

Chapter 13 *Resource Management Strategies*

13.0 Introduction

This chapter: 1) defines Resource Management Strategies (RMSs), 2) documents the range of state RMSs considered to meet IRWMP objectives, 3) provides a rationale for which of the state's RMSs are applicable to the region, 4) articulates which applicable RMSs address the region's identified climate change vulnerabilities, and 5) demonstrates how RMSs are integrated into the project development process.

13.1 Defining Resource Management Strategies

A resource management strategy is a project, program, or policy that helps local and regional agencies and governments manage water and watershed resources. RMSs are key components of the California Water Plan Update (2009). The range of strategies is comprehensive. These diverse tools are designed to meet the resource management needs of each region and the state. Therefore, not all RMSs apply to each IRWM region. The combination of RMSs varies depending on distinctive features of a region—its geography, climate, water system, and watershed attributes, in addition to its land-use patterns and social conditions.

13.2 California Water Plan Resource Management Strategies

The intended purpose of RMSs is to encourage diverse approaches to solve water management issues as a means to mitigate for uncertain future circumstances and comply with Public Resource Code (PRC) Section 75026 and California Water Code Section 10541(e)(2) (DWR 2010). **Table 13-1** below lists all 29 state RMSs as represented in the California Water Plan Update (2009) and their corresponding management objectives. During the development of the Yuba County IRWMP Update, the California Water Plan Update (2013) also occurred. At the time of developing this IRWMP, the Public Review Draft of the Water Plan Update was made available with some additions to the state RMSs. While this document does not directly incorporate the new RMSs, upon review, new state RMSs, such as Water and Culture and Outreach and Engagement are strategies that the region is already employing through existing collaborative efforts, expanded outreach through the IRWMP Update, and through project development and integration efforts.

Table 13-1. State of California RMSs and Management Objectives ¹		
	RMS	Management Objective
1	Agricultural Lands Stewardship	Practice Resource Stewardship
2	Agricultural Water Use Efficiency	Reduce Water Demand
3	Conjunctive Management and Groundwater Storage	Increase Water Supply
4	Conveyance - Delta	Improve Operational Efficiency and Transfers of Water
5	Conveyance - Regional/Local	Improve Operational Efficiency and Transfers of Water
6	Crop Idling for Water Transfers	Improve Operational Efficiency and Transfers of Water
7	Desalination	Increase Water Supply
8	Drinking Water Treatment and Distribution	Improve Water Quality
9	Economic Incentives	Practice Resource Stewardship
10	Ecosystem Restoration	Practice Resource Stewardship
11	Flood Risk Management	Improve Flood Management
12	Forest Management	Practice Resource Stewardship
13	Groundwater Remediation/Aquifer Remediation	Improve Water Quality
14	Land Use Planning and Management	Practice Resource Stewardship
15	Matching Water Quality to Use	Improve Water Quality
16	Pollution Prevention	Improve Water Quality
17	Precipitation Enhancement	Increase Water Supply
18	Recharge Area Protection	Practice Resource Stewardship
19	Recycled Municipal Water	Increase Water Supply
20	Salt and Salinity Management	Improve Water Quality
21	Surface Storage - CALFED	Increase Water Supply
22	Surface Storage - Regional/Local	Increase Water Supply
23	System Reoperation	Improve Operational Efficiency and Transfers of Water
24	Urban Run-off Management	Improve Water Quality
25	Urban Water Use Efficiency	Reduce Water Demand
26	Water Transfers	Improve Operational Efficiency and Transfers of Water
27	Water-dependent Recreation	Practice Resource Stewardship
28	Watershed Management	Practice Resource Stewardship
29	Other Strategies such as Irrigated Land Retirement	Objectives Vary by Strategy

13.3 Documenting the Process for RMS Determination

The Yuba County IRWM region initiated the RMS determination process for the IRWMP Update by first identifying regional issues and conflicts which informed the development of goals and objectives. With the goals and objectives in place, the Regional Water Management Group (RWMG), the Yuba County IRWM region's governing body, considered the full range of RMSs found in the California Water Plan. They explored which RMSs were applicable to achieve the goals and objectives of the IRWMP. This sequence was undertaken to reinforce that RMSs are tools to address regional issues and meet multiple objectives. **Table 13-2** below illustrates the relationship between the Yuba County regionally identified goals and objectives and the corresponding, applicable RMS.

