Chapter 5 Vision, Goals, and Objectives

In order for the East Stanislaus Region to effectively manage its water resources, it first identified the regional water resources-related conflicts and issues to be resolved through this Integrated Regional Water Management Plan (IRWMP). The Region then developed a shared vision, outlining what the future of water management will look like for the region. Goals were then developed, defining what exactly the Region would like to achieve in meeting its vision. These goals are steps required to achieve the vision (Figure 5-1). Finally, objectives were defined for each goal. Each objective was framed to be specific, measureable and attainable and once achieved, will move the region forward towards achieving its goals, and ultimately, its vision. This IRWMP represents that pathway that the East Stanislaus Region will follow to achieve its objectives, goals and vision.

The identified conflicts, and goals and objectives to address the conflicts, as well as the process used, are discussed in this section. The IRWM Plan must clearly present plan objectives and describe the process used to develop the objectives. Plan objectives must address major water-related issues and conflicts within the region. In addition, objectives must be measureable by some practical means so achievement of objectives can be monitored.

The objectives may be prioritized for the region. The IRWM Plan must contain an explanation of the prioritization or reason they the objectives were not prioritized.

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Figure 5-1: Relationship between Vision, Goals, and Objectives

Regional Conflicts and Issues

Regional conflicts, as well as the goals and objectives described in Section 5.1, were brainstormed and discussed at several Steering Committee (SC) and Public Advisory Committee (PAC) meetings held between September 2011 through December 2011. Each committee revised an initial list of identified regional conflicts and issues; the list was finalized in January 2012. The primary water resources-related issues and conflicts identified within the East Stanislaus Region include:

- Water supply reliability
- Drinking water quality
- Water quality protection
- Groundwater overdraft, contamination, and recharge
- Protection and enhancement of aquatic, riparian, and watershed resources
- Water-related needs for disadvantaged communities
- Flood protection
- Recycled water use
- Water conservation
- Aging infrastructure

These shared conflicts and interests within the East Stanislaus Region led to cooperativelydeveloped regional goals and objectives.

5.1 Region's Vision for Water Resources Management

After reviewing the identified conflicts and issues, the East Stanislaus Regional Water Management Partnership (ESRWMP) established a vision for the Region to act as a guiding principal throughout the IRWM planning process and establish what future regional water management will achieve.

The East Stanislaus region's vision for IRWM planning is to:

Integrate projects to provide multiple benefits, resolve identified issues and conflicts, and meet the regional goals and objectives to achieve water reliability and sustainability and flood protection while protecting and enhancing the environment and regional economies and culture.

5.2 Region Goals & Objectives

5.2.1 Goals and Objectives

Identifying the Region's issues and conflicts allowed the SC and PAC to develop goals that, if achieved, would help resolve the issues in the Region and achieve its vision. For example, the committees identified drinking water quality, water quality protection, and groundwater overdraft and contamination as issues in the region. To address these, a water quality-focused goal was developed – *Protect and improve water quality for beneficial uses consistent with regional interests and the Regional Water Quality Control Board (RWQCB) Basin Plan in cooperation with local, state, and federal agencies, and regional stakeholders.* Then, for the identified goal, a number of measureable objectives were developed that would enable the region to determine if the goal is being achieved. Goals were identified in the categories of Water Supply, Flood Protection, Water Quality, Environmental Protection and Enhancement, Regional Communication and Cooperation, and Economic and Social Responsibility.

Water Supply Goals and Objectives

Goal:

Protect existing water supplies and water rights, and improve regional water supply reliability.

Objectives:

- Provide a variety of water supply sources, including recycled water, to meet all current and future demands (urban, agricultural and the environment) under various hydrologic conditions.
- Promote the use of groundwater storage and conjunctive use options to reduce groundwater overdraft.
- Protect existing water rights.
- Implement water conservation plans for both urban and agricultural uses.
- Support monitoring and research to improve understanding of water supplies and needs.
- Address conveyance infrastructure needs.

Flood Protection Goals and Objectives

Goal:

Ensure flood protection strategies are developed and implemented through a collaborative process, utilizing both local and watershed-wide approaches designed to maximize opportunities for comprehensive water resource management.

Objectives:

- Develop outlines of regional projects and plans necessary to protect infrastructure from flooding and erosion from the 100-year event.
- Work with stakeholders to preserve existing flood attenuation by implementing land management strategies throughout the watershed.
- Develop approaches for adaptive management that minimize maintenance requirements and protect water quality and availability while preserving and enhancing ecologic and stream functions, as appropriate.
- Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
- Protect, restore, and enhance the natural ecological and hydrologic functions of rivers, creeks, streams and their floodplains.

Water Quality Goals and Objectives

Goal:

Protect and improve water quality for beneficial uses consistent with regional interests and the RWQCB Basin Plan in cooperation with local, state and federal agencies and regional stakeholders.

Objectives:

- Meet or exceed all applicable water quality regulatory standards.
- Deliver agricultural water to meet water quality guidelines established by stakeholders.

- Aid in meeting Total Maximum Daily Loads established, or to be established, for the Tuolumne River watershed.
- Protect surface waters and groundwater basins from contamination and threat of contamination.
- Manage existing land uses while preserving or enhancing environmental habitats.
- Minimize impacts from storm water through implementation of Best Management Practices, Low Impact Development or other similar projects.
- Promote programs and projects to reduce the quantity and improve the quality of urban and agricultural runoff.
- Promote and support regional monitoring to further understanding of water quality issues.

Environmental Protection and Enhancement Goals and Objectives

Goal:

Protect the environmental resources of the Stanislaus, Tuolumne, Merced and San Joaquin River watersheds by identifying, promoting and implementing opportunities to assess, restore and enhance natural resources of these watersheds.

Objectives:

- Identify and incorporate (where possible and reasonable) opportunities to assess, protect, enhance, and/or restore natural resources when developing water management strategies.
- Minimize adverse effects on biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species, and archaeological sites when implementing strategies and projects.
- Identify opportunities for open spaces, trails and parks along creeks and other recreational projects in the watershed to be incorporated with water supply, water quality, or flood protection projects.
- Contribute to the long-term sustainability of agricultural, commercial, industrial, and urban land uses and activities within the basin.
- Identify opportunities to protect, enhance, or restore habitat to support all watersheds in the Region in conjunction with water supply, water quality, or flood protection projects.
- Support projects to understand, protect, improve and restore the region's ecological resources.

Regional Communication and Cooperation Goals and Objectives

Goal:

Implement and promote this IRWM Plan through regional communication, cooperation, and education.

Objectives:

- Develop a forum for consensus decision-making and IRWM Plan implementation by regional entities.
- Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate permitting of water-related projects and ensure continued consistency with state water plans.
- Facilitate dialogues between regional and inter-regional entities to reduce inconsistencies and conflicts in water management and to maximize benefits from water-related projects.
- Maintain avenues of communication with the general public and offering opportunities to provide feedback on the IRWM and water-related projects through the regional websites and other public forums.
- Identify opportunities for public education about water supply, water quality, flood management, and environmental protection.

Economic and Social Responsibility Goals and Objectives

Goal:

Promote development and implementation of projects, programs and policies that are socially impartial and economically sound.

Objectives:

- Support the participation of disadvantaged communities in the development, implementation, monitoring and long-term maintenance of water resource projects.
- Develop cost-effective multi-benefit projects.
- Consider disproportionate community impacts to ensure environmental justice.
- Maximize economies of scale and governmental efficiencies.
- Protect cultural resources.
- Reduce energy use and/or use renewable resources where appropriate.

5.2.2 Prioritizing Objectives

The regional IRWM planning participants chose to prioritize the Region's goals, and therefore the associated objectives, for use in project prioritization. The planning participants felt that by prioritizing the Region's goals and objectives, along with the Statewide priorities and other relevant factors, that the resulting ranking of projects would help to identify those projects that, when implemented, would have the greatest impact in addressing the identified conflicts and issues and would best help the Region achieve its vision for regional water resource management. The participants chose to use a weighting schema to prioritize the projects, allowing for flexibility in future changes to the prioritized objectives as regional water resources issues change. Table 5-1 summarizes the measurements for each objective.

