cleaning products, and other personal care products. Residual waste products of genetically modified organisms are also of potential concern. Several studies, such as by Watanabe et al. in 2010, have recently been published or are underway regarding the potential link between dairies and the occurrence of pharmaceuticals in shallow groundwater in the San Joaquin Valley.

Perfluorooctanesulfonic acid (PFOS) and perfluorooctantoic acid (PFOA) are organic chemicals synthesized for water and lipid resistance, used in a wide variety of consumer products as well as fire-retarding foam and various industrial processes. These chemicals tend to accumulate in groundwater, though typically in a localized area in association with a specific facility, such as a factory or airfield (California Water Boards, 2018). There are currently no MCLs for PFOS or PFOA; however, the USEPA is moving forward with establishing the MCL and is recommending municipalities notify customers at levels at or greater than 70 parts per trillion in water supplies (USEPA, 2019). California's DDW has established notification levels at 6.5 parts per trillion for PFOS and 5.1 parts per trillion for PFOA (SWRCB, 2019).

1,2,3-Trichloropropane (1,2,3-TCP) is a solvent is typically found in industrial or hazardous waste sites. Along with an industrial solvent, 1,2,3-TCP is a cleaning and degreasing agent and associated with pesticide products. Though there is currently no federal MCL, the MCL for 1,2,3-TCP in California is 0.005 µg/L (SWRCB, 2019).

Currently, data on PFOS, PFOA, and 1,2,3-TCP are limited in the ESJ Subbasin since these are emerging contaminants.

4.3 Saline Groundwater Migration and Groundwater Quality

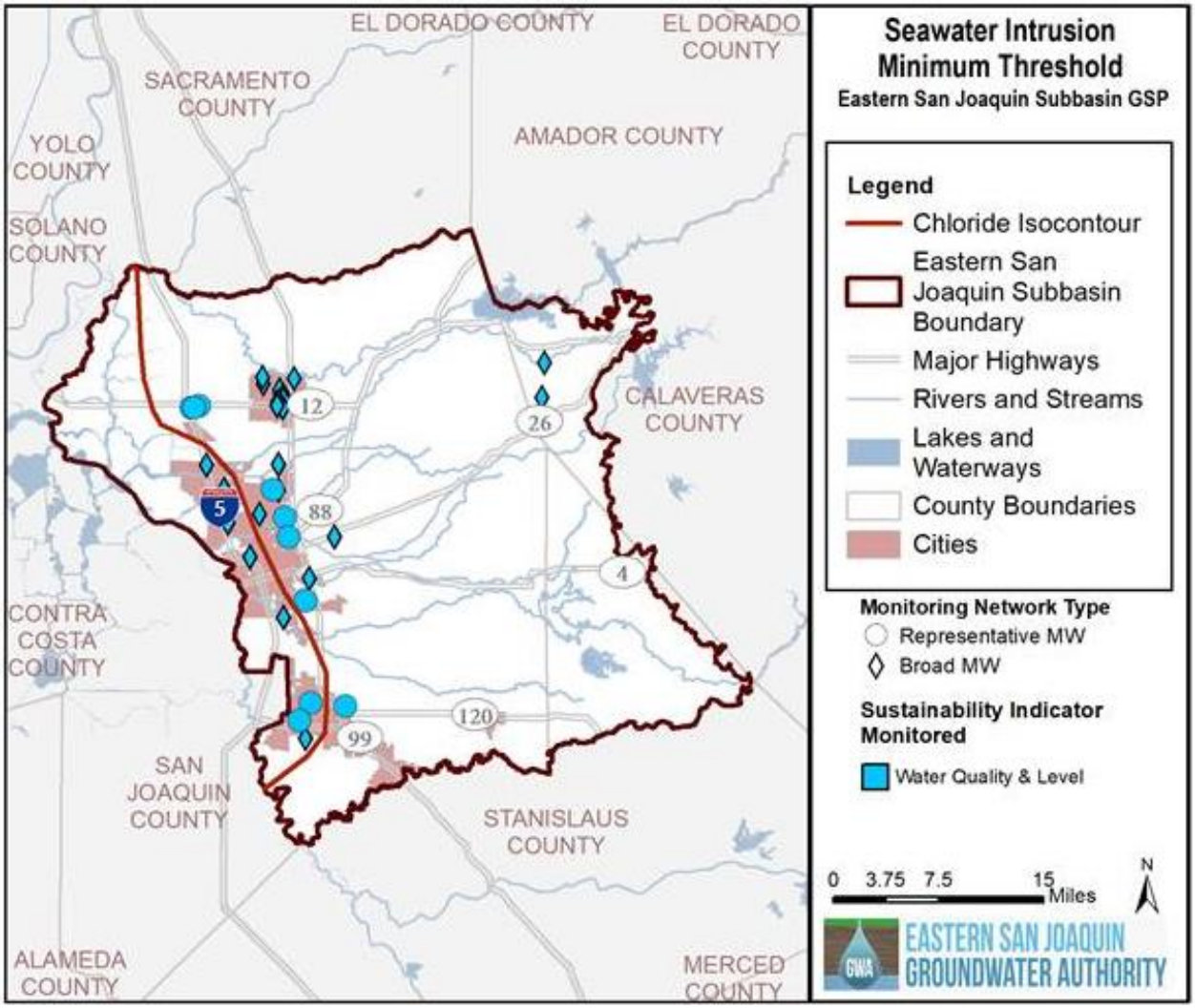
Groundwater flow in the Basin may converge on the depression with relatively steep groundwater gradients eastward from the Delta toward the depression east of Stockton. The eastward flow from the Delta area is significant because of the typically poorer quality water may move eastward in the Stockton area.

Degradation of water quality due to saline migration threatens the beneficial uses and long-term sustainability of underlying basin. Salt laden groundwater is unusable for either urban drinking water needs or for irrigating crops. The saline migration problem is not well understood by the GSJCRWCC. Limited studies and monitoring have produced postulates as to the sources and extent of the saline front.

Figure 4-18 displays the minimum threshold line for chloride in the ESJ GSP. Projections indicate that the rate of eastward migration of the saline front is approximately 150 to 250 feet per year.

The ESJ Subbasin uses an isocontour line for the early detection and management of seawater intrusion. The ESJ Subbasin is not in a coastal area and seawater intrusion is not currently present. While the Delta ecosystem evolved with a natural salinity cycle that brought brackish tidal water in from the San Francisco Bay, levees installed to allow development of agriculture, followed by development and operation of the Central Valley Project and the State Water Project, have altered the inward movement of seawater through the Delta. Current management practices endeavor to maintain freshwater flows through a combination of hydraulic and physical barriers and alterations to existing channels. Portions of the Subbasin do, however, experience water quality issues related to salinity, which are addressed under the degraded water quality sustainability indicator. Salinity in the Subbasin is due to other factors and is not the result of seawater intrusion. Undesirable results related to seawater intrusion are not currently occurring and are not reasonably expected to occur. However, this GSP establishes monitoring protocols for the early detection of seawater intrusion, were it ever to occur, so that the ESJGWA can take action to address undesirable results. The 2,000 mg/L chloride isocontour line depicted is a demarcation of where the ESJGWA would consider seawater intrusion has created an undesirable result. As data are collected from wells within the water quality monitoring network, an isocontour line can be drawn with the most current data. If the drawn isocontour line representing current data crosses the minimum threshold isocontour line at chloride concentrations 2,000 mg/L or higher, the ESJGWA would consider that an undesirable result had occurred. It is unlikely that the Subbasin will experience an undesirable result due to seawater intrusion during the SGMA planning horizon.

Figure 4-18. Seawater Intrusion Minimum Threshold Chloride Isocontour Line.



Source: Figure 3-4, from the ESJ Groundwater Subbasin GSP (November 2019)

4.4 Plan Objectives

For discussion on adapting to changes in the amount, intensity, timing, quality and variability of runoff and recharge, *see* Section 4.7.4 of this IRWMP Addendum.

For consideration of the effects of sea level rise (SLR) on water supply conditions and identify suitable adaptation measures, *see* Section 4.12.1 and 4.7.5 of this IRWMP Addendum.

For discussion on reducing energy consumption, especially the energy embedded in water use, and ultimately reducing greenhouse gas (GHG) emissions, *see* Section 4.7.9 and Table 4-15 of this IRWMP Addendum.

For evaluation of different ways to meet IRWM Plan objectives and consideration the strategies adopted by CARB in its AB 32 Scoping Plan, *see* Sections 4.7.6-4.7.9 and Section 4.12.1, which

discuss how greenhouse gas emissions are planning on being reduced in the region. Furthermore, Appendix A of the San Joaquin County 2035 General Plan details sustainability policies and programs including GHG emissions reduction targets and programs for improving energy efficiency, reducing waste and promoting recycling, and managing water use.

For consideration of options for carbon sequestration and using renewable energy where such options are integrally tied to supporting IRWM Plan objectives, note that the projects proposed in this IRWMP Addendum do not incorporate renewable energy to support IRWM Plan objectives. However, for information related to reducing energy consumption overall, *see* Sections 4.7.6-4.7.9 and Section 4.12.1 in this IRWMP Addendum.

Section 7.4 of the 2014 IRWM ("Objectives") addresses the collaborative process behind the former GBA's process in formulating IRWM Plan Objectives, which have been continued by the GSJCRWCC.

4.4.1 2019 GSP Sustainability Goal

Sustainability Goal – This goal is the culmination of conditions resulting in a sustainable condition (absence of undesirable results) within 20 years.

- Goals are the desired results to achieve the mission and are typically broad and long-term.
- An objective defines the specific, measurable actions undertaken to achieve the overall goal.

SGMA requires development of a GSP that achieves groundwater sustainability in the Subbasin by 2040. The GSP outlines the need to reduce overdraft conditions and has identified 23 projects for potential development that either replace groundwater use (offset) or supplement groundwater supplies (recharge) to meet current and future water demands.

A Public Draft GSP was prepared and made available for public review and comment on July 10, 2019 for a period of 45 days ending on August 25, 2019.[16] The final GSP was adopted in December 2019 and submitted to DWR in January 2020.