¹ State of California, Water Plan Update Volume 2 Resource Management Strategies, pp 1-6 (2009).

Table 13-2. The Relationship Between Goals and Objectives and RMSs	
Goals/Objectives	RMSs
Goal 1: Ensure adequate and reliable water supply that meets the diverse needs of the region	
1.1 Improve water supply system capacity, flexibility, and efficiency, including, but not limited to, optimizing existing water storage, upgrading and retrofitting aging infrastructure, and developing new infrastructure, where necessary.	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Delta ▪ Conveyance Local/Regional ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Matching Quality to Use ▪ Pollution Prevention ▪ Recharge Area Protection ▪ Recycled Municipal Water ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Water Transfers
1.2 Promote water conservation and water use efficiency by instituting various techniques including, but not limited to, groundwater recharge, conjunctive management, irrigation efficiencies, municipal water conservation, water recycling and reuse.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Irrigated Land Retirement ▪ Land Use Planning and Management ▪ Matching Quality to Use ▪ Pollution Prevention ▪ Recharge Area Protection ▪ Recycled Municipal Water ▪ Salt and Salinity Management ▪ Urban Runoff Management ▪ Urban Water Use Efficiency ▪ Water Transfers
1.3 Protect and restore water supplies that support wildlife species and watershed health.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Conjunctive Management and Groundwater ▪ Conveyance Local/Regional ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Irrigated Land Retirement ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recharge Area Protection ▪ System Reoperation ▪ Urban Runoff Management ▪ Water-Dependent Recreation ▪ Watershed Management ▪ Water Transfers

<p>1.4 Promote disaster preparedness and conservation planning efforts.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recycled Municipal Water ▪ Salt and Salinity Management ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Urban Runoff Management ▪ Urban Water Use Efficiency ▪ Watershed Management ▪ Water Transfers
<p>1.5 Maintain and enhance flood control infrastructure to protect water supplies.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Conveyance Regional/Local ▪ Flood Risk Management ▪ Land Use Planning and Management ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Urban Run-off Management ▪ Water Transfers
<p>1.6 Preserve water supplies that support recreational opportunities, ecosystem services, and agricultural uses.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recharge Area Protection ▪ Recycled Municipal Water ▪ System Reoperation ▪ Urban Run-off Management ▪ Water Transfers ▪ Water-Dependent Recreation ▪ Watershed Management
<p>1.7 Support regulatory compliance with current and future state and federal water supply standards.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Land Use Planning and Management ▪ Recharge Area Protection ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Water Transfers
<p>1.8 Promote regional education and outreach regarding water supply issues and needs.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Drinking Water Treatment and Distribution

<p>1.8 <i>continued</i></p>	<ul style="list-style-type: none"> ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Water-Dependent Recreation ▪ Watershed Management
<p>Goal 2: Protect, restore, and enhance water quality for water users and in support of healthy watersheds</p>	
<p>2.1 Protect and improve water quality by mitigating for urban, agricultural, and wildland/sediment run-off.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Watershed Management
<p>2.2 Minimize water quality impacts from flood, effluent discharge, and wastewater spills.</p>	<ul style="list-style-type: none"> ▪ Economic Incentives ▪ Flood Risk Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management
<p>2.3 Promote recreational activities and programs that minimize or mitigate impacts to water quality.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management ▪ Water-Dependent Recreation ▪ Watershed Management
<p>2.4 Protect and improve the water quality of water generated by healthy, forested watersheds.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management ▪ Watershed Management
<p>2.5 Maintain and improve water quality required to restore and protect freshwater ecosystems, fisheries, and groundwater-dependent habitat.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Pollution Prevention ▪ System Reoperation ▪ Urban Run-off Management