Goal/Objective	Possible Measure(s)
Water Supply	
Provide a variety of water supply sources to meet all current and future demands under various hydrologic conditions	Acre-feet of water supply by water type; Percent demand met in any given year; Comparison of projected demand to existing water supplies
Promote the use of groundwater storage and conjunctive use options to reduce groundwater overdraft	Number of local conjunctive use programs; Acre-feet of water stored (directly and/or in-lieu); groundwater elevations
Protect existing water rights	Acre-feet of water delivered compared to perfected water rights
Implement water conservation plans for both urban and agricultural uses	Number of Demand Management Measures (DMMs) implemented regionally; Acre-feet of conserved water annually; 2015 and 2020 per capita water use rates
Support monitoring and research to improve understanding of water supplies and needs	Ongoing and new monitoring programs; Regional demand estimates
Address conveyance infrastructure needs	Acre-feet of water lost through leakage; Percent demand met
Flood Protection	
Develop outlines of regional projects and plans necessary to protect infrastructure from flooding and erosion from the 100-year event	Project list from Regional Flood Management Plan (RFMP); Incorporate RFMP project list into IRWMP project list
Work with stakeholders to preserve existing flood attenuation by implementing land management strategies throughout the watershed	Coordinate with Regional Flood Management Plan effort
Develop approaches for adaptive management that minimizes maintenance requirements and protects water quality and availability while preserving and enhancing ecologic and stream functions, as appropriate	Coordinate with Regional Flood Management Plan to ensure adaptive management element; Incorporate RFMP elements into IRWMP Update
Provide community benefits beyond flood protection, such as public access, open space and recreation	Number of multi-benefit projects identified and/or implemented providing flood protection and other benefits

Table 5-1: Measures for Regional Goals and Objectives

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Flood Protection (cont'd)	
Protect, restore, and enhance the natural ecological and hydrologic function of rivers, creeks, streams and their floodplains	Number of acres of riparian habitat/floodplain restored or protected
Water Quality	
Meet or exceed all applicable water quality regulatory standards	Basin Plan Water Quality Objectives (narrative and numerical); water quality
Deliver agricultural water to meet water quality guidelines established by stakeholders	Water quality monitoring data
Aid in meeting TMDLs established, or to be established, for the Tuolumne River watershed	Constituent concentrations (for specific TMDLs)
Protect surface waters and groundwater basins from contamination and threat of contamination	Surface and groundwater water quality monitoring data
Manage existing land uses while preserving or enhancing environmental habitats	Number of acres of habitat protected/maintained
Minimize impacts from storm water through implementation of BMPs, LID and other similar projects	Number of projects implemented incorporating storm water BMPs, LID or the like
Promote programs and projects to reduce the quantity and improve the quality of urban and agricultural runoff	Storm water monitoring data
Promote and support regional monitoring to further understanding of water quality issues	Participation in state and federal monitoring programs such as CASGEM; monitoring data
Environmental Protection and Enhancement	
Identify and incorporate (where possible and reasonable) opportunities to assess, protect, enhance, and/or restore natural resources when developing water management strategies	Number of acres of habitat restored, enhanced or protected
Minimize adverse effects of biological and cultural resources when implementing strategies and projects	Measurement and monitoring of biological and cultural resources before and after project development
Identify opportunities for open spaces, trails and parks, and other recreational projects to be incorporated with water supply, water quality or flood protection projects	Number of multi-benefit projects on IRWMP list that incorporate open space, trails, parks or other recreational benefits

Environmental Protection and Enhancement (cont'd)	
Contribute to the long-term sustainability of agricultural, commercial, industrial and urban land uses and activity in the basin	Number of acres of each land use type in the Region
Identify opportunities to protect, enhance, or restore habitat to support all watersheds in the Region in conjunction with water supply, water quality, or flood protection projects	Number of multi-benefit projects on IRWMP list that include the protection, enhancement, or restoration of watershed habitats
Support projects to understand, protect, improve and restore the region's ecological resources	Number of multi-benefit projects on IRWMP list that include the protection, improvement, or restoration of ecological resources
Regional Communication and Cooperation	
Develop a forum for consensus decision-making and IRWM Plan implementation by regional entities	Develop and implement governance structure that is based on consensus decision-making; Develop protocols for committee decision-making based on consensus
Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate permitting of water-related projects and ensure continued consistency with state water plans	Invite State and Federal regulatory agency representatives to participate in IRWM regional governance; Participate in and/or coordinate with, either formally or informally, with State and Federal regulatory agencies and other water forums
Facilitate dialogues between regional and inter-regional entities to reduce inconsistencies in water management strategies and to maximize benefits from water-related projects	Communicate directly with adjacent IRWM regions; Participate in opportunities for dialogues with other IRWM regions
Maintain avenues of communication with the general public and offering opportunities to provide feedback on the IRWM and water-related projects through the regional websites and other public forums	Develop and maintain IRWM website; Provide notice of and conduct public workshops and meetings;
Identify opportunities for public education about water supply, water quality, flood management, and environmental protection	Number of multi-benefit projects on IRWMP list that include public education components

Economic and Social Responsibility	
Support the participation of disadvantaged communities (DACs) in the development, implementation, monitoring and long-term maintenance of water resource projects	Provide direct outreach to DACs; Provide contextual and technical support to DACs as funding permits
Develop cost-effective multi-benefit projects	Number of multi-benefit projects on IRWMP list; Evaluation of costs and benefits of projects on IRWMP list
Consider disproportionate community impacts to ensure environmental justice	Geographical distribution of projects on IRWMP list relative to DAC locations
Maximize economies of scale and governmental efficiencies	Number of projects on IRWMP list with multiple project proponents; Evaluation of costs and benefits of projects on IRWMP list
Protect cultural resources	Measurement and monitoring of cultural resources before and after project development
Reduce energy use and/or use renewable resources where appropriate	Number of projects on IRWMP that include energy- reduction or renewable energy components



During development of the project prioritization process, the SC and PAC applied weighting factors to the scoring criteria which included the categories of Regional Objectives, Statewide Priorities, Other Strategies, and Feasibility. With the Region's vision in mind, the Regional Objectives account for half of the total weight, as collectively, achieving the region's goals and objectives are at the forefront of successful IRWM planning. Of that, the goals were then weighted individually as shown below. The committees agreed that water supply, flood protection, and water quality are major issues that need to be addressed, as demonstrated by each category accounting for 10% of a project's score. Then, environmental protection and enhancement, and regional communication and social responsibility accounts for 6% of a project's score. The planning participants also felt that achieving the Statewide Priorities, addressing other project aspects (such as readiness to proceed) and project feasibility also merited consideration in project ranking, and assigned relative weights accordingly. The resulting percentages applied to the various project scoring criteria are summarized below. A sample project scoring sheet, also showing the assigned category weights, is included in Appendix K.

- Regional Objectives 50%
 - Water Supply 10%
 - \circ Flood Protection 10%
 - Water Quality 10%
 - Environmental Protection and Enhancement Goal 7%
 - Regional Communication and Cooperation 7%
 - Economic and Social Responsibility 6%
- Statewide Priorities 25%
 - Drought Preparedness 5%
 - Use and Reuse Water More Efficiently 5%
 - Climate Change Response/Adaptation Actions 3%
 - Expand Environmental Stewardship 2%
 - Practice Integrated Flood Management 3%
 - Protect Surface Water and Groundwater Quality 3%
 - Improve Tribal Water and Natural Resources 2%
 - Ensure Equitable Distribution of Benefits; Provide Environmental Justice 2%
- Other Strategies 16%
 - Direct Benefit to DAC and/or Native American Communities 4%
 - Schedule (i.e. Readiness to Proceed) 8%
 - Inter-regional Project 2%
 - Provide Non-Water Related Benefits 2%
- Feasibility 9%
 - o Benefit-Cost Analysis 6%
 - Financing/Economic Feasibility 3%

5.3 Resource Management Strategies

The IRWM Plan must

document the range of Resource Management Strategies (RMS) considered to meet the IRWM objectives and identify which RMS were incorporated into the IRWM Plan.

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As described in the 2009 California Water Plan (CWP) Update, Resource Management Strategies (RMSs) are a diverse set of strategies to meet water-related resource management needs of each IRWM region (listed in Table 5-2). The ESRWMP has considered all of these CWP RMSs for inclusion in the East Stanislaus IRWMP and application in the region; those that were deemed appropriate and applicable have been included as shown in Table 5-2. A summary of the RMSs, their relevancy to the region, and the ability of achieving the regional objectives through RMS implementation are summarized in the following sections. The Regional Objectives' relation to the RMSs is shown in Table 5-3.