4.4.1.1 2007 Basin Management Framework

Following the completion of the ESJ Groundwater Management Plan in 2004 with its adopted Basin Management Objectives, additional stakeholder discussions where conducted by the GBA

[16] Eastern San Joaquin Groundwater Management Authority, 2017. Eastern San Joaquin Groundwater Sustainability Plan, November 2017, p.ES-1

Coordinating Committee to undertake the development of a basin management framework and operations criteria.

This effort was based on the assumption that the ESJ Groundwater Basin could be operated conjunctively without adjudication through enhanced groundwater recharge and sustainable use. The Basin Management Framework adopted in the 2007 IRWMP has been superseded by the 2019 GSP. The 2019 GSP used the definitions below to establish the Sustainable Management Criteria.

Minimum Thresholds – Minimum thresholds are numeric values for each sustainability indicator and are used to define when undesirable results occur. Undesirable results occur if minimum thresholds are exceeded in an established percentage of sites in the ESJ Subbasin's representative monitoring network.

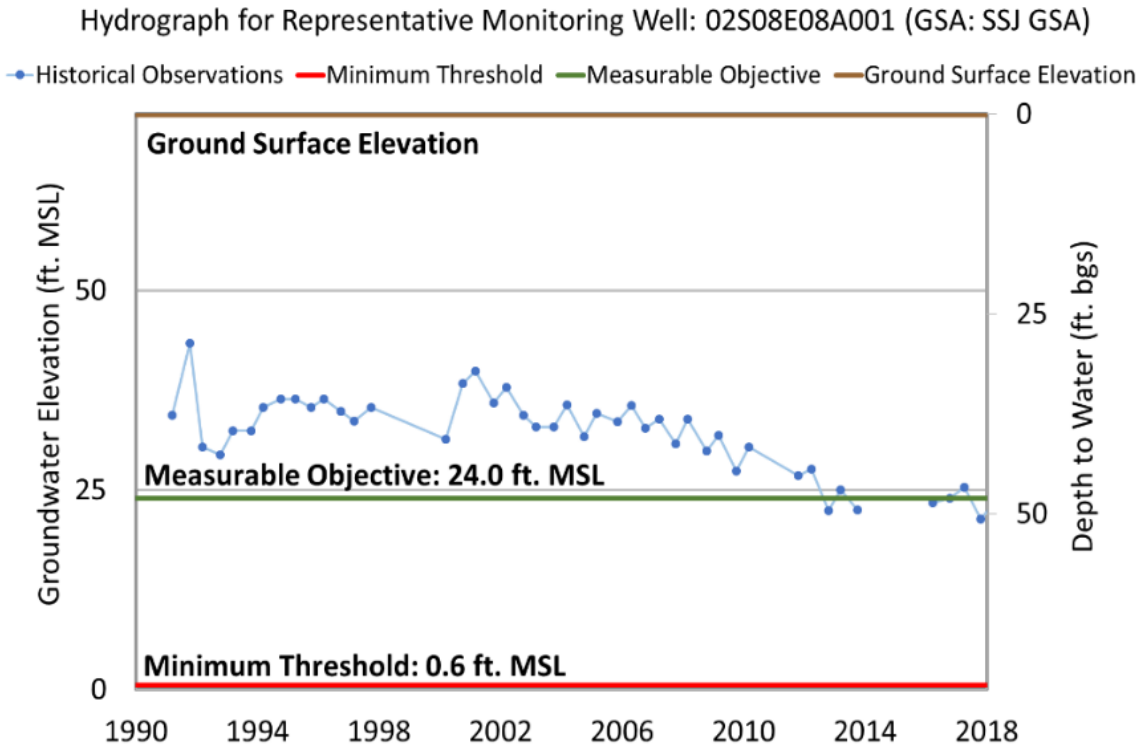
Measurable Objectives – Measurable objectives are a specific set of quantifiable goals for the maintenance or improvement of groundwater conditions.

The method prescribed by SGMA to measure undesirable results involves setting minimum thresholds and measurable objectives for a series of representative wells. Representative wells are identified to provide a basis for measuring groundwater conditions throughout a basin or subbasin without having to measure each well, which would be cost prohibitive. In the ESJ Subbasin, representative wells were selected based on history of recorded groundwater levels and potential to effectively represent the groundwater conditions.

A total of 20 representative wells were identified for measurement of groundwater levels in the Subbasin, and 10 representative wells were identified for groundwater quality monitoring. The GSP uses groundwater quality data as the basis for evaluating conditions for seawater intrusion and uses groundwater level data as the basis for evaluating conditions for groundwater storage, depletions of interconnected surface water, and land subsidence. As such, these representative wells provide the basis for measuring the six sustainability indicators across the Subbasin.

Minimum thresholds and measurable objectives were developed for each of the representative wells. Figure 4-19 shows a typical relationship of the minimum thresholds, measurable objectives, and historical groundwater level data for a sample groundwater level representative monitoring well.

Figure 4-19. Sample Relationship Between Minimum Threshold and Measurable Objective.



Source: Figure E-5, from the ESJ Groundwater Subbasin GSP (November 2019)

Minimum thresholds for groundwater levels were developed with reference to historical drought low conditions and domestic well depths. Specifically, minimum thresholds were established based on the deeper of the historical drought low plus a buffer of the historical fluctuation *or* the 10th percentile domestic well depth, whichever is shallower – establishing levels that are protective of 90 percent of domestic wells. In municipalities with ordinances requiring the use of city water (water provided by the city's municipal wells), the 10th percentile municipal well depth is used in place of the 10th percentile domestic well depth criteria.

Measurable objectives were established based on the historical drought low and provide a buffer above the minimum threshold. A table summarizing minimum thresholds and measurable objectives is included in the GSP. Graphs showing the minimum threshold and measurable objective for each of the representative wells are contained in an appendix to the GSP.

Minimum thresholds for water quality were defined by considering two primary beneficial uses at risk of undesirable results related to salinity: drinking water and agriculture uses. Minimum thresholds are 1,000 mg/L for each representative monitoring well, consistent with the upper limit SMCL for TDS. Crop tolerances in the Subbasin range by crop type from 900 mg/L TDS for almonds up to 4,000 mg/L TDS for wheat, assuming a 90 percent yield.

The minimum threshold for seawater intrusion is a 2,000 mg/L chloride isocontour line established near the western edge of the Subbasin, between sentinel monitoring locations. 2,000 mg/L chloride is approximately 10 percent of seawater chloride concentrations

(19,500 mg/L) and was developed as a minimum threshold based on consideration of existing management practices in other areas of the state.

For depletions of interconnected surface water, the minimum thresholds and measurable objectives for groundwater levels are used. There is significant correlation between groundwater levels and depletions, and the groundwater levels minimum thresholds are found to be protective of depletions.

Similarly, the minimum thresholds and measurable objectives for groundwater levels are used for the land subsidence and groundwater storage sustainability indicators, as both are strongly linked to groundwater levels. The groundwater levels minimum thresholds are found to be protective of land subsidence and groundwater storage.

Additional detail on Sustainable Management Criteria can be found in Chapter 3 of the 2019 GSP.

4.5 Resource Management Strategies

All 32 DWR RMS were considered in the 2020 IRWMP Update. A complete listing of RMS is presented in Table 4-12 and includes some "other strategies" from the 2013 California Water Plan Update toward the number of RMS (36 total).

Table 4-12. Resource Management Strategies in California Water Plan Update 2013.

Management Objective	Resource Management Strategy	Included in IRWMP	Notes
Reduce Water Demand			
1	Agricultural Water Use Efficiency	Yes	
2	Urban Water Use Efficiency	Yes	
Improve Operational Efficiency and Transfers of Water			
3	Conveyance—Delta	Yes	
4	Conveyance—Regional and Local	Yes	
5	System Reoperation	Yes	
6	Water Transfers	Yes	
Increase Water Supply			
7	Conjunctive Management and Groundwater	Yes	
8	Desalination – Brackish and Sea Water	Considered	Not practical for region
9	Precipitation Enhancement	Considered	Not practical for region
10	Municipal Recycled Water	Yes	
11	Surface Storage—CALFED and State	Considered	
12	Surface Storage—Regional and Local		
Improve Water Quality			
13	Drinking Water Treatment and Distribution	Yes	
14	Groundwater and Aquifer Remediation	Yes	Saline barrier project
15	Matching Water Quality to Use	Yes	
16	Pollution Prevention	Yes	
17	Salt and Salinity Management	Yes	
18	Urban Stormwater Runoff Management	Yes	

Management Objective	Resource Management Strategy	Included in IRWMP	Notes
Practice Resource Stewardship			
19	Agricultural Land Stewardship	Considered	Does not address Plan
20	Ecosystem Restoration	Yes	
21	Forest Management	No	Not applicable to Region
22	Land Use Planning and Management	Yes	
23	Recharge Area Protection	Yes	
24	Watershed Management	Yes	
25	Sediment Management[17]		
Improve Flood Management			
26	Flood Management	Yes	
People and Water			
27	Economic Incentives (Loans, Grants, Water	Yes	
28	Outreach and Engagement[69]	Yes	
29	Water and Culture[69]	Yes	
30	Water-dependent Recreation	Considered	
Other Strategies			
31	Crop Idling for Water Transfers	Considered	
32	Dewvaporation or Atmospheric Pressure	No	Not practical for region
33	Fog Collection	No	Not practical for region
34	Irrigated Land Retirement	Yes	
35	Rain-fed Agriculture	Yes	Not practical for region
36	Waterbag Transport/Storage Technology	No	Not practical for region

Notes: Strategies identified in the 2013 California Water Plan Update (Bulletin 160-13)

The resource management strategies for the region are informed by climate change impacts in the region as outlined in the California's Fourth Climate Change Assessment (Westerling et al, 2018) and in the 2014 IRWM Plan. The Fourth Assessment report includes a regional assessment for San Joaquin Valley Region which includes all of San Joaquin, Stanislaus, Merced, Kings, and Tulare counties as well as parts of Madera, Fresno, and Kern counties. The report identifies key climate impacts as acceleration of warming, more intense and frequent heat waves, higher frequency of catastrophic floods, accelerating SLR, more intense and frequent drought, and more severe and frequent wildfires. These impacts are likely to increase stresses to agriculture, ecosystems, water resources, land use and community development, transportation, energy, public health and climate justice. Conversely, the 2014 IRWMP discusses the region's ability to adapt to changes in water supply, water demand, water quality, flooding hazards, SLR, hydropower generation, and ecosystems and habitats as key regional vulnerabilities.