2.5 <i>continued</i>	<ul style="list-style-type: none"> ▪ Urban Water Use Efficiency ▪ Watershed Management
2.6 Support regulatory compliance with current and future state and federal water quality standards.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Forest Management ▪ Groundwater/Aquifer Remediation ▪ Matching Quality to Use ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Salt and Salinity Management ▪ System Reoperation ▪ Urban Run-off Management ▪ Watershed Management
2.7 Protect public and ecosystem health from the physical and chemical hazards of Abandoned Mine Lands (AMLs).	<ul style="list-style-type: none"> ▪ Ecosystem Restoration ▪ Pollution Prevention ▪ Forest Management ▪ Watershed Management
Goal 3: Preserve and restore watershed health and promote environmental stewardship	
3.1 Steward healthy forests through fire and fuels management, erosion control measures, and wetland restoration.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Watershed Management
3.2 Identify and manage for aquatic and terrestrial invasive species and their impact on water supply infrastructure and watershed health.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Conveyance Regional/Local ▪ Ecosystem Restoration ▪ Forest Management ▪ Storage Local/Regional ▪ Watershed Management
3.3 Recover endangered and threatened fish species through habitat restoration and by addressing access to historic habitat, wherever feasible.	<ul style="list-style-type: none"> ▪ Conveyance Regional/Local ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ System Reoperation ▪ Watershed Management
3.4 Enhance floodplain function and wildlife habitat while achieving multiple flood management benefits and maintaining public safety.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Irrigated Land Retirement ▪ Land Use Planning and Management ▪ Recharge Area Protection ▪ System Reoperation ▪ Watershed Management
3.5 Promote watershed-level remediation of legacy mining toxins.	<ul style="list-style-type: none"> ▪ Ecosystem Restoration ▪ Forest Management ▪ Pollution Prevention

3.5 <i>continued</i>	<ul style="list-style-type: none"> ▪ Watershed Management
3.6 Support environmental protections to prevent the extinction of economically, ecologically, and culturally significant species.	<ul style="list-style-type: none"> ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recharge Area Protection ▪ System Reoperation ▪ Watershed Management
3.7 Steward the region’s biodiversity and ecological resources that directly provide opportunities for public access, recreation, and education while maintaining the co-equal objectives of flood protection and preservation of agricultural lands.	<ul style="list-style-type: none"> ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Water-Dependent Recreation ▪ Watershed Management
Goal 4: Enhance regional economic development by supporting recreational opportunities and sustainable agriculture	
4.1 Promote comprehensive recreation planning and implementation with a focus on regional economic development.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Forest Management ▪ Land Use Planning and Management ▪ Water-Dependent Recreation ▪ Watershed Management
4.2 Enhance river access points to encourage recreational use while preserving flood control/water storage infrastructure and managing for human impacts to watershed health.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Land Use Planning and Management ▪ Water-Dependent Recreation ▪ Watershed Management
4.3 Create river corridor linkages while enhancing migration corridors for plants and animals.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Water-Dependent Recreation ▪ Watershed Management
4.4 Explore opportunities to increase water-dependent tourism throughout the region while building local communities’ capacity to manage their recreational resources.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Water-Dependent Recreation ▪ Watershed Management
4.5 Protect and restore working landscapes, particularly ranch/ag lands, and the watershed benefits they provide.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Salt and Salinity Management ▪ Watershed Management