RMS	Incorporated into IRWMP	RMS	Incorporated into IRWMP
Agricultural Water Use Efficiency		Matching Quality to Use	✓
Urban Water Use Efficiency	✓	Pollution Prevention	\checkmark
Conveyance – Delta		Salt and Salinity Management	\checkmark
Conveyance – Regional/Local	 Image: A set of the set of the	Urban Runoff Management	✓
System Reoperation	 ✓ 	Agricultural Lands Stewardship	\checkmark
Water Transfers		Economic Incentives (Loans, Grants, and Water Pricing)	~
Conjunctive Management and Groundwater Storage		Ecosystem Restoration	~
Desalination		Forest Management	✓
Precipitation Enhancement	×	Land Use Planning and Management	✓
Recycled Municipal Water	~	Recharge Area Protection	✓
Surface Storage – CALFED		Water-Dependent Recreation	✓
Surface Storage – Regional/Local	✓	Watershed Management	✓
Drinking Water Treatment and Distribution	~	Flood Risk Management	~
Groundwater Remediation / Aquifer Remediation	~	Other Strategies	~

Table 5-2: RMS Incorporated into East Stanislaus IRWMP

Agricultural Water Use Efficiency

This strategy aims at reducing net agricultural water use, focusing on improvements in technology and management of water, where appropriate, both on-farm and at the irrigation district level. This RMS is highly applicable to the East Stanislaus Region. A significant amount of water use in the region is for agricultural uses, and agricultural water use efficiency could be further applied, as is reasonable and cost-effective, contributing to water savings for the region. Agricultural water use efficiency measures are already being implemented in the region. For example, Modesto Irrigation District (MID) designed and installed a new irrigation control SCADA system providing new water management tools and improved operational efficiency of canals. MID and Turlock Irrigation District (TID) also recently prepared its 2012 Agricultural Water Management Plans, in accordance with the Agricultural Water Management Planning Act in SBx7-7, and have begun implementing the efficient water management practices as identified. The act requires water suppliers who provide water to 10,000 or more irrigated acres to develop and adopt a plan and implement cost-effective efficient water management practices. However, it is also important to recognize that agricultural applied water is a source of recharge to the underlying groundwater basins, and reduction in applied irrigation could lead to reductions in groundwater recharge. This irrigation-recharge connection will have to be considered in any project implementing this RMS. This RMS aligns with the Water Supply objective identified by the Region to implement water conservation plans for both urban and agricultural uses.

Urban Water Use Efficiency

Application of the Urban Water Use Efficiency RMS results in benefits to water supply and water quality through improvements in technology and human behavior to decrease both indoor and outdoor water use. While Agricultural Water Use Efficiency reduces water use on farms and through irrigation districts, Urban Water Use Efficiency applies to residential, commercial, industrial, and institutional water uses. This RMS is already being applied throughout the region through agency conservation programs, and will continue to be used in the future to manage water resources, contribute to drought preparedness, and reduce energy use and associated greenhouse gas (GHG) emissions. Similar to the Agricultural Water Use Efficiency RMS, application of this RMS would contribute to the objective to implement water conservation plans for both urban and agricultural uses.

Conveyance - Delta

Conveyance provides for the movement of water, and includes natural water courses such as streams, rivers, and groundwater aquifers, as well as constructed facilities such as ditches, canals, and pipelines. The Delta, located at the confluence of the Sacramento and San Joaquin Rivers, is composed of natural streams and sloughs, as well as artificial channels and constructed islands protected by levees that naturally convey water from the Sacramento and San Joaquin Rivers westward to the Pacific Ocean. Conveyance facilities within the Delta also pump water from it into canals that move water southward to urban and agricultural users. Delta conveyance can maintain or improve water supply reliability, protect water quality, provide water system operational flexibility, and improve the environment.

The East Stanislaus Region, while upstream of the Delta, is not in direct proximity to the Delta and would not utilize it for conveyance; therefore, this RMS is not applicable to the region.

Conveyance – Regional/Local

Various regional and interregional conveyance facilities exist throughout California and within the East Stanislaus Region. Interregional conveyance facilities, such as the State Water Project (SWP) and the federal Central Valley Project (CVP), move water throughout the state. Regional or local conveyance is when water is distributed to users from locally-developed sources, usually located within the same watershed or river system. Conveyance facilities can provide benefits to flood management, environmental uses, water quality, recreation, operational flexibility, and can be related to conjunctive use applications as well as urban and agricultural water use efficiency. This RMS would be implemented through the following:

- Improve existing conveyance systems, which could consist of improving aging infrastructure, increasing existing capacities, and adding new facilities.
- Upgrade distribution systems to improve efficiencies, improve water quality, and reduce energy demands.
- Construct new conveyance systems to replace or supplement existing systems.
- Maintain channel capacity.
- Add system interties to interconnect conveyance systems.

Water agencies and irrigation districts in the East Stanislaus Region rely on local conveyance every day and maintain their conveyance facilities to provide water supply reliability and flood control. The region will continue to rely on this RMS in the future. It aligns with the Region's Water Supply objective to address conveyance infrastructure needs.

System Reoperation

System reoperation consists of modifying the existing procedures for operation and management of water systems, including reservoirs and conveyance facilities. Oftentimes, system reoperation occurs to address a specific issue.

System Reoperation is an RMS that can be applied in the East Stanislaus Region. It will likely become more common in the future as populations continue to grow and climate change impacts are realized. As described in Section 2.3, climate change could alter the amount of snowpack in the Sierra Nevada, the timing of snowmelt, and runoff patterns which could greatly impact existing operations of water systems in the East Stanislaus region. System reoperation is one adaptive management strategy that the region can employ to address climate change impacts.

Water Transfers

The California Water Code defines a water transfer as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to transfer or exchange of water rights. Transfers can be between water districts using, in general, one of the following methods to make water available for the transfer:

- Transfer water from storage that would be carried over to the next year.
- Transfer previously-banked groundwater by directly pumping and transferring that water or by pumping the banked groundwater for local use and transferring surface water that would have been used locally.
- Reduce existing consumptive use of water and transfer the excess.
- Reduce seepage from conveyance systems to make additional water available.

Water transfers can provide operational flexibility and can be linked to conjunctive management, groundwater banking, conveyance efficiency, agricultural and urban water use efficiency, and water

quality improvement. This RMS will be included in the East Stanislaus IRWMP and considered both now and in the future to meet demands.

Conjunctive Management and Groundwater Storage

Conjunctive management is the planned use of surface water and groundwater resources to maximize availability and reliability of water supplies. For conjunctive management to be successful, groundwater storage must be feasible. Groundwater aquifers may be "recharged" from natural hydrologic process or water may be introduced to the aquifer through active groundwater management. Water can then be withdrawn through wells or it can discharge naturally, contributing to streamflow.

Conjunctive management is already relied upon by water managers in the region. For example, the City of Modesto relies on conjunctive use to meet demands with its water supplies from groundwater and Tuolumne River surface water that is purchased wholesale from MID. Turlock Irrigation District also manages its Turlock Groundwater Subbasin supplies conjunctively with its surface water supplies. Conjunctive management and groundwater will continue to be relied upon in the future.

Desalination

Desalination consists of the removal of salt from water to allow for the water's beneficial use. In terms of the desalination RMS, it has typically focused on treating seawater or brackish water (water that has salt levels exceeding those acceptable for domestic, municipal, and irrigation uses).For inland areas, groundwater desalting is technically feasible and could be used in the region to address increasing groundwater salinities; however, as management strategy, it is expensive, energy intensive, and results in a waste brine that may be difficult to manage. As such, desalination will not be considered further for the East Stanislaus Region at this time.

Precipitation Enhancement

Cloud seeding, or precipitation enhancement, artificially stimulates clouds to precipitate by injecting artificial substances (usually silver iodide) into clouds that enable snowflakes and raindrops to form more easily. Precipitation enhancement has been performed in California since the early 1950s, with most of it occurring along the central and southern Sierra Nevada. A long-term precipitation enhancement project is planned for the North Fork of the Stanislaus River, sponsored by the Northern California Power Authority, with a primary goal of increasing hydroelectric power. According to the 2009 CWP Update, the cost of cloud seeding is typically less than \$20 per acre-foot per year. In 2013, TID and MID entered its 25th year of its cloud seeding program. TID studies estimate that cloud seeding produces a 2% annual increase in total precipitation which translates to approximately 40,000 acre-feet per year (Cantatore, 2010). This is and will continue to be valuable in the future as climate change impacts occur.

Recycled Municipal Water

One RMS commonly applied throughout California to increase available water supplies and meet current and future water demands is the use of Recycled Municipal Water, consisting of treating and reusing wastewater. Recycled water can offset potable water supplies, diversify a water agency's water supply portfolio, creating a more drought resistant supply and beneficially reusing wastewater. The East Stanislaus Region recognizes the importance of maximizing use of recycled water, as demonstrated in its Water Supply objective to provide a variety of water supply sources, including recycled water, to meet all current and future demands under various hydrologic conditions, and plans to expand application in and around the region.

Surface Storage – CALFED

DWR, the Bureau of Reclamation, and local water interests are investigating five potential reservoirs for surface water storage as part of the CALFED Record of Decision. These include the Shasta Lake Water Resources Investigation, North-of-the-Delta Offstream Storage, In-Delta Storage Project, Los Vaqueros Reservoir Expansion, and the Upper San Joaquin River Basin Storage Investigation. Because none would apply to the East Stanislaus Region, this RMS is not being considered for future application or incorporation into the IRWMP.

<u>Surface Storage – Regional/Local</u>

Relying on surface storage, consisting of reservoirs to collect water for later release and use, is often necessary throughout California. Surface storage can also be operated in conjunctive with groundwater storage to create conjunctive use opportunities. Modesto Reservoir and Turlock Lake lie within the East Stanislaus Region and are used by MID and TID, respectively, for surface storage. Regional and local surface storage will continue to be used for water management in the East Stanislaus Region. The addition or expansion of reservoirs could be an option for increased water supplies in the future, if deemed necessary.