[17] Additional RMS's in the 2013 update are Sediment Management, Outreach and Engagement, and Water and Culture (for a total of 32 requirements).

Water resources impacts of climate change identified for the region in the 2014 IRWM Plan and in Fourth Assessment report (Westerling et al, 2018) are also very similar. The region is projected to experience more variable precipitation regimes with prolonged periods of drought and more extreme precipitation events. At higher elevations, increased warming could lead to more precipitation projected to occur as rain instead of snow, earlier spring snowmelt and more rain-on-snow events from atmospheric rivers. Downstream areas such as San Joaquin County will experience increased risk of late winter and early spring flooding, changes in reservoir operations, and reduced flows to meet summer irrigation requirements, and reduced water quality from reduced flows and increasing stream temperatures. These changes could lead to increased pumping of already overdrafted groundwater basins, increasing the likelihood of adverse impacts such as subsidence and declining water quality.

Table 4-13 shows the how regional climate change vulnerabilities which are prioritized in Section 4.12 are considered in the resource management strategies. This Plan aims to reduce regional climate vulnerabilities by adopting resource management strategies and developing projects that implement the strategies. Table 4-13 also demonstrates how the effects of climate change on its region are factored into its RMS and how they eliminate or minimize those vulnerabilities, including those impacting water infrastructure systems (i.e. water supply and storage), and supplements the RMS discussion in Chapter 9 of the 2014 IRWMP, which also addresses these requirements.

For reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions, *see* Section 4.7.9 of this IRWMP Addendum.

Table 4-13. Consideration of Regional Climate Change Vulnerabilities in Resource Management Strategies.

Management Objective		Resource Management Strategy	Water Supply and Storage	Water Quality and Saltine Water	Water Demand Uncertainty	Ecosystems & Habitat	Flooding due to Sea Level Rise	Flooding and Water Logging of Crop Areas	Seasonal Riverine Flooding	Hydropower Generation
Reduce Water Demand										
	1	Agricultural Water Use Efficiency			✓					
	2	Urban Water Use Efficiency			✓					
Improve Operational Efficiency and Transfers of Water										
	3	Conveyance—Delta								
	4	Conveyance—Regional and Local				✓				
	5	System Reoperation	✓	✓			✓			✓
	6	Water Transfers	✓							✓
Increase Water Supply										
	7	Conjunctive Management and Groundwater	✓						✓	
	10	Municipal Recycled Water	✓			✓				
	12	Surface Storage—Regional and Local	✓							✓
Improve Water Quality										
	13	Drinking Water Treatment and Distribution								
	14	Groundwater and Aquifer Remediation		✓						
	15	Matching Water Quality to Use	✓		✓					
	16	Pollution Prevention		✓						
	17	Salt and Salinity Management		✓		✓	✓			
	18	Urban Stormwater Runoff Management	✓			✓		✓		

Management Objective		Resource Management Strategy	Water Supply and Storage	Water Quality and Saltine Water	Water Demand Uncertainty	Ecosystems & Habitat	Flooding due to Sea Level Rise	Flooding and Water Logging of Crop Areas	Seasonal Riverine Flooding	Hydropower Generation
Practice Resource Stewardship										
	20	Ecosystem Restoration				✓				
	22	Land Use Planning and Management			✓			✓		
	23	Recharge Area Protection	✓							
	24	Watershed Management		✓		✓			✓	
		Sediment Management[1]	✓	✓		✓				
Improve Flood Management										
	25	Flood Management					✓	✓	✓	
People and Water										
	26	Economic Incentives (Loans, Grants, Water Pricing)			✓	✓				
	27	Outreach and Engagement[69]			✓	✓				
	28	Water and Culture[69]			✓	✓				
Other Strategies										
	33	Irrigated Land Retirement			✓	✓				

4.5.1 Sediment Management

Sediment is a valuable natural resource as sediment processes are integral to various environmental and economic systems. Unfortunately, managing sediment is not simple. In certain settings sediment is desirable, but in other settings sediment is unwanted or excessive.

There are three main components addressed in sediment management: source and type of sediment, sediment transportation, and site of sediment deposition. When sediment is managed properly, watersheds benefit from improved water quality, improved flood management, and enhanced health of aquatic habitats.

4.5.2 Outreach and Engagement

Water management can be promoted through outreach and engagement of the public by water agencies. This communication provides decision-makers with insights on local practices and opinions, educates members of the public about best practices and water management activities, and supports collaboration and conflict resolution. As described in the California Water Plan (CWP), an effective outreach and engagement strategy has the following characteristics:

- Relevant
- Focused
- Scale-appropriate
- Innovative
- Collaborative
- Factually and scientific sound
- Adaptive
- Visible
- Effective
- Sustainable
- Measurable

4.5.3 Water and Culture

Water and culture are inextricably linked. Cultural values are reflected in policies related to water management. Water use is tied to cultural norms and practices. The condition of current water resources has been shaped by California's history and culture. This strong relationship necessitates the consideration of culture and cultural activities when making water management decisions. Understanding how culture interacts with water management can prevent conflict, promote sustainability, encourage collaboration and support, reduce costs, and facilitate partnerships.

4.6 Disadvantaged Communities

A disadvantaged community is defined as a community with an annual Median Household Income (MHI) less than 80 percent of the statewide annual MHI. Based on United States Bureau

Census (Census) data,[18] 80 percent of California's statewide annual MHI is $51,026.[19] MHI and population data have been retrieved from the Census website along with Census tracts for San Joaquin County. Census tracts are a small, relatively permanent statistical subdivision of a county designed to be homogenous with respect to population characteristics, economic status, and living conditions. A map of area DACs is presented in Figure 4-20.

The GSJCRWCC has been involved with creating several avenues to inform the region about their activities. Specific details of the Coordinating Committee can be found online at http://www.esjirwm.org. The website provides general information on the activities, accomplishments, and background of the GSJCRWCC including meeting agendas and minutes, press releases, newsletters, public notices, as well as reports and documents.

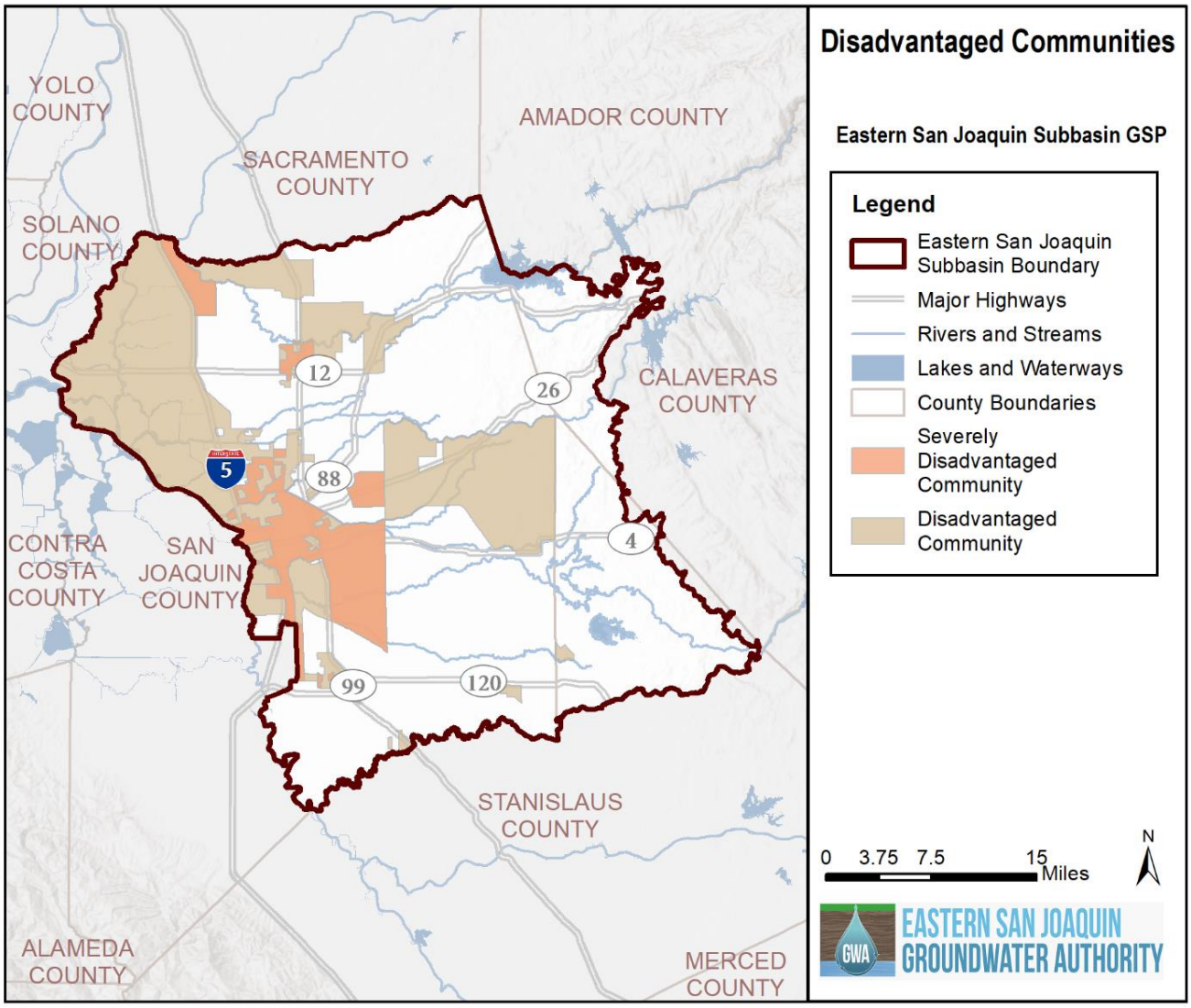
The DACIP is an element of the DWR's (IRWM) Program, a collaborative effort to identify and implement water management solutions on a regional scale. This approach is intended to increase regional self-reliance, reduce conflict, and concurrently achieve social, environmental, and economic objectives.