<p>4.6 Promote regulations that support local and regional economic resiliency by working with and among regulatory agencies to: 1) reduce regulatory conflicts, 2) ensure consistent enforcement of regulations, and 3) reduce costs and difficulty of meeting regulatory compliance.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Conjunctive Management and Groundwater Storage ▪ Economic Incentives ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recharge Area Protection ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Watershed Management
<p>Goal 5: Protect public safety through emergency and drought preparedness and integrated flood management</p>	
<p>5.1 Improve integrated flood management to ensure emergency preparedness, increase flood protection, and enhance regional and interregional collaboration.</p>	<ul style="list-style-type: none"> ▪ Conveyance Regional/Local ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Irrigated Land Retirement ▪ Land Use Planning and Management ▪ Recharge Area Protection ▪ System Reoperation ▪ Urban Run-off Management ▪ Watershed Management
<p>5.2 Support regional and interregional collaboration to improve drought and emergency preparedness.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Delta ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Flood Risk Management ▪ Forest Management ▪ Irrigated Land Retirement ▪ Land Use Planning and Management ▪ Storage Local/Regional ▪ System Reoperation ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Water Transfers ▪ Watershed Management
<p>Goal 6: Address climate vulnerabilities and reduce greenhouse gas emissions</p>	
<p>6.1 Support efforts to reduce greenhouse gas emissions in the region, particularly those directly related to water management operations.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Watershed Management

<p>6.2 Improve data modeling and technical analyses to better understand the impacts of climate change on regional and interregional water supply and watershed health.</p>	<ul style="list-style-type: none"> ▪ Conjunctive Management and Groundwater Storage ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Recharge Area Protection ▪ System Reoperation ▪ Watershed Management
<p>6.3 Increase system flexibility and resiliency to adapt to climate variability.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management/Groundwater Storage ▪ Conveyance Regional/Local ▪ Drinking Water Treatment and Distribution ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Recycled Municipal Water ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Water Transfers ▪ Watershed Management
<p>6.4 Promote alternative energy and energy efficiency throughout the region.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Watershed Management
<p>6.5 Promote education about climate change and its impacts on water management and watershed health throughout the region.</p>	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Agricultural Lands Stewardship ▪ Drinking Water Distribution and Treatment ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Recycled Municipal Water ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Water-Dependent Recreation ▪ Watershed Management
<p>6.6 Promote regional and interregional collaborations to implement climate change adaptive management strategies.</p>	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management/Groundwater Storage ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recharge Area Protection ▪ Urban Water Use Efficiency ▪ System Reoperation

6.6 <i>continued</i>	<ul style="list-style-type: none"> ▪ Urban Water use Efficiency ▪ Water Transfers ▪ Watershed Management
Goal 7: Promote equitable distribution of resources to disadvantaged communities and Tribes across the region	
7.1 Support DAC and Tribal project development/ implementation activities by providing ongoing outreach, proposal and funding development assistance, and training.	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Recycled Municipal Water ▪ Urban Run-off Management ▪ Urban Water Use Efficiency ▪ Water-Dependent Recreation ▪ Watershed Management
7.2 Prioritize ongoing participation of DACs and Tribes in the Regional Water Management Group	<ul style="list-style-type: none"> ▪ Economic Incentives
7.3 Foster partnerships to build the capacity of DACs and Tribes throughout the region to manage their own recreational amenities.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Conjunctive Management ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Water-Dependent Recreation ▪ Watershed Management
7.4 Promote regional education and outreach in collaboration with DACs and Tribes.	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management ▪ Drinking Water Treatment and Distribution ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Recycled Municipal Water ▪ Urban Water Use Efficiency ▪ Watershed Management

13.3.1 Rationale for RMS Determination

Table 13-3 below illustrates the RMSs that were identified by the RWMG as applicable to the region. A rationale for each RMS determined as “not applicable to the region” is included in the table. The mix of 27 RMSs displayed in **Table 13-3** demonstrates the breadth of potential water management tools available to Yuba County IRWM region stakeholders.

The RMS structure will be used by the RWMG into the future to support Plan updates in response to ongoing and new studies and policies, development of new data, and new issues that emerge. Future Plan updates will consider whether strategies identified as “not applicable” in this IRWMP Update may become applicable in response to changing conditions. Additionally, in subsequent updates, the RWMG will formally consider new RMSs as identified through the 2013 California Water Plan Update when that document is adopted.