Drinking Water Treatment and Distribution

Drinking water treatment and distribution is a key RMS to achieving the region's Water Supply and Water Quality goals and objectives. Providing a high quality, reliable drinking water supply to users is the primary goal of public water systems. The water agencies in the East Stanislaus Region apply this RMS every day, and will continue doing so through maintenance of existing water treatment and distribution facilities and the addition of new facilities, as necessary to meet demands.

Groundwater and Aquifer Remediation

Groundwater in aquifers throughout the state has degraded water quality that prevents beneficial use. In some areas, groundwater quality is degraded by naturally occurring constituents while other areas, poor water quality is caused by a variety of human activities. In order to allow for use of the degraded groundwater as a drinking water supply, groundwater and/or aquifer remediation may be required. Groundwater remediation removes contaminants that affect the beneficial use of the groundwater and can consist of the following methods:

- Passive groundwater remediation: allowing contaminants to biologically or chemically degrade or disperse in-situ over time.
- Active groundwater remediation: treating contaminated groundwater in-situ or extracting contaminated groundwater and then treating it. When groundwater is extracted, treated, and then injected back into the aquifer, it is commonly referred to as a 'pump and treat system'. If groundwater is pumped, treated, and then delivered to users for potable, irrigation or industrial use, it is referred to as wellhead treatment.

The East Stanislaus Region's groundwater quality is variable and has been impacted by overlying land uses in many locations. For this reason, treating the pumped groundwater prior to delivery (i.e. active groundwater remediation) is necessary. Groundwater monitoring for groundwater levels and quality is conducted and will continue to be; if contaminants spread or groundwater quality worsens, or if water quality regulations are modified, additional groundwater and/or aquifer remediation could be required in the future.

Matching Quality to Use

Not all water uses require the same quality of water. High quality water can be used for potable water supplies while a water of less quality, such as recycled water, may be appropriate for uses

other than drinking water. The East Stanislaus Region plans on expanding recycled water use, initiating storm water capture and reuse, and expanding the non-potable use of degraded aquifer supplies. By applying this RMS, the Region will match quality to use in other water resource applications both at present and in the future.

Pollution Prevention

Pollution prevention is the protection of water quality at its source, oftentimes through land use management practices to prevent sediment and pollutants from entering the source water. It can not only improve water quality for all beneficial uses, but also reduce the cost for other water management and treatment processes. This RMS would help meet the Water Quality goals and objectives for the Region. The Region has and will continue to apply this RMS.

Salt and Salinity Management

With the exception of freshly fallen snow, salt, or materials originating from dissolution or weathering of rocks and soil, is present in most natural water supplies because soluble salts in rocks and soil begin dissolving as soon as water reaches them. Recycled water applications can increase salinity, and while living organisms benefit from low levels of salt concentrations, salinity can become a problem when consumptive use and evaporation concentrates salts to levels that adversely impact beneficial uses. The Central Valley Salinity Alternatives for Long-term Sustainability initiative (CV-SALTS), a collaborative effort initiated in 2006 by the Central Valley Salinity Coalition, was created to find a solution to the rising salt levels in the Central Valley that have the potential to impact drinking water quality and productive crops throughout the basin. It is the Salt and Nutrient Planning effort in the Central Valley region as indicated by the RWQCB. The City of Modesto has been participating in CV-SALTS and plan on continuing its membership. The Region continues managing salt and applying this RMS through participation in CV-SALTS, as well as other methods. This RMS will help achieve the Water Supply and Water Quality goals and objectives identified for the East Stanislaus Region.

Urban Runoff Management

Urbanization, through increased impervious surfaces, alters flow paths, water storage, pollutant levels, evapotranspiration, groundwater percolation and recharge, surface runoff and many other natural processes. Urban runoff management is the management of stormwater and dry weather runoff (e.g. excess landscape irrigation water flows to the storm drain) typically for flood control and pollution prevention. This RMS focuses on a watershed focused approach for urban runoff management through the implementation of best management practices (BMPs) and Low Impact Development (LID) in which the natural hydrologic cycle can be emulated and preserved. The BMPs are designed to reduce pollutant loading, reduce the volumes of runoff, and reduce velocities of urban runoff discharged to surface waters. LID creates site designs and applies BMPs that maintain the site's pre-development runoff rates and volumes. The East Stanislaus Region manages urban runoff in the more traditional sense in which stormwater is collected and conveyed through storm drains and pipes. The Region will continue applying this RMS and in the future, identify opportunities to apply a watershed approach of urban runoff management and to manage stormwater runoff through capture and reuse.

Agricultural Lands Stewardship

Agricultural lands stewardship consists of conserving natural resources and protecting the environment while improving land for food, fiber and biofuels production, watershed function, soil, air, energy, plant and animal and other conservation purposes. It can help attenuate peak precipitation runoff, conserve water, facilitate groundwater recharge, provide critical habitat, sequester carbon, and also maintain production of food and fiber. The economy of the East

Stanislaus Region is distinguished by its large agricultural sector. Protection of these lands, and therefore implementation of this RMS is already underway and it will continue to be implemented in the future, helping meet the Environmental Protection and Enhancement goal and objectives.

Economic Incentives (Loans, Grants, and Water Pricing)

Economic incentives can be provided to influence the amount and timing of water use, wastewater volume generated, and sources of water supplies. Economic incentives generally come in the form of financial assistance such as low interest loans and grants, water pricing (e.g. water rates), and rebates or free services. The most common water rate policy is for water suppliers to recover costs for planning, operation and maintenance, capital, and administration costs for water-related projects. All of the water suppliers in the East Stanislaus Region use rate structures to fund their capital, water enterprise, and general funds and some offer rebates to encourage the use of water conserving fixtures. Economic pricing can be used to encourage the continued use of surface water, rather than moving to groundwater when implementing advanced irrigation practices. Keeping surface water conditions. This RMS will continue to be relied upon to promote and implement efficient water management practices for both urban and agricultural uses, a Water Supply objective for the region, as well as continue to fund needed projects and offset costs for low-income and disadvantaged communities.

Ecosystem Restoration

The Ecosystem Restoration RMS aligns directly with the Environmental Protection and Enhancement goal and objectives for the Region. Ecosystem restoration for the purposes of this RMS includes the restoration of aquatic, riparian, and floodplain ecosystems as they are most directly affected by water and flood management activities. Restoration can be completed as standalone projects, or aspects of ecosystem restoration can be incorporated into water resources-related projects to create multi-benefit projects. This RMS is incorporated into the East Stanislaus IRWMP.

Forest Management

The East Stanislaus Region's water supplies originate from high elevation forests in the Sierra Nevada. Forests in California are used for sustainable production of resources such as water, timber, native vegetation, fish, wildlife, livestock, and recreation opportunities. Forest management can directly impact water quantity and quality. This RMS focuses on forest management activities that improve availability and quality of water for downstream users. A portion of the Stanislaus National Forest lies within the eastern portion of the East Stanislaus Region. The Forest Management RMS can be applied there which will benefit the entire East Stanislaus Region and help contribute to the Water Supply, Water Quality, Flood Protection, and Environmental Protection and Enhancement goals and objectives.

Land Use Planning and Management

The Land Use Planning and Management RMS focuses on integrating land use and water management to plan for housing and economic development needs while providing for efficient use of water, water quality, energy, and other resources. The way land is used (i.e. land use type) directly affects water supply and quality and flood management. This RMS relates to the Water Supply, Water Quality, Flood Protection, and Environmental Protection and Enhancement goals and objectives. The Region has, and will continue to, apply this RMS, integrating land use with water resource management.

Recharge Area Protection

Recharge areas are locations where groundwater is replenished through percolation. Ideal natural recharge areas are those areas that allow for high quality water to percolate through sediments and rocks to the underlying groundwater basins. Protection of recharge areas consists of ensuring recharge areas continue to allow recharge, rather than being covered by urban infrastructure (impervious areas), and preventing pollutants from contaminating the groundwater that has recharged the area. This RMS is required in order to maintain groundwater quantity and quality. The East Stanislaus Region has, and will continue to, apply this RMS in order to achieve its Water Supply and Water Quality goals and objectives.

Water-Dependent Recreation

The East Stanislaus Region has many opportunities for water-dependent recreation such as fishing, swimming, waterfowl hunting and birding, boating, canoeing and kayaking. The upper reaches of the Tuolumne River are known for whitewater rapids for rafting. The lower reaches of the Tuolumne River, Modesto Reservoir, New Don Pedro Reservoir, and Turlock Lake are recreation areas offering opportunities for boating, swimming, birding, and fishing. There are areas throughout the Region, that while they do not depend on water are enhanced by being near water, that allow for hiking, biking, picnicking, camping, and wildlife viewing. Water planners can incorporate water-dependent recreation opportunities as part of water projects. This RMS has been applied, and will continue to be, in order to help achieve the objective to identify opportunities for open spaces, trails, and parks along creeks and other recreational projects in the watershed to be incorporated with water supply, water quality, or flood protection projects.