The SJRFA received funding through the DACI Program. Per the Program requirements, the SJRFA conducted a DAC Needs Assessment (The San Joaquin River Funding Area Disadvantaged Community Needs Assessment Report). The Needs Assessment is ultimately intended to provide a better understanding of water management needs to help direct resources and funding.

[18] The specific dataset used in the tool is the US Census American Community Survey (ACS) 5-Year Data: **2012 - 2016.** https://water.ca.gov/Work-With-Us/Grants-And-Loans/Mapping-Tools

[19] The statewide MHI for the current dataset is **$63,783**; therefore, the calculated DAC and SDAC thresholds are **$51,026** and **$38,270**, respectively. https://water.ca.gov/Work-With-Us/Grants-And-Loans/Mapping-Tools

Figure 4-20. Map of Disadvantaged Communities.



Source: Figure 1-8, from the ESJ Groundwater Subbasin GSP (November 2019)

4.7 Project Review Process

The initial project review process and procedures first identified in the 2007 IRWMP and 2014 Update (Section 9.5 of 2014 IRWMP) were used to identify projects for inclusion in this IRWMP Addendum. Going forward, projects proposed by the GSJCRWCC and regional stakeholders will be considered on an open and continuous basis. Project proponents that want to add their projects to the IRWMP can do so by contacting the GSJRWCC Secretary who will bring the projects to the GSJRWCC for consideration. The following approaches may be used for adding or modifying projects to this IRWMP Addendum in order to maintain a current and relevant list of projects:

- GSJCRWCC staff maintains contact with the membership and ask for project updates on a regular basis.

- Solicitation for new projects will take place in several forums:
    - Project solicitations will be posted on the GSJCRWCC website, and communicated to the membership, identified stakeholder groups, and the public at large.
    - GSJCRWCC staff will out to each public agency that provides water service in the Region.
    - GSJCRWCC staff will make contact with community organizations, especially those representing DACs, to explain the IRWMP process and to identify potential projects.
    - Updated project information was shared with the GSJCRWCC membership on a quarterly basis.
- Additional solicitations may take place during periods when grant funding is available.

As an update since the 2014 IRWMP, each agency adopting the IRWM in its adopting resolution recognizes that the project list may be occasionally updated using the GSJCRWCC's process for amending the projects list as part of the IRWM adoption. Furthermore, minor IRWMP edits and the addition of projects do not require a Notice of Intent per DWR guidelines, and thus the incorporation of new projects can be integrated into the Plan quickly to meet the needs of the community as quickly and conveniently as possible.

4.7.1 Potential Effects of Climate Change

Section 15.4 of the 2014 IRWM Plan summarized simulation results from the Variable Infiltration Capacity model and CALSIM II under different future emission scenarios through the end of the 21st century. The analysis compared historical and future streamflow projections at major regional water supply reservoirs including New Hogan, New Melones, Folsom, Pardee and Camanche reservoirs. Runoff entering many of these reservoirs originates in snowmelt driven watershed. Snow accumulated and retained in the snowpack in winter yields water in the drier late spring and summer seasons.

Snowpack in this region is very sensitive to temperature so slight changes in temperatures can result in extensive melting. With increasing temperatures, the snowpack is projected to melt earlier in the spring, increasing spring runoff and reducing summer flows into the reservoirs in the region. In addition, precipitation at lower and middle elevations in the region can easily change form from snow to rainfall with slight changes in temperature. The shift in winter precipitation from snow to rain will exacerbate the early reservoir inflow problem. The region therefore needs to find alternative locations to store spring runoff which exceeds the storage capacity of existing reservoirs.

4.7.2 Include potential effects of Climate Change on the region and consider if adaptations to the water management system are necessary.

Local impacts of climate change within IWRM region under mid-century conditions were summarized in Section 15.5 of the 2014 IRWM Plan. The results show projected increase in maximum temperatures in all seasons (4 to 8%) resulting in an overall annual increase (4 to 6%) for all future emission scenarios. The temperature increases result in annual increases in evapotranspiration (3 to 5%). However, the change is exacerbated by changes in seasonal demand patterns. Evapotranspiration and water demand are projected to decrease in winter while increasing in summer. These seasonal changes would shift additional water demand to summer months which already have the highest seasonal demand under baseline years. Operations of existing and proposed water infrastructure will likely need to be altered to adapt to the changing seasonal water supply and demand patterns.

4.7.3 Consider the contribution of the project to adapting to identified system vulnerabilities to climate change effects on the region.

In assembling the current project portfolio for funding considerations (Table 4-14), each project evaluated for funding is reviewed to identify the climate vulnerabilities to be addressed. Each of the top three climate vulnerabilities in the IRWM region are being addressed by at least eight proposed projects. The water reserve storage and management vulnerabilities are addressed in nine projects which include conjunctive use, recharge and banking components. The water quality and saline water intrusion vulnerabilities are addressed in eight projects which include water reuse and recycling for non-potable reuse, reductions in land disposal, and reductions in surface water withheld from the Delta. Vulnerabilities related to water demand uncertainty addressed in 10 projects which include loss reduction, metering, and other infrastructure improvements. An overarching objective of these projects is to reduce uncertainties related to water demands and the region's ability to reliably meet future demands while reducing dependency on the Delta as a source of supply.

Table 4-14. Climate Vulnerabilities Addressed by Proposed Projects.

	Top Priority Climate Vulnerabilities			Second Tier Climate Vulnerabilities			Third Tier Climate Vulnerabilities	
Project	Water Supply and Storage	Water Quality and Saltine Water Intrusion	Water Demand Uncertainty	Ecosystems & Habitat	Flooding due to Sea Level Rise	Flooding and Water Logging of Crop Areas	Seasonal Riverine Flooding	Hydropower Generation
1. CSA 14 - Victor Storm Drainage Retention Project	X			X		X		
2. Disadvantaged Community Infrastructure Improvement Program (Thornton Interconnection)		X	X				*	
3. CSA 12 - Thornton Water and Storm Drainage Improvements		X	X			X		
4. Colonial Heights Water System Improvements		X	*	*			*	
5. Delta Water Supply Project Phase II – Recharge Basin Improvement Project	X	X	X	X	*	X	X	
6. Emergency Generator Project		X	X					
7. Lincoln Village Water System Improvements			X		*			
8. NSJWCD South System Modernization	X		X				X	

Project	Top Priority Climate Vulnerabilities			Second Tier Climate Vulnerabilities			Third Tier Climate Vulnerabilities	
	Water Supply and Storage	Water Quality and Saltine Water Intrusion	Water Demand Uncertainty	Ecosystems & Habitat	Flooding due to Sea Level Rise	Flooding and Water Logging of Crop Areas	Seasonal Riverine Flooding	Hydropower Generation
9. Cal Fed/ Woodbridge Recharge Project	X						*	
10. Tecklenburg Recharge Project	X		X			X		
11. Winery Recycled Water Project	X	X		X				
12. North System Groundwater Recharge Project	X		X				*	
13. Riverbank Regional Recycled Water Program	X	X	X					
14. City of Escalon Wastewater Treatment Plant Expansion		X	X	*				
15. South System Groundwater Banking with EBMUD	X						*	

4.7.4 Consider changes in the amount, intensity, timing, quality and variability of runoff and recharge.

As outlined in the proposed project portfolio in Table 4-14, the region is adopting a broad set of new conjunctive use, recharge and banking projects to address climate vulnerabilities related to changing precipitation patterns which results in water storage management challenges, and SLR which results in water quality and saline water intrusion challenges. To maximize their utility, recharge projects must be operated to maximize recharge in spring when excess runoff is available. This could result in the need for increasing large recharge areas increased climate-induced warming. Excess water delivery infrastructure and recharge capacity must be integrated into the design and operation of new and existing recharge projects to optimize their effectiveness in a changing climate.

4.7.5 Consider the effects of sea level rise on water supply conditions and identify suitable adaptation measures.

The changing seasonality of precipitation and increasing spring snowmelt and runoff would result in increasing flow into the Sacramento-San Joaquin River System and the Delta in spring and decreasing flows in summer. As outlined in Section 4.12.1 of this Plan, SLR will also increase water required to meet ecosystem demands in the Delta. In effect, more water will be required in summer to meet ecosystem water demands in the Delta due to the combined impact of reduced summer flows and SLR. The design and operations of new and existing water systems must be adapted to these projected changes by reducing reliance on surface water supplies during the summer.

4.7.6 Contribution of project in reducing GHGs

The GHG emissions impact of each project is assessed by computing new emissions resulting from proposed project operations and subtracting avoided emissions from existing (no-project) operations that would be replaced. For water supply or demand reduction projects, the water-energy intensity of the proposed project operations is multiplied by the emission factor for energy consumed in the region.

The USEPA publishes the Emissions & Generation Resource Integrated Database (eGRID) which shows the emission factors for energy delivered by various power entities around the nation. Data published in the eGRID (2020) database indicates that energy supplied by the California Independent System Operator in 2018 had an annual carbon dioxide equivalent (CO_2e) emission Factor of 401 lb/MWh. The emission facto compares favorably with the 775 lb/MWh for the Western Electric Coordinating Council region which includes 14 western U.S. states. The California Independent System Operator emission factor is adopted for this analysis because it represents the highest resolution dataset with the full coverage of all energy consumed within the IRWM region.

Water-energy intensities for different water activities were published in the statewide study on embedded energy in water (GEI Consultants, Inc. [GEI], 2010). Table G-1 of the GEI study shows annual energy intensities of groundwater extraction in each hydrologic region during 8 water years. In the San Joaquin hydrologic region, energy intensities ranged from 212 kilowatt hours per acre feet (kWh/AF) to 255 kWh/AF with a mean of 230.5 kWh/AF. In this study, recharge projects are assumed to move the region to the lower energy intensity while continued pumping would yield the higher intensity. Avoided emissions for recharge projects (relative to continued pumping) are calculated using an energy intensity reduction of 43 kWh/AF which in the difference between the low and high values.