Table 13-3. Resource Management Strategies Applicable to the Yuba County IRWM Region		
State RMS (DWR 2012 Guidelines) (Applicable RMSs are numbered)	RMSs Applicable to Yuba Region	Rationale for Determination
Reduce Water Demand		
1. Agricultural Water Use Efficiency	Yes	Agriculture is the single largest land use in the Yuba County IRWM region (over 50 percent). The sector is also the largest water user in the region (80 percent), mostly for irrigated crops. Water use efficiency is already being practiced by water purveyors in the region and on-farm. Efficiency improvements in on-farm irrigation equipment, crop and farm management, and water supply management and distribution systems to reduce water demand will continue to be key considerations in the Yuba County IRWM region.
2. Urban Water Use Efficiency	Yes	Urban water purveyors in the Yuba County IRWM region have estimated, and are on track to comply with, their 2020 targets outlined in their Urban Water Management Plans and required by legislation. Additionally, several Yuba County DACs have elected to employ practices consistent with the 20x2020 targets despite the fact that they are not technically subject to the legislation. In light of climate change and drought conditions, this strategy will continue to be a key consideration to reduce the water demand of residential, commercial, industrial, and institutional water users.
Improve Operational Efficiency and Transfers		
3. Conveyance – Delta	Yes	YCWA currently is party to a water purchase agreement in cooperation with state and federal water project operations which transfers water south of Delta for statewide uses, making it subject to Delta conveyance plans.
4. Conveyance – Regional/ Local	Yes	While the Yuba County IRWM region is one of the smallest IRWM region’s in the state, it houses significant local and regional conveyance facilities, most notably YCWA’s Yuba River Development Project (FERC No. 2246). Managing the region’s conveyance system will continue to be a central priority to specifically address maintenance and improvements of aging infrastructure, impacts to fish and habitat, as well as flooding impacts and levee maintenance.
5. System Reoperation	Yes	The FERC-licensed facilities in the region will require ongoing consideration of this issue. Reoperation to address specific needs, to improve efficiency and water supply reliability as well as reoperation in anticipation of future climate-related changes are all key considerations for the Yuba County IRWM region.
6. Water Transfers	Yes	Water is transferred in the region through interbasin transfers and YCWA conducts water transfers south of Delta as stated in #3. This strategy will continue to be employed in the region. Additionally, it is a key consideration for regional drought preparedness as it allows for coordinated regional response to both short-term and climate-change supply issues.
Increase Water Supply		
7. Conjunctive Management and Groundwater Storage	Yes	Conjunctive management is an established and integrated management strategy of the Lower Yuba River Accord. Also, YCWA and local irrigation districts have established a comprehensive groundwater management program. It will continue to constitute a key consideration in the region. Additionally, regional reliance upon groundwater is substantial, as all five urban water purveyors in the region rely solely on groundwater for municipal use. This reliance could increase given projected climate change trends, further prioritizing this strategy for the region.