Watershed Management

The Watershed Management RMS consists of creating and implementing plans, programs, and projects to restore and enhance watershed functions to meet the diverse needs of communities that depend on it. Using watersheds as organizing units for planning and implementing projects is made possible in the East Stanislaus Region by integrated regional water management planning. The Region's Regional Communication and Cooperation goals and objectives align with this RMS, which is incorporated into the East Stanislaus IRWMP.

Flood Risk Management

The Flood Risk Management RMS would help achieve the Flood Protection goal identified by the Region, to ensure flood protection strategies are developed and implemented through a collaborative process, utilizing both local and watershed-wide approaches designed to maximize opportunities for comprehensive water resource management, and its associated objectives. The East Stanislaus Region is participating in the development of the Central San Joaquin River Regional Flood Management Plan, and through this and other processes, will implement the objectives for achieving its Flood Management goal. Therefore, the Region's goals and objectives are aligned with this RMS and are therefore incorporated into the IRWMP.

Other Strategies

Other RMSs such as crop idling, irrigated land retirement, fog collection, rainfed agriculture, dewvaporation, and waterbag transport are identified in the 2009 CWP. While some of the RMSs are feasible (such as crop idling, irrigated land retirement and rainfed agriculture), they would be applied only in the most desperate of circumstances. Most likely, unless all other RMSs have been exhausted, the East Stanislaus Region would not apply these strategies as they could have substantial economic impacts; as such, these strategies will not be considered further at this time.

5.4 Relation to Statewide Priorities

A Program Preference identified by DWR in the 2012 IRWM Guidelines is to address statewide priorities, which include:

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

The goals and objectives identified for the East Stanislaus Region align with DWR's Statewide Priorities. All Statewide Priorities have been included in the Region's project prioritization process, and therefore all would be achieved by IRWM projects that contribute to the Region's objectives. The Regional Objectives' relation to the Statewide Priorities is shown in Table 5-4.

Achieving objectives, when integrated with the Statewide Priorities and Resource Management Strategies, will result in a multi-benefit solution meeting the Region's needs, as well as the State's priorities and preferences.

Table 5-3: East Stanislaus Regional Objectives' Relation to RMSs

													Reso	ource N	Manag	ement	Strate	gies										
Goal	Objective	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance-Delta	Conveyance-Regional/local	System Reoperation	Water Transfers	Flood Risk Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Recharge Area Protection	Conjunctive Mgmt /GW Storage	Desalination	Recycled Municipal Water	Surface Storage - CALFED	Surface Storage – Regional/local	Drinking Water Treatment & Distrib.	Groundwater/Aquifer Remediation	Land Use Planning & Management	Matching Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Water-Dependent Recreation	Watershed Management	Other Strategies
Water Supply - Protect existing water supplies	Provide a variety of water supply sources, including recycled water, to meet all current and future																											
and water rights, and improve regional water	demands (urban, agricultural and the environment) under various hydrologic conditions.						~						✓			~		~	~	~		\checkmark	~	~				
supply reliability	Promote the use of groundwater storage and conjunctive use options to reduce groundwater overdraft.					~							✓	✓						~			✓	~			✓	
	Protect existing water rights.				✓	✓	\checkmark							✓				\checkmark	✓			\checkmark	✓		✓			
	Implement water conservation plans for both urban and agricultural uses.	~	~							~																		
	Support monitoring and research to improve understanding of water supplies and needs.																				✓			✓	✓		✓	
	Address conveyance infrastructure needs.	✓	4		✓			~											✓						✓			
Flood Protection - Ensure flood protection strategies are	Develop outlines of regional projects and plans necessary to protect infrastructure from flooding and erosion from the 100-year event.							~																	✓		✓	
developed and implemented through a collaborative process,	Work with stakeholders to preserve existing flood attenuation by implementing land management strategies throughout the watershed.							~			~	✓									✓				✓		✓	
watershed-wide approaches designed to maximize opportunities for comprehensive water resource	Develop approaches for adaptive management that minimizes maintenance requirements and protects water quality and availability while preserving and enhancing ecologic and stream functions, as appropriate.							~			~														✓		✓	
management	Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.							~	~																	~	✓	
	Protect, restore, and enhance the natural ecological and hydrologic functions of rivers, creeks, streams and their floodplains.							✓			~														✓		✓	

		Resource Management Strategies																										
GoalObjectiveWater Quality - ProtectMeet or exceed all applicable water quality regulatory		Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance-Delta	Conveyance-Regional/local	System Reoperation	Water Transfers	Flood Risk Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Recharge Area Protection	Conjunctive Mgmt /GW Storage	Desalination	Recycled Municipal Water	Surface Storage - CALFED	Surface Storage – Regional/local	Drinking Water Treatment & Distrib.	Groundwater/Aquifer Remediation	Land Use Planning & Management	Matching Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Water-Dependent Recreation	Watershed Management	Other Strategies
Water Quality - Protect and improve water	Meet or exceed all applicable water quality regulatory standards.												\checkmark			~			✓	~		~	~	✓				
quality for beneficial uses consistent with	Deliver agricultural water to meet water quality guidelines established by stakeholders.	✓						4	~							~				~		~	✓	✓				
regional interests and the RWQCB Basin Plan in cooperation with	Aid in meeting Total Maximum Daily Loads established, or to be established, for the Tuolumne River watershed.								✓		~									~	✓		~					
agencies and regional stakeholders	Protect surface waters and groundwater basins from contamination and threat of contamination.										~	~	~							~	✓	✓	✓	√	~			
	Manage existing land uses while preserving or enhancing environmental habitats.								~			~	✓								~		~		~		~	
	Minimize impacts from storm water through implementation of Best Management Practices, Low Impact Development or other similar projects.										~	✓									✓		✓	✓	✓		✓	
	Promote programs and projects to reduce the quantity and improve the quality of urban and agricultural runoff.	1	~						~	~											✓		✓		✓		✓	
	Promote and support regional monitoring to further understanding of water quality issues.												~										~				~	
Environmental Protection and Enhancement - Protect the environmental	Identify and incorporate (where possible and reasonable) opportunities to assess, protect, enhance, and/or restore natural resources when developing water management strategies.							✓			✓	✓									~						v	
resources of the Stanislaus, Tuolumne, Merced and San Joaquin River watersheds by identifying, promoting	Minimize adverse effects on biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species, and archaeological sites when implementing strategies and projects.										✓		✓								✓						✓	
and implementing opportunities to assess, restore and enhance natural resources of these watersbeds	Identify opportunities for open spaces, trails and parks along creeks and other recreational projects in the watershed to be incorporated with water supply, water quality, or flood protection projects.										✓										~					✓	✓	
	Contribute to the long-term sustainability of agricultural, commercial, industrial, and urban land uses and activities within the basin.	✓	✓			√		✓	✓					√		✓		✓		✓	✓	✓	✓	√	✓		~	

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		Resource Management Strategies																										
Goal	Objective	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance-Delta	Conveyance-Regional/local	System Reoperation	Water Transfers	Flood Risk Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Recharge Area Protection	Conjunctive Mgmt /GW Storage	Desalination	Recycled Municipal Water	Surface Storage - CALFED	Surface Storage – Regional/local	Drinking Water Treatment & Distrib.	Groundwater/Aquifer Remediation	Land Use Planning & Management	Matching Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Water-Dependent Recreation	Watershed Management	Other Strategies
	Identify opportunities to protect, enhance, or restore habitat to the support all watersheds in the Region in conjunction with water supply, water quality, or flood protection projects.							~			~		~								✓						✓	
	Support projects to understand, protect, improve and restore the region's ecological resources.							4990													✓						~	
Regional Communication and	Develop a forum for consensus decision-making and IRWM Plan implementation by regional entities.									T											✓			✓			~	
Cooperation - Implement and promote this IRWM Plan through regional	Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate permitting of water-related projects and ensure continued consistency with state water plans.																_				~						✓	
communication, cooperation, and education	Facilitate dialogues between regional and inter- regional entities to reduce inconsistencies and conflicts in water management and to maximize benefits from water-related projects.																				✓							
	Maintain avenues of communication with the general public and offering opportunities to provide feedback on the IRWM and water-related projects through the regional websites and other public forums.																											
	Identify opportunities for public education about water supply, water quality, flood management, and environmental projection.								✓																			
Economic and Social Responsibility - Promote development and implementation of	Support the participation of disadvantaged communities in the development, implementation, monitoring and long-term maintenance of water resource projects.																											
projects, programs and	Develop cost-effective multi-benefit projects.																				✓						✓	
impartial and economically sound	Consider disproportionate community impacts to ensure environmental justice.																											
contention y bound	Maximize economies of scale and governmental efficiencies.															~												
	Protect cultural resources.																				✓							
	Reduce energy use and/or use of renewable resources where appropriate.															✓			~			✓						

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Table 5-4: East Stanislaus Regional Objectives' Relation to Statewide Priorities