The GEI study (2010) also estimated the energy intensity of recycled water statewide as 1,129 kWh/AF. Avoid emissions for recycled water projects are computed by comparison to emissions from using alternative potable groundwater at the same location. The alternate groundwater which would have to be extracted by pumping (230.5 kWh/AF), treated (312 kWh/AF) and distributed (1,000 kWh/AF) to the intended use location. For this study, we assume that distribution of recycled water travels requires half the distance to the intended use location. This results in a net energy intensity increase of 87.5 kWh/AF for recycled water projects relative to the potable groundwater alternative in the IRWM region.

Most surface water deliveries occur via gravity flow without externally applied energy. In many instances, surface water deliveries are often used to generate hydropower which results in a negative energy intensity. The GEI study (2010) computed an energy intensity reduction of 10 kWh/AF for surface water supplies based on associated hydropower generation. Using these estimates, replacing groundwater with surface water in the IRWM region would result in a net avoided emission of 240.5 kWh/AF. Avoided emissions of proposed projects are summarized in Table 4-15.

Table 4-15. Emissions Impact of Proposed Projects.

Project Name	Water Savings (AFY)	Water Energy Avoided (kWh/AF)	Direct Energy Requirement (kWh)	Avoided Emissions (lbs CO2e)	Description of Avoided Emissions
1. CSA 14 – Victor Storm Drainage Retention Project	Not Available	Not Available	Not Available	Not Available	Reduced Energy Requirement for Pumping
2. Disadvantaged Community Infrastructure Improvement Program (Thornton Interconnection)	Not Available	Not Available	Not Available	Not Available	Reduced Energy Requirement for Pumping
3. CSA 12 – Thornton Water and Storm Drainage Improvements	Not Available	Not Available	Not Available	Not Available	Reduced Energy Requirement for Pumping
4. Colonial Heights Water System Improvements	Not Available	Not Available	Not Available	Not Available	Reduced Energy Requirement for Pumping
5. Delta Water Supply Project Phase II – Recharge Basin Improvement Project	12,500	-43	(537,500)	(215,628)	Recharge in-lieu of groundwater pumping
6. Emergency Generator Project	Not Available	Not Available	Not Available	Not Available	Reduced Energy Requirement for Pumping
7. Lincoln Village Water System Improvements	Not Available	-231	Not Available	Not Available	Water Loss Reduction in-lieu of groundwater pumping
8. NSJWCD South System Modernization	9,000	-27	(238,500)	(95,679)	50% Surface Water, 50% recharge in-lieu of groundwater pumping
9. Cal Fed/Woodbridge Recharge Project	5,000	-43	(215,000)	(86,251)	Recharge in-lieu of groundwater pumping
10. Tecklenburg Recharge Project	3,500	-43	(150,500)	(60,376)	Recharge in-lieu of groundwater pumping
11. Winery Recycled Water Project	750	87.5	65,625	26,327	Recycled water
12. North System Groundwater Recharge Project	2,600	-43	(111,800)	(44,851)	Recharge in-lieu of groundwater pumping

Project Name	Water Savings (AFY)	Water Energy Avoided (kWh/AF)	Direct Energy Requirement (kWh)	Avoided Emissions (lbs CO2e)	Description of Avoided Emissions
13. Riverbank Regional Recycled Water Program	1,700	87.5	148,750	59,674	Recycled Water in-lieu of groundwater pumping
14. City of Escalon Wastewater Treatment Plant Expansion	2,421	87.5	211,838	84,982	Recycled Water in-lieu of groundwater pumping
15. South System Groundwater Banking with EBMUD	8,000	-43	(344,000)	(138,002)	Recharge in-lieu of groundwater pumping

4.7.7 Consider the contribution of the project in reducing GHG emissions as compared to project alternatives

The contributions of proposed projects to reducing GHG emissions relative to the no-project alternative of continuing to pump groundwater are summarized in Table 4-15. The proposed projects would result in total avoided energy of 1,171,088 kWh per year and total avoided emissions of 469,803 lbs CO2e per year.

4.7.8 Consider a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over the 20-year planning horizon.

Avoided Emissions from water supply operation contribute to the region's efforts to reduce GHG emissions. Appendix A of the San Joaquin County 2035 General Plan details sustainability policies and programs including GHG emissions reduction targets and programs for improving energy efficiency, reducing waste and promoting recycling, and managing water use. While the General Plan does not include numerical targets for water use programs, it specifically identifies groundwater recharge and stormwater management projects among the supporting project activities. Implementation of the proposed projects therefore support the region's goals and programs to reduce GHG emissions.

4.7.9 Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions.

Refer to Table 4-15 (Emissions Impact of Proposed Projects) for calculations pertaining to the energy embedded in water use, and the accompanying avoided emissions.

4.7.10 Status of Project Proponents' Plan Adoption.

This amendment will first be accepted by the GSJCRWCC, a step that will enable the amendment to be submitted to DWR for review and approval. Subsequent to being accepted by the GSJRWCC, member organizations will adopt the Plan with the schedule for adoption being contingent on administrative factors including schedules of each entity's board meeting. Project proponents who are not members of the GSJCRWCC will also be required to adopt the amendment so that their projects may be presented as elements of the amendment.

4.7.11 Environmental Justice.

The GSJCRWCC includes the Catholic Charities of the Diocese of Stockton Environmental Justice among its members. Representation by this organization, together with the GRJCRWCC's consensus-driven governance structure, will provide consideration of environmental justice concerns during the project review process.

4.7.12 Project contribution to reducing dependence on Delta Water Supply.

A goal of the GSJCRWCC is to assist in development of projects that will advance regional water management to produce a wide array of benefits. Because of the region's proximity to the Delta,

protection of the Delta and reduction of dependence on the Delta for water supply are among the benefits to be attained through implementation of the IRWMP. The importance of improving water supply reliability while protecting the Delta is evidence in the group of projects improved for inclusion by the GSJCRWCC, which includes a number of projects designed to augment regional water supply through mechanisms such as recycling, groundwater recharge and that would reduce dependence on the Delta.

4.7.13 Finance.

Projects presented in this amendment include 1) 15 projects approved for inclusion by the GSJCRWCC; 2) projects presented in the GSP, and 3) projects included in the Regional Flood Management Plan (2014). Proponents for each of these projects will have the opportunity to prepare documentation describing how implementation and operation and maintenance (O&M) of projects will be financed. This documentation will include descriptions of sources of local, federal and other non-state funding that have been secured to support implementation of the project as well as sources of funding available for O&M. A well-developed financial plan, to be developed in the future, will be an important criterion in evaluation of projects to be advanced for grant funding.

4.7.14 Impact and Benefit.

Projects presented in this amendment include 1) 15 projects approved for inclusion by the GSJCRWCC; 2) projects presented in the GSP, and 3) projects included in the Regional Flood Management Plan. Proponents for each of the projects will have the opportunity to prepare detailed project-specific impact and benefit analyses. Documentation of impacts and benefits and of project readiness will be key criteria in selection of projects presented for grant funding.

4.8 Plan Performance and Monitoring

4.8.1 Specific benefits to critical water issues for Native American Tribal communities

There are no Native American reservations in San Joaquin County. For information related to Native American residents and their involvement in water issues in the County, *see* Section 3.7.4.

4.8.2 Adaptive Management

An adaptive management process will be incorporated into future updates of the IRWM Plan. The process will evaluate whether adaptation measure adopted in prior IRWM plans are adequately addressing climate vulnerabilities prioritized. The review will assess changes in our understanding of the climate change and its impacts on the water resources of the region.

Adequacy of water storage and management programs will be monitored to ensure the 10-year increase in annual groundwater recharge and new surface water projects matches or exceeds the net increase in water demand over the same period. Changes in water supply reliability indices in local Urban Water Management Plans and Groundwater Sustainability Plans will also be monitored. Water sourcing,

recharge and demand management programs will be modified as needed to adapt to changes in water supply reliability.

Changes in regional flood risk with climate change will be reviewed and regional flood management programs will be adapted to change hazards. RWMG members will continue to advance flood resilience in the region through participation in the planning and implementation activities of the Central Valley Flood Protection Plan (CVFPP) and the RFMP.

Future Plan updates will incorporate any updates to the statewide guidance on SLR projections from the Ocean Protection Council. Changes in regional vulnerability to SLR and saline water intrusion will be monitored using water quality data. Changes in the percentage of wells with chloride measurements greater than 250 mg/L by decade will be used as an indicator of SLR adaptation and salinity control programs.

Future Plan updates will also incorporate emerging climate adaptation tools and guidance as they are developed by state entities and regional partners. In particular, the California Adaptation Planning Guide developed by the California Governor's Office of Emergency Services and the Adaptation Clearinghouse hosted by the Governor's Office of Planning and Research are two emerging resources which could provide additional planning resources for local water sector planning with continued development. The 2014 IRWMP currently discusses how the IRWMP will adapt to new climate research in Section 16.2 (Management Actions), and Section 2.6.1.4 (SJAFCA, Central Valley Flood Protection Plan and Corps of Engineers) and Section 11.1 (Sources of Existing Information) discuss how other emerging data, including for flood management, will be incorporated into future IRWMP updates.

Future Plan updates will additionally consider ongoing activities in and around the region such as expansion of the Region boundary and inclusion of projects from the Tracy Subbasin GSP.

A Storm Water Resources Plan, when it is developed for the Region, will be incorporated into the next update to the IRWMP.

4.8.3 Stormwater Resources Plan

The GSJCRWCC have not yet developed a Storm Water Resources Plan. San Joaquin County is in active discussions with city of Stockton and San Joaquin Area Flood Control (SJAFCA) regarding the development of an SWRP. No projects are applying for funding as part of this IRWMP Addendum that claim a stormwater benefit.

4.9 Local Water Planning

4.9.1 San Joaquin County Groundwater Export Ordinance

In 2000, the Board of Supervisors amended the Groundwater Export Ordinance[20] to prevent the deliberate export of groundwater for use outside of the county and required a permit for extraction of banked groundwater by out-of-county partners. The Export Ordinance requires stringent monitoring and extraction protocols deemed necessary to protect adjacent landowners and the underlying basin from adverse impacts. The first Groundwater Export Permit was issued by the Board of Supervisors in 2017 for the Demonstration Recharge Extraction and Management (DREAM) Project.

The county and North San Joaquin Water Conversation District (NSJWCD), in partnership with the Stockton East Water District, Woodbridge Irrigation District (WID), and EBMUD, have been working to develop and implement the DREAM Project. The purpose of the DREAM Project is to develop a successful pilot scale groundwater storage project in ESJ County. The Project allows EBMUD to temporarily store Mokelumne River water in the underground basin and recover up to half of the banked water in the future, which would provide supplemental dry year supply for EBMUD while also providing additional water for the local groundwater basin.

On April 11, 2017, in accordance with the San Joaquin County Ordinance Code, the Board granted a Groundwater Export Permit for the DREAM Project allowing the partners to pursue additional permits, construction, and operation. The San Joaquin County Public Works Water Resources Division will continue to support the DREAM Project by convening a Monitoring Committee as required by the Ordinance and performing the monitoring of wells prior to and during recharge and extraction activities for the next four years to ensure that the DREAM Project meets the conditions of the Groundwater Export Permit. Costs for these activities will be reimbursed by the project fund established by an agreement with NSJWCD and EBMUD.

While the DREAM project does not directly address climate change impacts, it serves as proving ground for a number of concepts that have been incorporated into proposed projects in this IRWM Plan. These concepts include in-lieu irrigation which is credited as recharge water, and metering at flow diversion locations to record diversions, extractions and groundwater use. These in which address climate vulnerabilities. As shown in Section 4.12.1 of this IRWMP Addendum, these project concepts are included in several projects in this IRWMP which aim to reduce regional climate vulnerabilities through direct use of surface water in-lieu of groundwater pumping, and recharge in-lieu of groundwater pumping.

[20] Ordinance No. 4064, Section 5-8100

4.9.2 Stormwater Plans

There is no Storm Water Resource Plan yet developed for the region, and no projects are being introduced in this Plan which claim a stormwater benefit. There is a Stormwater Management Plan and accompanying Stormwater Program, the details of which are on the San Joaquin County Flood Control and Water Conservation District website (http://www.sjwater.org/Stormwater-Management/Stormwater-Program).

4.9.3 Groundwater Sustainability Plans

Groundwater Sustainability Plans being developed in the Tracy and Eastern San Joaquin groundwater subbasins are the most significant new addition to local water plans in the Region. In the Tracy Subbasin, a local GSA has been formed and a plan is currently being developed to meet SGMA regulatory requirements for GSP adoption by January 31, 2022. The GSP for the critically over-drafted Eastern San Joaquin Groundwater Subbasin was submitted to DWR in January 2020. The GSP for the ESJ Groundwater Subbasin was completed in December 2019 while development of the Tracy GSP is ongoing. Integration and coordination of IRWMP and GSP governance is described Section 3.1.1 of this IRWMP Addendum. Integration of GSP sustainability goals into the IRWMP is described in Section 4.4.1 of this IRWMP Addendum, and integration of GSP and IRWMP projects is described in Sections 4.7.13 and 4.7.14.

Analysis of climate change under the Eastern San Joaquin GSP shows that while average annual precipitation is projected to increase by 11 percent, surface water diversions are not expected to change due to both availability of water in the stream and water rights agreements limiting diversion months. Conversely, the average annual volume of evapotranspiration is projected to increase by 6 percent, leading to a net increase of groundwater production by approximately 11 percent. The GSP contains several recharge projects to augment groundwater storage, and many of the projects are also included in this IRWM Plan. Future IRWM updates will similarly coordinate with and incorporate climate projections, adaptation projects and management actions from both the Tracy and Eastern San Joaquin GSPs.

4.9.4 Regional Flood Management Plans

2014 IRWMP Sections 11.1 and 11.2 describe the coordination of Region's flood water and stormwater management activities with the San Joaquin Area Flood Control Agency (SJAFCA). It also details the integration of local and regional flood management efforts in the Region such as the State Plan of Flood Control, CVFPP, Lower San Joaquin River Feasibility Study, and Lower San Joaquin River/Delta South Regional Flood Management Plans. The 2017 CVFPP Update compiled flood projects from existing local and regional plans which were already described in Section 11.2 of the 2014 IRWMP. CVFPP is scheduled to be updated every five years with the next update due in 2022. Future IRWMP updates will be coordinated with future CVFPP updates to ensure the region’s climate vulnerabilities related to flood management are adequately addressed.

No additional revisions to the 2014 IRWMP of the regional flood management projects is required.

4.9.5 Small Water Systems Planning

To assess drought and water shortage vulnerability of small water suppliers and pursuant to California Water Code Section 10609.42, a methodology for analyzing risk was developed and 4,100 small water suppliers and self-supplied communities statewide were evaluated for their relative risk of drought and water shortage. This dataset contains the final risk score for each supplier examined. Boundaries of water suppliers were used to calculate the extent and severity of each suppliers' exposure to projected climate changes (temperature, wildfire, and SLR) and to current environmental conditions and events. The boundaries used to represent service areas are available for download from Tracking California: https://trackingcalifornia.org/water-systems/water-systems-landing

Each supplier and community examined received a numeric risk score, which is derived from a set of indicators developed from a stakeholder process. Indicators used to estimate risk represented three key components: (1) the exposure of suppliers and communities to hazardous conditions and events, (2) the physical and social vulnerability of suppliers and communities to the exposure, and (3) recent history of shortage and drought impacts. Separate datasets were developed to calculate risk scores for individual small water suppliers and self-supplied communities using the developed methodology and risk indicators. For the methodology, refer to https://water.ca.gov/Programs/Water-Use-And-Efficiency/Making-Conservation-a-California-Way-of-Life/County-Drought-Planning.

Table 4-16 lists the small water systems by name and by Public Water System ID with Risk scores greater than 70. It should be noted that each of these systems is a community water system (System Type C).

Table 4-16. Small Water Systems with Safe and Affordable Funding for Equity and Resilience (SAFER) Risks Scores Greater than 70

PWSID	System Type	System Name	Risk Score
CA3901217	C	HAYNES BOARD & CARE HOME	90.32
CA3900705	C	FINNLEES TRAILER PARK	87.27
CA3900813	C	HAVEN ACRES RIVER CLUB INC	86.59
CA3900733	C	COUNTRY CLUB VISTA MUTUAL WATER CO	85.69
CA3900559	C	WINE COUNTRY APARTMENTS	82.35
CA3900721	C	WOODBRIDGE MOBILE ESTATES	79.66
CA3900586	C	B&G MOBILE HOME PARK LLC WS	75.78
CA3901114	C	KING ISLAND TRAILER PARK WATER SYSTEM	75.1
CA3900661	C	MAPACHE TRAILER PARK	74.68
CA3900517	C	ALMOND PARK WATER SYSTEM	74.35
CA3900664	C	NEW HOPE LANDING GENERAL STORE	74.3
CA3900719	C	MOKELUMNE MEADOWS TRAILER PARK	73.47
CA3900682	C	LOCKEFORD MOBILE HOME PARK WTR SYS	70.2

As part of the Safe and Affordable Funding for Equity and Resilience (SAFER) Drinking Water Program, The SWRCB is developing an interactive tool to provide information on Drinking Water Systems with water quality violations. Of the seven systems with reported violations in San Joaquin County, 1,2,3 Trichloropropane (1,2,3 - TCP) is the analyte of concern associated with five of the violations with total haloacetic acids (commonly known as HAAS) and arsenic being the constituent of concern for the other two violations. TCP is a regulated chemical with an established state Maximum Contaminant Level (MCL) in drinking water of 0.005 mg/L, or 5 parts per trillion. Common sources of TCP in groundwater include solvent-related discharges.

There are no occurrences of contamination by nitrate, perchlorate or hexavalent chromium having resulted in violations of drinking water quality standards. Financial assistance provided by the state to correct the arsenic violations observed at the Sunny Road Water System as totaled $75,826 as of Summer (July/August) of 2020.

Table 4-17. Drinking Water Systems Violations.

Community	Analyte of Concern	Number of Violations	Year of Oldest Violation (since 2012)
West Lane Mobile Home Park	1,2,3-TCP	1	2018
Little Potato Slough Mutual	Total HAA5	1	2019
Cherry Lane Trailer Park	1,2,3-TCP	5	2018
Morada Estates N PWS #46	1,2,3-TCP	1	2018
SJ County-Raymus Village	1,2,3-TCP	5	2018
City of Manteca	1,2,3-TCP	6	2018
Sunny Road Water System	Arsenic	29	2012

4.10 Local Land Use Planning

Section ES.7 (Land and Water Use) of the 2014 IRWMP describes land use planning data used by the GBA in preparation of the Plan. Section ES.14 (Stormwater and Flood Water Management) of the 2014 IRWMP describes the linkages, coordination and dynamics between the IRWMP and local and regional planning entities. Chapter 16 (“Management Action Plan”) of the 2014 IRWMP includes Continued Long-Term Planning as one of the major categories of actions. It describes how information is shared, how regional planning efforts feed back into local planning efforts and provides mechanisms to ensure consistency and coordination with relevant planning and regulatory documents.

As an update to the 2014 IRWMP, the following should be noted:

2014 IRWMP Section 15 (Climate Change) and Section 4.12 of this IRWMP Addendum identify climate vulnerabilities for water resources and adaptation strategies. Climate adaptation strategies such as flood management and managed aquifer recharge integrate management of watersheds, floodplains, and other land uses. Agricultural areas, open space, and other low-density lands are being engaged through the design of adaptation projects to restore natural floodplain processes and improve flood control while also addressing water storage vulnerabilities. These strategies are being coordinated with local planning efforts through direct engagement with those planning efforts and briefings to stakeholders. As local plans evolve, adaptation strategies and projects in the IRWMP will also be

modified during future updates to reflect both advances in our understanding of climate change and the evolution of local planning efforts.

4.11 Stakeholder Involvement

Section 2.6 (Stakeholder Outreach and Coordination) of the 2014 IRWMP provides a thorough discussion of the stakeholder involvement process for San Joaquin County including how areas outside of the GBA's Management Area are outreached to, including outreach specifically to DACs. The implemented outreach efforts described in the IRWMP encourage involvement of diverse groups and outreach to new interested parties. There is no required fee or other barriers to involvement.

There are no Native American reservations in San Joaquin County. For information related to Native American residents and their involvement in water issues in the County, *see* Section 3.7.4.