Goal	Objective			•	Statewi	de Prior	rity		
		Drought Preparedness	Use & Reuse Water More Efficiently	Climate Change Response Actions	Expand Environmental Stewardship	Practice Integrated Flood Mngmt	Protect Surface Water & GW Quality	Improve Tribal Water & Natural Resources	Ensure Equitable Distrib. of Benefits
Water Supply - Protect existing water supplies and water rights, and improve regional water	Provide a variety of water supply sources, including recycled water, to meet all current and future demands (urban, agricultural and the environment) under various hydrologic conditions.	~	~	~			~		
supply reliability	Promote the use of groundwater storage and conjunctive use options to reduce groundwater overdraft.	✓		✓			✓		
	Protect existing water rights.	\checkmark	✓	✓	✓		\checkmark		
	Implement water conservation plans for both urban and agricultural uses.	\checkmark	✓	✓				\checkmark	\checkmark
	Support monitoring and research to improve understanding of water supplies and needs.			✓		✓		\checkmark	
	Address conveyance infrastructure needs.	\checkmark	✓	✓		✓		✓	\checkmark
Flood Protection - Ensure flood protection	Develop outlines of regional projects and plans necessary to protect infrastructure from flooding and erosion from the 100-year event.			✓	✓	✓		✓	\checkmark
strategies are developed and implemented	Work with stakeholders to preserve existing flood attenuation by implementing land management strategies throughout the watershed.					\checkmark			\checkmark
through a collaborative process, utilizing both local and watershed-wide approaches designed to maximize opportunities for comprehensive	Develop approaches for adaptive management that minimizes maintenance requirements and protects water quality and availability while preserving and enhancing ecologic and stream functions, as appropriate.				✓	✓	✓		
water resource management	Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.					✓		~	~
	Protect, restore, and enhance the natural ecological and hydrologic functions of rivers, creeks, streams and their floodplains.				✓	✓			
Water Quality - Protect and improve water	Meet or exceed all applicable water quality regulatory standards.						✓		
quality for beneficial uses consistent with	Deliver agricultural water to meet water quality guidelines established by stakeholders.						\checkmark		
regional interests and the RWQLB Basin Plan in cooperation with local state and federal agencies	Aid in meeting Total Maximum Daily Loads established, or to be established, for the Tuolumne River watershed.						✓		
and regional stakeholders	Protect surface waters and groundwater basins from contamination and threat of contamination.						✓		
	Manage existing land uses while preserving or enhancing environmental habitats.				\checkmark		\checkmark		
	Minimize impacts from storm water through implementation of Best Management Practices, Low Impact Development or other similar projects.						\checkmark		
	Promote programs and projects to reduce the quantity and improve the quality of urban and agricultural runoff.						✓		
	Promote and support regional monitoring to further understanding of water quality issues.						\checkmark		
Environmental Protection and Enhancement - Protect the environmental resources of the	Identify and incorporate (where possible and reasonable) opportunities to assess, protect, enhance, and/or restore natural resources when developing water management strategies.				✓				
Stanislaus, Tuolumne, Merced and San Joaquin River watersheds by identifying, promoting and implementing, opportunities to access, restore	Minimize adverse effects on biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species, and archaeological sites when implementing strategies and projects.				✓			~	
and enhance natural resources of these watersheds	Identify opportunities for open spaces, trails and parks along creeks and other recreational projects in the watershed to be incorporated with water supply, water quality, or flood protection projects.	✓	~	✓	✓	✓	✓	✓	✓
	Contribute to the long-term sustainability of agricultural, commercial, industrial, and urban land uses and activities within the basin.	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	 ✓ 	\checkmark

Goal	Objective		Statewide Priority									
		Drought Preparedness	Use & Reuse Water More Efficiently	Climate Change Response Actions	Expand Environmental Stewardship	Practice Integrated Flood Mngmt	Protect Surface Water & GW Quality	Improve Tribal Water & Natural Resources	Ensure Equitable Distrib. of Benefits			
	Identify opportunities to protect, enhance, or restore habitat to the support all watersheds in the Region in conjunction with water supply, water quality, or flood protection projects.	✓	✓	✓	✓	~	~	✓	~			
	Support projects to understand, protect, improve and restore the region's ecological resources.				\checkmark			\checkmark				
Regional Communication and Cooperation -	Develop a forum for consensus decision-making and IRWM Plan implementation by regional entities.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark			
Implement and promote this IRWM Plan through regional communication, cooperation, and	Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate permitting of water-related projects and ensure continued consistency with state water plans.	✓	~	~	✓	✓	✓	~	~			
education	Facilitate dialogues between regional and inter-regional entities to reduce inconsistencies and conflicts in water management and to maximize benefits from water-related projects.	~	✓	~	✓	✓	✓	✓	~			
	Maintain avenues of communication with the general public and offering opportunities to provide feedback on the IRWM and water-related projects through the regional websites and other public forums.	✓	✓	~	✓	✓	✓	~	~			
	Identify opportunities for public education about water supply, water quality, flood management, and environmental projection.	~	✓	✓	✓	✓	\checkmark	✓	\checkmark			
Economic and Social Responsibility - Promote development and implementation of projects,	Support the participation of disadvantaged communities in the development, implementation, monitoring and long-term maintenance of water resource projects.		~					✓	~			
programs and policies that are socially impartial	Develop cost-effective multi-benefit projects.	✓	✓	✓	\checkmark	\checkmark	\checkmark	✓	\checkmark			
and economically sound	Consider disproportionate community impacts to ensure environmental justice.				\checkmark			✓	\checkmark			
	Maximize economies of scale and governmental efficiencies.							✓	✓			
	Protect cultural resources.							✓	✓			
	Reduce energy use and/or use of renewable resources where appropriate.			✓				✓	✓			

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5.5 Relation to Regulatory Programs

The East Stanislaus Region falls under the purview of the U.S. Environmental Protection Agency (USEPA) Region 9, U.S. Fish and Wildlife Service (USFWS) Southwest Region, the Central Valley (Region 5) Regional Water Quality Control Board (RWQCB), the San Joaquin District of the California Department of Water Resources (DWR), the California Department of Public Health (CDPH), and the California Department of Fish and Wildlife (CDFW), Central Region. Most water resources management activities fall under the oversight of one or more of these agencies. Examples of activities requiring coordination with these areas include preparation of this IRWMP (completed using the guidelines issued by DWR); water treatment plant operations and potable water distribution (conducted under the oversight of CDPH); and discharges of treated wastewater to the San Joaquin River (CDFW and RWQCB). Direct and indirect regulatory agency participation has been sought by the East Stanislaus Region for participation on the SC or PAC; however, most region coordination with these State and Federal regulatory agencies is on a project-by-project basis.

5.6 Relation to Local Water Planning

Historically, there have not been any official IRWM planning efforts in the East Stanislaus Region, but entities within the East Stanislaus Region have worked together on various local water planning efforts and water projects over the years and have maintained an ongoing collaborative relationship through groundwater management groups, Directors meetings, and other efforts. Some of the historical water-related planning efforts are project-based, while others are related to a broader discussion of water resources-related issues. The cities and agencies within the East Stanislaus Region have worked together to develop solutions to the water management issues and conflicts they face. This IRWMP provides an integrated venue under which these historical efforts can continue on a programmatic level. It is anticipated that project-specific coordination will continue independent of the IRWMP implementation, as needed, for development, construction and operation of projects required to meet the region's water resource management needs.

The IRWMP must document the local water planning documents on which it is based including:

- A list of local water plans used in the IRWM Plan.
- A discussion of how the IRWM Plan relates to planning documents and programs established by local agencies.
- A description of the dynamics between the IRWM Plan and local planning documents.

- *Proposition 84 & 1E IRWM Guidelines*, November 2012, Page 22

Some of the historical local water planning efforts that

have laid the foundation for the East Stanislaus IRWMP are described in the following sections. A list of local plans used in the development of the IRWMP is included in Chapter 6, Technical Analysis (see Table 6-1).

5.6.1 Groundwater Management Planning

The Turlock Groundwater Basin Association (TGBA) was created for cooperative groundwater management activities in the Turlock Groundwater Basin. Agencies in TGBA include the Turlock and Merced Irrigation Districts; the cities of Ceres, Turlock, Modesto and Hughson; the Hilmar and Delhi County Water Districts; the Keyes, Denair and Ballico Community Services Districts; the Eastside and Ballico-Cortez Water Districts; and Stanislaus and Merced Counties. Since the mid-1990s, the TGBA has coordinated as follows.

- Pursuant to State Law, the purpose of the TGBA is to coordinate groundwater management activities within the Turlock Groundwater Basin. The guiding document for the TGBA is the *Groundwater Management Plan* (GWMP), prepared and adopted pursuant to state legislation (Assembly Bill [AB] 3030) signed into law January 1, 1993. The first GWMP was adopted in 1997; it was updated and re-adopted in 2008 to reflect current conditions in the basin area. The TGBA will continue to coordinate in the future and update the GWMP, as necessary, in order to successfully coordinate groundwater management activities in the basin.
- A water balance study of the Turlock Subbasin was prepared in 2003 and updated in 2007 to estimate the inflows and outflows from the subbasin between 1952 and 2006. Recent groundwater data indicate that the basin may no longer be in a state of equilibrium (that is, outflows have started to exceed inflows). While there is uncertainty about the causes, it is believed to be a combination of increased urbanization, recent dry years, and increased agricultural production (acreage) in the eastern hills (Turlock Lake area) which relies solely on groundwater for irrigation. The water balance study highlighted the importance of studying the issue in more detail and for member agencies to collaborate more closely on groundwater management issues within the entire subbasin area.
- In response to the requirements of Senate Bill (SB) x7-6, the TGBA submitted an application to DWR to comply with requirements as a Cooperative Groundwater Monitoring Association. This has necessitated the formation of a SBx7-6 Committee to assist in coordinating compliance activities including, but not limited to: representing the TGBA at meetings regarding SBx7-6; development of draft submittals to DWR for TGBA's approval; and coordinating implementation of a monitoring program with DWR and local agencies.
- Submitted an application for, and was awarded in 2013, a Local Groundwater Assistance grant to study the geology of the far eastern side of the Turlock Subbasin, to update and refine the local groundwater model and the future needs study, and to identify additional monitoring locations in nearly planted areas to the east.

The Cities of Modesto, Oakdale and Riverbank, MID, Oakdale Irrigation District, and Stanislaus County are members of the Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) which was formed in 1994. The purpose of the association is to manage the groundwater resources within the Modesto Groundwater Basin. The STRGBA developed and adopted an *Integrated Regional Groundwater Management Plan* (IRGMP) in 2005 pursuant to state legislation SB1938. The STRGBA is working with the United States Geological Survey (USGS) through a contract for developing a numerical groundwater model for the Modesto Groundwater Basin. This effort will characterize the basin and provide modeling capabilities for various groundwater scenarios. To comply with SBx7-6 State legislation requiring groundwater monitoring, passed in 2009, the STRGBA submitted an application to the DWR stating its intent as a Cooperative Groundwater Monitoring Association to submit a groundwater monitoring program for the Modesto sub-basin.

The STRGBA also received a \$250,000 grant under the AB303 legislation to develop a Well Field Optimization Program. Phase 1 of this program is to develop and implement the first of the nine IRGMP management actions; more specifically, to operate wells to meet water supply demands, lower pumping power costs and prioritize well usage, maintain groundwater levels to satisfy Basin Management Objectives (BMOs), manage quality of discharge water and, increase effectiveness of shallow groundwater management. This study was completed in June 2007. Phase 2 expands the program to include aspects specific to urban purveyors of groundwater, but with similar goals of facilities inventory and maintaining groundwater levels to satisfy BMOs. More recently, the

STRGBA submitted an application for, and was awarded in 2013, a Local Groundwater Assistance grant to study the eastern side of the Modesto Subbasin to identify areas for potential groundwater recharge and to develop conceptual ideas for possible groundwater augmentation projects to support basin-wide conjunctive use.

5.6.2 Groundwater Elevation Monitoring/CASGEM

Senate Bill x7 6 added provisions for groundwater monitoring to Division 6 of the California Water Code and authorized DWR to establish permanent, locally managed, groundwater elevation monitoring and reporting in all of California's alluvial groundwater basins. To meet this legislative requirement, DWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program to establish a program of regular and systematic monitoring of groundwater elevations and to track seasonal and long-term trends in groundwater elevations statewide.

A core component of CASGEM is the identification of Monitoring Entities in each groundwater basin/subbasin. Monitoring Entities are responsible for coordinating the groundwater elevation monitoring and reporting for their jurisdictional area, with groundwater elevation monitoring beginning in the Fall of 2011, and elevation reporting to DWR by January 1, 2012. TGBA and STRGBA have respectively registered to become the Monitoring Entities for the Turlock and Modesto Subbasins of the San Joaquin Valley Groundwater Basin.

5.6.3 Groundwater Quality Monitoring

In 2006, the State Water Resources Control Board (SWRCB) conducted an investigation in the Central Eastside study unit, overlying the Modesto and Turlock Subbasins, as part of the Statewide Basin Assessment Project of the Groundwater Ambient Monitoring and Assessment (GAMA) Program. The GAMA program was developed in response to the Groundwater Quality Monitoring Act of 2001 and was conducted in coordination with the USGS and the Lawrence Livermore National Laboratory (LLNL). The one-time study was conducted to provide a spatially unbiased assessment of raw groundwater for comparing water quality. Data collected during the study is the SWRCB's available online at Geotracker GAMA website at http://www.waterboards.ca.gov/gama/geotracker gama.shtml. This website currently integrates data from the SWRCB, the RWQCBs, CDPH, the California Department of Pesticide Regulation, DWR, USGS and LLNL.

At present, all water agencies and irrigation districts in the East Stanislaus Region rely partially or wholly on groundwater wells. Active municipal supply wells have to be tested per CDPH regulations on an annual basis. Groundwater quality is reported by water agencies annually to the public as part of their consumer confidence reporting and to CDPH as part of their permit requirements. Further, CASGEM requires some basic water quality testing and reporting in the wells that are monitored as part of the CASGEM program. Finally, the Irrigated Lands Regulatory Program and the Dairy Program are also monitoring groundwater quality in the region. The Irrigated Lands Regulatory Program began in 2003 to prevent agricultural runoff from impairing surface waters. Under the program waste discharge requirements were developed to protect both surface and groundwater. The first in a series of waste discharge requirements were adopted by the Central Valley Water Board in December 2012; others are planned to be developed for all regions in the Central Valley by mid-2014. Additionally, as part of this program, if there are two or more exceedances of the same pollutant at the same site within a three year period, management plans must be prepared and implemented. The Irrigated Lands Regulatory Program provides public access to monitoring reports, management plans, and water quality data collected since 2004. Data collected under the program can be accessed through the California Data Exchange Network The Dairy Program has a General Order for Existing Milk Cow Dairies requiring (CEDEN). monitoring and reporting in the Central Valley Region. Monitoring of discharges of manure and/or

process wastewater, stormwater, or tailwater from dairy production is required to minimize leaching of nutrients and salts to groundwater and nearby surface waters. This program requires dischargers submit annual reports to the Central Valley Water Board.

5.6.4 Salt & Nutrient Management Planning

As previously stated, the City of Modesto is a member of the Central Valley Salinity Coalition, a nonprofit coalition of public agencies, businesses, associations, and other members, formed in July 2008 with the purpose of better managing salts in the Central Valley of California. The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) program is being led by the Coalition to find solutions to the Central Valley salt problem, and in February 2010, the organization completed the Salt and Nitrate Sources Pilot Implementation Study. The purpose of the study was to develop a methodology and provide guidance for development of the Central Valley Salt and Nutrient Management Plan (SNMP), including methods for quantifying salt and nutrient (or nitrate) sources. The identified methods were pilot tested to evaluate their appropriateness and effectiveness. Following completion of the pilot study, the Coalition developed a Framework for Salt/Nitrate Source Identification Studies, which has now led to preparation of the Initial Conceptual Model (ICM), currently underway. The ICM is the first phase of a three-phased effort to develop the technical and regulatory basis for the SNMP. The ICM will consist of a conceptual level analysis of the water balance in the Central Valley and the associated salt and nutrient conditions. The result of the ICM will be an assessment of the salt and nutrient conditions in the Central Valley. Phases 2 and 3 of the ICM will consist of refining the findings from Phase 1, delineating management zones, and developing the SNMP which will include preparation of a salt and nutrient program of implementation and completion of regulatory analyses to support adoption of the SNMP in the Central Valley RWOCB's Basin Plan. Development of the ICM began in September 2012 and is anticipated to be completed in May 2013. The results of Phases 1 through 3 will be incorporated into future East Stanislaus IRWMP updates, and the resulting SNMP will contribute to IRWM planning in the region as the phases are completed.

5.6.5 Water Planning Efforts

In addition to the development of agency-specific Water Master Plans, Urban Water Management Plans (UWMPs) and Agricultural Water Management Plans (AWMPs) in the Region, agencies within the Region have coordinated on regional and joint-projects and programs. Some of these are described as follows:

Regional Surface Water Supply Project (RSWSP). For the past several years, the Cities of Turlock, Modesto, Ceres and Hughson have been negotiating with TID to receive treated water from the Tuolumne River to supplement current potable water supplies. On September 27, 2011, a Joint Powers Agreement (JPA) was executed between the cities of Turlock, Modesto and Ceres to establish the Stanislaus Regional Water Authority (SRWA). The member agencies of the SRWA are all heavily or entirely dependent upon groundwater as their source of water supply and groundwater is a diminishing resource in the region. Each of the Participants is authorized to develop, obtain, and serve a municipal and industrial water supply, pursuant to California law. It is anticipated that the SRWA's Regional Surface Water Supply Project (RSWSP) will result in a safe, dependable, economical and long term municipal and industrial water supply system. The SRWA creates a forum and decision-making body to collectively discuss, develop and negotiate alternatives regarding the RSWSP. The intent of the Joint Powers Authority is to develop the RSWSP whereby the SRWA would purchase water from the Turlock Irrigation District, treat such water in an SRWA-owned and operated water treatment plant, and make the treated water available at cost to the members of the SRWA.