The only update to the existing 2014 IRWMP to address stakeholder involvement is as follows:

In early 2019, the Region began discussing options for updating the IRWMP for the ESJ Planning Region. As a result of these discussions, the GBA was replaced with the Greater San Joaquin Regional Water Coordinating Committee (GSJCRWCC) as the Regional Water Management Group. The 2007 and 2014 Eastern San Joaquin IRWMPs were prepared under direction of the GBA. All stakeholder involvement and the processes pertaining to the GBA remain the same for the GSJCRWCC. Note that there are no recognized Native American reservations in the County.

4.12 Climate Change

4.12.1 Climate Change Vulnerabilities

Regional climate vulnerabilities are assessed using the vulnerability assessment form contained in Appendix B of the Climate Change Handbook for Regional Water Planning (DWR, 2011) (*see* Appendix B of this IRWMP Addendum). The results of the regional vulnerability assessment are summarized in Table 4-18.

Table 4-18. Summary of Regional Vulnerability Assessment.

Source	Vulnerabilities
Water Demand	High Seasonal Runoff Variability
	Climate Sensitive Crops
	Over-Stressed Groundwater Supplies
	Increasing Instream Flow Requirements
Water Supply	Decreasing Snowmelt
	Severe Droughts
Water Quality	Increasing Threat of Wildfires
	Decreasing Summer Flows
Sea Level Rise	Delta Ecosystems at Risk of Flooding
	Land Subsidence in the Delta
Flooding	Infrastructure at Risk in Floodplains
	Susceptibility to San Joaquin Overflows
	Aging Levees and Flood Protection Facilities
	History of Major Flooding
	Post-Fire Debris Flow Hazards
Ecosystem and Habitat Vulnerability	Intrusion of Freshwater and Saltwater Interface
	Endangered and Threatened Species
	Aquatic Recreation Facilities and Habitats
	Changing Environmental Flow Requirements
	Wetland Habitats and Wildlife Migration Corridors
Hydropower	Large Hydropower Plants

4.12.1.1 Greenhouse Gas Emissions

The ESJ Region relies on a combination of surface water and groundwater sources. The region receives surface water from the snowmelt driven rivers in the Sierra Nevada. The region also overlies the ESJ groundwater basin which provides a significant part of the Region's water supply. Surface water is used conjunctively with groundwater. Emissions impacts of proposed projects are estimated by applying water-energy intensity estimates based on the water sources and delivery modes. Further information about the implementation over a 20-year planning horizon can be found in Section 4.7.8 of this IRWMP Addendum.

4.12.1.2 Prioritized Vulnerabilities

A climate vulnerability assessment was conducted for the region as part of the 2014 IRWM Plan. The assessment reviewed vulnerabilities in the region under three future climate scenarios with high, medium and low emission future emissions. Each vulnerability identified was assigned a rating on a scale ranging from low to moderate to high to very high priority vulnerabilities. Table 4-19 shows the moderate, high and very high prioritized vulnerabilities for each emission scenario as well as an aggregate score which integrates all three future scenarios.

Table 4-19. Prioritized Regional Climate Vulnerabilities.

Climate Vulnerability	Vulnerability Rank			
	Low Emission Scenario	Medium Emission Scenario	High Emission Scenario	Aggregate of Scenarios
Water Reserve Storage and Management	Very High	Very High	Very High	Very High
Water Quality and Saline Water Intrusion	Very High	Very High	Very High	Very High
Water Demand Uncertainty	High	High	Very High	Very High
Damage to Ecosystems & Habitats	High	High	High	High
Flooding due to Sea Level Rise	High	High	High	High
Local flooding and water logging of crop areas	Very High	Moderate	Moderate	High
Seasonal Riverine Flooding	Moderate	Moderate	Moderate	Moderate
Hydropower Generation	Moderate	Moderate	Moderate	Moderate

The results indicated that the highest priority climate vulnerabilities that need to be addressed in the region include enhancing water storage, managing water quality and saline water intrusion, and reducing water demand uncertainty. The second set of regional climate vulnerabilities include addressing ecosystem and habitat impacts, preventing flooding due to SLR, and managing local flooding from stormwater and water logging of crop areas. The third priority of climate vulnerabilities in the region include seasonal riverine flooding and changes to the reliability of hydropower generation. The feasibility of addressing the prioritized regional climate vulnerabilities by working through the RWMG is displayed in Table 20.

Table 4-20. Feasibility of the RWMG to Address Prioritized Regional Climate Vulnerabilities.

Climate Vulnerability	Vulnerability	Feasibility of Addressing Vulnerability
Water Reserve Storage and Management	Very High	The RWMG and partner agencies are highly motivated and committed to enhancing water storage through recharge programs proposed in the IRWM and SGMA plans. The proposed projects would adequately address the vulnerabilities if fully implemented.
Water Quality and Saline Water Intrusion	Very High	The Delta ecosystem faces a complex set of vulnerabilities due to climate change and SLR as well as uncertainty on the impact of proposed tunnel projects. The RWMG has limited influence on the direction of these projects which have significant water management impacts in the region.
Water Demand Uncertainty	High/Very High	The Plan includes programs to reduce water loss and manage water demand. However, agriculture which relies heavily on water resources is a leading economic activity in the region. The RWMG has limited options for reducing water demand without adversely impacting the economy and livelihoods of communities in the region.
Damage to Ecosystems & Habitats	High	As noted under the water quality and saline water intrusion discussion, the RWMG has limited influence on the direction of Delta activities and projects which have significant impacts in the region. However, the

Climate Vulnerability	Vulnerability	Feasibility of Addressing Vulnerability
		region has proposed a number of water recycling and reuse projects which could resource adverse ecosystem impacts.
Flooding due to Sea Level Rise	High	Flood vulnerabilities in the region have been studied extensively in the San Joaquin River Basin-Wide Feasibility Study and are being addressed through the CVFPP. While flooding vulnerabilities are being addressed, the risk of widespread levee failures in the Delta during major storms remains high, particularly if subsidence continues.
Local flooding and water logging of crop areas	High	The region has a Stormwater Management Plan for addressing local flooding issues. The region has also proposed a number of water recycling and reuse projects which could reduce the risk of local flooding. However, the region not yet completed development of a Stormwater Resource Plan or a functional equivalent.
Seasonal Riverine Flooding	Moderate	As previously noted, flood vulnerabilities in the region have been studied extensively in the San Joaquin River Basin-Wide Feasibility Study and are being addressed through the CVFPP. The riverine flooding vulnerabilities are likely to be addressed by integrating regional and statewide efforts.
Hydropower Generation	Moderate	The region's hydropower installations have adequate storage reservoirs to weather changes in seasonality of flows through multi-year droughts could have adverse impacts to generation. The RWMG's proposed recharge programs could buffer the region against multi-year droughts.

4.12.1.3 Adaptation to Variability in Runoff

The region is adapting to climate-related variability in runoff through a series of programs to reduce reliance on groundwater. The programs include increased direct use of surface water, increased recharge, recycled water and system improvement which reduce loss and energy requirements for pumping. Water savings, avoided energy, and avoided emissions from adaptation programs being adopted in the region are summarized in Table 4-21. Further information on this can be found in Section 4.7.4 in this IRWMP Addendum.

Table 4-21. Summary of Regional Adaptation to Runoff Variability.

Adaptation Programs	Total Water Savings (AFY)	Total Avoided Energy (kWh)	Total Avoided Emissions (lbs CO2e)
Direct use of surface water in-lieu of groundwater pumping	4,500	(238,500)	(95,679)
Recharge in-lieu of groundwater pumping	31,600	(1,358,800)	(545,107)
Recycled water in-lieu of groundwater pumping	4,871	426,213	170,983
Reduced Energy Requirement for Pumping	Not Applicable	Not Available	Not Available
Water Loss Reduction in-lieu of groundwater pumping	Not Applicable	Not Available	Not Available
Total	**45,471**	**(1,171,088)**	**(469,803)**

Rainfall at the Stockton Fire Station No. 4 for 1969 through 2018 is presented in Table 4-4.

4.12.1.4 Sea Level Rise

The San Joaquin Delta region portion of the IRWMP region is the largest estuary in the western United States. It drains the Sacramento and San Joaquin rivers and their tributaries into the San Pablo and San Francisco bays and subsequently into the Pacific Ocean. The city of Stockton is an important inland port and lies to the east of the Delta. The Delta houses substantial reclaimed areas that are protected by levees. The connection of the Delta to the Pacific Ocean makes changes in sea level an important variable in the water resources planning in the San Joaquin IRWM region. Section 15.6 (Sea Level Rise) of the 2014 IRWMP provides a thorough discussion of global and California-specific SLR projections from reports published in 2007 and 2011.

The region includes ecosystem resources such as the complex network of wetlands and water bodies, the San Joaquin River National Wildlife Refuge, and spawning grounds for fish such as Chinook Salmon and Steelhead Trout. Lower flows in the summers would cause the freshwater-saltwater interface to move inwards in the Delta, and potentially up to the western Delta causing the freshwater-saltwater habitat to migrate eastward. Climate impacts of water quality, timing of low flows, and water temperatures could impact spawning of fish such as Chinook salmon and Steelhead Trout. Plant communities such as alkali milk-vetch, brittle scale, and heart scale could also be adversely impacted by increases in temperatures and evapotranspiration and changes in precipitation patterns. The combined impact of SLR and climate change could severely damage the livelihoods of communities in the Delta which was designated a National Heritage Area in 2019.

The only update to the existing 2014 IRWMP to address SLR, in addition to Section 4.7.5 of this IRWMP Addendum, is as follows:

In 2019, the California Ocean Protection Council published an update to the state of California Sea-Level Rise Guidance which includes projections for 12 locations along the state's coastline. For the Eastern San Joaquin IRWM region, the nearest tide gauge in the Ocean Protection Council guidance is located in San Francisco. The SLR projections are probabilistic and use 2000 as the baseline year. The choice of projections to use for planning depends on the project lifespan, likelihood of low or high carbon emission during the lifespan, and local choices about low, medium-high and extreme risk aversion decisions based on potential impacts and adaptive capacity.

Table 4-22. Sea level rise projections for the tidal gauge at San Francisco from the State Guidance.

		Probabilistic Projections (in feet) (based on Kopp et al. 2014)					H++ scenario (Sweet et al. 2017) *Single scenario
		MEDIAN	LIKELY RANGE		1-IN-20 CHANCE	1-IN-200 CHANCE	
		50% probability sea-level rise meets or exceeds...	66% probability sea-level rise is between...		5% probability sea-level rise meets or exceeds...	0.5% probability sea-level rise meets or exceeds...	
				Low Risk Aversion		Medium - High Risk Aversion	Extreme Risk Aversion
High emissions	2030	0.4	0.3 -	0.5	0.6	0.8	1.0
	2040	0.6	0.5 -	0.8	1.0	1.3	1.8
	2050	0.9	0.6 -	1.1	1.4	1.9	2.7
Low emissions	2060	1.0	0.6 -	1.3	1.6	2.4	
High emissions	2060	1.1	0.8 -	1.5	1.8	2.6	3.9
Low emissions	2070	1.1	0.8 -	1.5	1.9	3.1	
High emissions	2070	1.4	1.0 -	1.9	2.4	3.5	5.2
Low emissions	2080	1.3	0.9 -	1.8	2.3	3.9	
High emissions	2080	1.7	1.2 -	2.4	3.0	4.5	6.6
Low emissions	2090	1.4	1.0 -	2.1	2.8	4.7	
High emissions	2090	2.1	1.4 -	2.9	3.6	5.6	8.3
Low emissions	2100	1.6	1.0 -	2.4	3.2	5.7	
High emissions	2100	2.5	1.6 -	3.4	4.4	6.9	10.2
Low emissions	2110*	1.7	1.2 -	2.5	3.4	6.3	
High emissions	2110*	2.6	1.9 -	3.5	4.5	7.3	11.9
Low emissions	2120	1.9	1.2 -	2.8	3.9	7.4	
High emissions	2120	3	2.2 -	4.1	5.2	8.6	14.2
Low emissions	2130	2.1	1.3 -	3.1	4.4	8.5	
High emissions	2130	3.3	2.4 -	4.6	6.0	10.0	16.6
Low emissions	2140	2.2	1.3 -	3.4	4.9	9.7	
High emissions	2140	3.7	2.6 -	5.2	6.8	11.4	19.1
Low emissions	2150	2.4	1.3 -	3.8	5.5	11.0	
High emissions	2150	4.1	2.8 -	5.8	7.7	13.0	21.9

4.12.1.5 Climate Change Mitigation

In Section 4.7.6 of this IRWMP Addendum, GHG emissions impact of each project is assessed by computing new emissions resulting from proposed project operations and subtracting avoided emissions from existing (no-project) operations that would be replaced. Six of the projects identified in Table 4-15 would contribute to reducing the region's GHG emissions, primarily through recharge and direct use of surface water in in-lieu of groundwater pumping. Prioritizing implementation of these projects over the next 20 years would reduce regional GHG emissions by 640,787 lbs CO2e per year relative to the groundwater pumping alternative.

Table 4-15 also contains six proposed projects which involve stormwater and water system improvements which could contribute to reduce regional GHG emissions through reduced energy requirement for pumping and water loss reduction in-lieu of groundwater pumping. Proposed projects

within this second list of priorities need to be developed further to quantify their water and energy savings and impacts on reducing regional GHG emissions.

The third category of proposed projects which involve water recycling and wastewater treatment would increase regional GHG emissions by 170,983 lbs CO2e per year. However, these project address region's efforts to manage climate vulnerabilities to increasing water demand and reducing reliance on surface water sources. Even with the inclusion of these projects, the IRWMP project portfolio would still reduce the region's overall GHG emissions by 469,804 lbs CO2e per year relative to the no-project alternative of continuing to rely on groundwater pumping.

4.13 Data Management and Quality Assurance / Quality Control

The purpose of data management by the RWMG is to ensure efficient access to and use of data available within the RWMG and effective integration into existing State databases as needed.

Data relevant to RWMG activities includes measurements of climate parameters, water deliveries, groundwater pumping, groundwater recharge, groundwater levels, and water quality. Land use surveys are also included, inasmuch as they involve a periodic assessment of the acreage of each of several categories of land use and, in the case of agriculture, the acreage of each of several crop types.

Most of the data collection and management within the RWMG is conducted by entities using well established quality assurance and quality control (QA/QC) practices. Rather than instituting an additional layer of management and QA/QC standards, the RWMG has created a “roadmap” to be used to facilitate data requests by providing direction to the best source of the requested data.

Project level data are typically presented in grant proposals at the feasibility stage, while performance data are presented to satisfy grant reporting requirements following implementation. With regard to compatibility with State databases, entities participating in the CASGEM program and in preparation of Agricultural Water Management Plans, Groundwater Sustainability Plans, and Urban Water Management Plans have data QA/QC’d according to State guidelines.

In September of 2016, Governor Brown signed The Open and Transparent Water Data Act (AB 1755), which is focused on making water data available, open, and transparent, but also focused on interagency cooperation opportunities for innovation. This legislation requires DWR, in consultation with the California Water Quality Monitoring Council, the State Water Resources Control Board, and the California Department of Fish and Wildlife, to create, operate, and maintain a statewide integrated water data platform. Additionally, DWR must develop protocols for data sharing, documentation, quality control, public access, and promotion of open-source platforms and decision support tools related to water data. The RWMG will continue to ensure that relevant data pertaining to water and climate is shared in a timely manner with the State and integrated into publicly available plans and reports as appropriate.

4.14 IRWM Plan Standards Review Form

IRWM planning regions must have an IRWM Plan that has been reviewed and deemed consistent with the IRWM Plan Standards by DWR for eligibility to receiving Proposition 1 IRWM Implementation Grant funding. DWR will use this IRWM Plan Standards Review Form, which can be found at the link in Volume 1, Appendix A and represented in Table 4-23, to ensure a consistent assessment of whether the 2016 IRWM Guidelines are being addressed in the IRWM Plan. The form contains a checklist for each of the 16 Plan Standards and narrative evaluations where required. The evaluation is pass/fail; there is no numeric scoring. Each Plan Standard is either sufficient or not, based on its associated requirements. Each Standard consists of between one and 15 requirements. A Yes or No is automatically calculated in each Plan Standard header based on the individual requirement evaluations. In general, a passing score of "C" (i.e., 70% of the requirements for a given Plan Standard) is required for a Standard to pass. Standards with only one or two requirements will need one or both of those requirements to pass. Standards with three requirements will need at least two of the requirements to pass. Standards with four or five requirements will need at least three to pass. Some Plan elements are legislated requirements. Such Plan elements must be met in order to be considered consistent with Plan standards. A summary of the sufficiency of each Standard is automatically calculated on the Standards Summary worksheet shown on Table 4-24. A "No" evaluation indicates that a Standard was not met due to insufficient requirements comprising the Standard. The evaluation for each Plan Standard and any associated insufficiencies is automatically compiled on the Standards Summary page. Additional reviewer comments may be added at the bottom of each standards work sheet.

Note: This review form is meant to be a tool used in conjunction with the relevant IRWM Grant Program Guidelines document to assist in the evaluation of IRWM plans. It is not designed to be a substitute for the guidelines document itself. Reviewers must use the relevant guidelines in determining Plan consistency.

Table 4-23. Plan Standards Review Tool Content.

DEFINITION OF TABLE HEADINGS	
IRWM Plan Standard:	**As named in the 2016 IRWM Guidelines.**
Overall Standard Sufficient:	This field is either "YES" or "NO" and is automatically calculated based on the "Sufficient" column described below. If all fields are "y", the overall standard is deemed sufficient. Any entry other than a "y" in the Sufficient column (i.e., "n", ?, not sure, more detail needed, etc.) results in a NO.
Plan Standard Requirements Which Must Be	Fields with an asterisk * are required by legislation to be included in an IRWM Plan.
Requirement	Requirements are taken directly from the 2016 IRWM Guidelines.
Included	Is the Guideline Requirement included in the IRWM Plan? The options are: y = yes, requirement is included in the IRWMP; or n = no, requirement is not included in the IRWMP. If only y or n then presence/absence of the requirement is sufficient for evaluation. If there is a "q" (qualitative) then add a brief narrative, similar to a Grant Application Review public evaluation or supporting information.
Plan Standard Source	
2016 IRWM Guidelines/Source Page(s)	Page(s) in the Guidelines (2016 IRWM Guidelines) which pertain to the Requirement.
Legislative Support and/or Other Citations	The CWC or other regulations that pertain to the Requirement, **if applicable**. This is for reference purposes. The cell links to a weblink of the regulatory code.
Evidence of Sufficiency	
Location of Standard in Grantee IRWM Plan	The page(s) or sections in the IRWM Plan where information on the Requirement can be found. This can be specific paragraphs or entire chapters for more general requirements.
Brief Qualitative Evaluation Narrative	Supporting information for the Requirement if a "q" is in the Included column. This can be just a few sentences or a paragraph and can be taken directly from the IRWM Plan. Comments or supporting information may be entered regardless of whether required.
Sufficient	Is the Guidelines requirement sufficiently represented in the IRWM Plan (y/n)?

IRWM Plan Standards Review Form

Regional Acceptance Process Planning Region:

Regional Water Management Group:

IRWM Plan Title: DWR Reviewer:

ONE OR MORE PLAN STANDARDS NOT SUFFICIENT		
IRWM Plan Standard	**Overall Standard Sufficient**	**Requirement(s) Insufficient**
Governance	**Yes/No**	

Table 4-24. Plan Standards Summary.

Region Description	**Yes/No**
Objectives	**Yes/No**
Resource Management Strategies	**Yes/No**
Integration[1]	**Yes/No**
Project Review Process	**Yes/No**
Impact and Benefit	**Yes/No**
Plan Performance and Monitoring	**Yes/No**
Data Management	**Yes/No**
Finance	**Yes/No**
Technical Analysis	**Yes/No**
Relation to Local Water Planning	**Yes/No**
Relation to Local Land Use Planning	**Yes/No**
Stakeholder Involvement	**Yes/No**
Coordination	**Yes/No**
Climate Change	**Yes/No**
Additional Comments:	
[1]. If not included as an individual section use Governance, Project Review Process, and Data Management Standards per the relevant IRWM Program Guidelines.	

4.15 References

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