• *Modesto Regional Water Treatment Plant (MRWTP) Phases 1 & 2.* This is an on-going effort between the City of Modesto and the MID to deliver treated Modesto Reservoir surface water to the City of Modesto and other adjacent communities adjacent for which Modesto owns and operates the water systems. In 1992, the City and MID entered into a Treatment and Delivery Agreement to construct Phase 1 of the MRWTP, consisting of fourteen miles of conveyance piping, two terminal reservoir tanks and pumping facilities for the delivery of 30 million gallons per day (mgd) of potable water. Since 1995, Modesto has been receiving these surface water deliveries. In 2005, the City and MID entered into an Amended and Restated Treatment and Delivery Agreement to construct Phase 2 of the MRWTP, which would increase treated surface water deliveries to 60 mgd. The Phase 2 project is currently under construction and is expected to be operational by 2015.

5.6.6 Wastewater Planning Efforts

In addition to the development of agency-specific Wastewater Master Plans, regional coordination for wastewater-related efforts has been completed by entities within the Region, helping lay the foundation for IRWM planning in the Region. Examples of these efforts include:

- The Turlock Regional Water Quality Control Facility (RWQCF). The Turlock Regional Water Quality Control provides tertiary treatment of wastewater from the City of Turlock and the community service districts of Keyes and Denair. Furthermore, the Turlock RWQCF processes one million gallons per day of wastewater from the City of Ceres (approximately 30% of Ceres' total flow); this wastewater is partially treated before being sent to Turlock. Ceres has purchased the rights to discharge an additional 1 mgd of wastewater to Turlock, and the pipeline from Ceres to Turlock has a total hydraulic capacity of 6.5 mgd to allow for further regionalization efforts. Operation of these facilities requires on-going communication and coordination.
- *Wastewater Regionalization.* In November 2010, Erler & Kalinowski, Inc. (EKI) completed an evaluation of the feasibility of forming a regional system to provide wastewater services to the Cities of Modesto, Ceres, and/or Turlock. The study area consisted of the Cities of Modesto, Ceres, and Turlock. The study identified and evaluated options for wastewater regionalization in the study area and evaluated the feasibility of these options on a technical, economic, and legal basis. The study found that there are significant operational efficiencies to be realized by combining wastewater treatment and disposal systems in the study area. According to a conceptual-level cost evaluation, the potential combined savings across all three cities on a 30-year present worth basis appear to be in the ballpark of \$100 million. The cities will continue to coordinate on the potential for wastewater regionalization.
- North Valley Regional Recycled Water Program (NVRRWP). This is a proposed recycled water project to deliver up to 30,930 AFY of tertiary-treated recycled water to the droughtimpacted west side of Stanislaus County, primarily the Del Puerto Water District and other potential users. The recycled water will be used for agricultural irrigation. This quantity of water would be available from the combined Cities of Modesto, Turlock, and Ceres effluents and could irrigate 15,600 acres of land per year (at two acre-feet per acre of applied water). An additional 15,682 acre-feet per year of recycled water will be made available once the City of Modesto upgrades its secondary-treated wastewater treatment plant to tertiary levels. At the above-described build-out scenario, a total of 46,900 acre-feet per year of recycled water would be available for unrestricted farmland irrigation. The cities are coordinating with Del Puerto Water District to determine project feasibility.

• *Recycled Water Expansion.* As noted in their 2010 UWMP, the City of Modesto currently recycles some of its effluent for agricultural irrigation and is currently evaluating expansion of recycled water use in the future (West Yost Associates, 2011b). The City of Patterson has expressed interest in participating in Modesto's program when recycled water becomes available and may also seek to send its wastewater to Modesto for full or tertiary treatment and have the recycled water returned for use in its non-potable system (The H2O Group, 2012).

5.7 Relation to Local Flood Control Planning

There are existing flood management planning activities underway in the East Stanislaus Region that are contributing to development of the East Stanislaus IRWMP. Two significant efforts include the DWR's Regional Flood Management Planning Initiative's Central Valley Flood Protection Plan, as well as the Mid-San Joaquin River Regional Flood Management Plan. The goal of DWR's Regional Flood Management Planning Program is to build upon flood risk management information developed through, and contained in the Central Valley Flood Protection Plan and to develop a longterm vision for "a flood safe region" through the use of detailed regional information and a collaborative local planning process. Integrated Flood Management is an approach to dealing with flood risk that recognizes the:

- interconnectedness of flood management actions within broader water resources management and land use planning,
- value of coordinating across geographic and agency boundaries,
- need to evaluate opportunities and potential impacts from a system perspective, and
- importance of environmental stewardship and sustainability.

The Mid-San Joaquin River Region will support DWR's FloodSAFE initiative through demonstration of integrated multi-benefit flood management projects, coordination with adjacent flood management planning regions, and develop a region-wide flood management solution. A Regional Flood Management Plan will be developed for the Mid-San Joaquin River Region by participating agencies including the Reclamation District (RD) 2092 and Stanislaus County. The East Stanislaus IRWMP participating entities will be active participants in the development of this Flood Management Plan, providing close coordination and integration among the IRWMP and flood management in the Region.

Separately, the Cities of Modesto and Turlock, Stanislaus County, and the TID jointly fund, and work cooperatively on the operation of Gomes Lake, a flood control facility on the San Joaquin River. The Gomes Lake Pumping Plant is approximately 3.5 miles east of the San Joaquin River. The Gomes Lake Pumping Plant pumps backed up water over levees that were constructed in the 1950s and 1960s to preventing stormwater from draining into the San Joaquin River. The water is then discharged into the San Joaquin River (ESA, 2013).

5.8 Relation to Local Land Use Planning

Land use planning entities in the East Stanislaus Region consist of Stanislaus County, Merced County, the incorporated cities of Modesto, Turlock, Ceres, Hughson, Oakdale, Riverbank, Waterford, the Stanislaus Local Agency Formation Commission (LAFCo), and the Stanislaus Council of Governments (StanCOG). Stanislaus County LAFCo develops and updates spheres of influence for cities and districts, prepares Municipal IRWM Plans must document:

- Current relationship between local land use planning, regional water issues, and water management objectives.
- Future plans to further a collaborative, proactive relationship between land use planners and water managers.

- *Proposition 84 & 1E IRWM Guidelines*, November 2012, Page 22 Service Reviews (MSRs), and works cooperatively with public and private agencies and interests on growth, preservation and service delivery. StanCOG is the Metropolitan Planning Organization (MPO) for the Stanislaus Region as designated by the Federal government. It is a council of city and county governments comprised of the Cities of Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock and Waterford and Stanislaus County. The water management entities within the Region include Stanislaus County, Merced County, the cities of Modesto, Turlock, Ceres, Hughson, Oakdale, Riverbank, MID, TID, and OID, various community service districts, as well as the Army Corps of Engineers and state entities. Many of the water management entities in the Region are also land use planning entities and therefore, coordinate internally. Indirect coordination is conducted through completion of master plans, General Plans, UWMPs, and other land use or water plans in which water managers can provide input regarding project or land use decisions that may impact water supply or water quality and vice versa.

The relationship between the cities and the irrigation districts in Stanislaus County is very good, however, it is recognized that coordination between water managers and land use entities could always be improved; it is the intent of the East Stanislaus IRWM planning process to strengthen coordination among all water and land use planning entities in the Region. Because the East Stanislaus Region overlies a significant portion of Stanislaus County, the County is being encouraged to participate in the IRWM planning effort. Targeted outreach to County representatives has, and will continue to be, conducted in the future.

Stanislaus County, and the Cities of Ceres, Hughson, Modesto, Oakdale, Riverbank, Turlock, Waterford, as well as Newman and Patterson (both of which are just outside of the East Stanislaus Region), prepared and submitted a joint funding request to the California Strategic Growth Council for the Stanislaus County Regional Sustainability Toolbox. The Toolbox will include the development of multiple planning tools to achieve greenhouse gas reductions in the region, comprised of eleven components. For example, Water Efficient Landscape Guidelines and Standards will be developed, as well as Low Impact Developments Standards and Specifications. Some of these components are related to land use planning and because many of the same entities were involved in development of the Toolbox, this will be an opportunity to coordinate on water planning and land use planning efforts. It is recognized by participating agencies that there are opportunities for improved coordination among water planners and land use planners. Allowing for early water management input and coordination with those responsible for making land use decisions and implementing land use changes will improve not only land use planning, but also water resources planning.