Desalination	Not applicable	Not applicable because of distance from coastal zone.
Precipitation Enhancement	Not applicable	Currently cloud seeding is not applied in the region.
8. Recycled Municipal Water	Yes	While recycled water has generally not been used in the Yuba County IRWM region, some water purveyors in the region are considering assessing potential benefits of establishing a program.
9. Surface Storage – CALFED/ State	Not applicable	This RMS is not applicable to the region.
10. Surface Storage – Regional/Local	Yes	Surface storage is actively used as a resource management strategy in the region for water supply, flood control, and hydropower generation. Ongoing dialogue will take place regarding enhanced surface storage options in light of projected climate-change impacts.
Improve Water Quality		
11. Drinking Water Treatment and Distribution	Yes	Evolving drinking water quality standards (regulations) and new technology will keep this strategy relevant, as will the ability of regional DACs to meet these water quality standards. Distribution system efficiencies and upgrades are a key concern.
12. Groundwater Remediation/Aquifer Remediation	Yes	While groundwater remediation is not currently being utilized as an RMS, there are some undocumented cases of groundwater contamination. Also, there is some concern about possible groundwater contamination that may occur if a proposed landfill is developed in the City of Wheatland.
13. Matching Quality to Use	Yes	YCWA's conjunctive management program and the Lower Yuba River Accord actively match quality of water to the respective uses. Municipal water purveyors in the region are considering recycled water programs that would match quality to use. However, the costs associated with infrastructure are a key concern in realizing the potential of this resource management strategy throughout the region.
14. Pollution Prevention	Yes	There are several Clean Water Act Section 303(d)-listed water bodies in the Yuba County IRWM region for pollutants/stressors including pH, mercury, arsenic, temperature, chlorpyrifos, copper, diazinon, Group A pesticides, and BCPs. In addition to the aforementioned pollutants and stressors, sedimentation and ongoing monitoring are issues that are an active focus and will need to be addressed through Plan implementation.
15. Salt and Salinity Management	Not currently applicable	No documented impacts of salt or salinity have been reported in the region. However, with a potential increase in water recycling programs, salt and salinity management may become a more relevant RMS for the region in the future.
16. Urban Runoff Management	Yes	Yuba County is projected to grow substantially within the time horizon of this Plan. Increased development can impact water quality both from a greater level of disturbance and general traffic, and from runoff from constructed surfaces and roads. Moreover, if the climate dries, as projected, less water will be available for dilution of pollutants. The Yuba County IRWM region stakeholders are interested in programs that consider the link between natural resource management and protection of the region's water quality.
Improve Flood Management		
17. Flood Risk Management	Yes	Flooding and flood management have been identified as major issues by stakeholders in the Yuba County IRWM region, especially in the Central Valley where most of the region's population resides, and agricultural production is vulnerable. Flooding has been a recurrent and often extensive occurrence that has had significant social and economic impacts. Integrated flood management, disaster mitigation and flood plans, and projects that prioritize flood control

		and floodplain restoration to attenuate flooding will continue to be priority strategies for the Yuba County IRWM region.
Practice Resources Stewardship		
18. Agricultural Lands Stewardship	Yes	As previously stated, agricultural land use is the largest single land use in the planning area, both the irrigated agricultural and grazing/pasture operations and lands in the region are key to the local economy and open space values. Ongoing strategies include on-farm BMPs, potential for carbon sequestration on pasture lands, and working to identify crops that are appropriate to climate change considerations. Agricultural lands constitute an integral feature of flood management to the region and will continue to function as an essential flood control strategy.
19. Economic incentives (Loans, Grants, and Water Pricing)	Yes	Water-pricing incentives are already in use in the region and will continue to play a role, particularly in response to impacts of supply due to climate change.
20. Ecosystem Restoration	Yes	Yuba County IRWM regional stakeholders are engaged in ongoing ecosystem restoration activities, including floodplain restoration, riparian reforestation, habitat restoration for salmonids and other in-stream biota, vernal pool restoration, remediation of mining toxins, and fire and fuels management for forest health. These restoration activities will continue to constitute key strategies for the region.
21. Forest Management	Yes	In the upper watershed and in the areas around New Bullards Bar Reservoir, there are federally owned or privately managed forest lands. Study of the impacts of a variety of management strategies and pilot projects is already ongoing and will continue. A key evaluation of climate change is focused on the impacts of catastrophic wildfire.
22. Recharge Area Protection	Yes	The 2010 Yuba County Water Agency Groundwater Management Plan suggests that runoff and recharge from agricultural irrigation may be a significant contributor to overall groundwater, offering over 30 percent of recharge from percolation of applied surface water. Yuba County population growth projections indicate that a significant percentage of agricultural lands in the county will be urbanized. This future condition may pose a threat to groundwater recharge in the region and highlight the need to protect these recharge areas.
23. Water-Dependent Recreation	Yes	Water-dependent recreation is an economic driver for the region. Many stakeholders have voiced interest in expanding water-dependent recreation to enhance the regional economy through project implementation. Balancing the expansion of water-dependent recreation and human impacts to watershed health, public safety, and flood management will be key considerations.
24. Watershed Management	Yes	Issues associated with watershed management are of central importance to stakeholders in the Yuba County IRWM region. Stewardship of watershed lands will continue to be reflected in IRWMP projects and inter-IRWMP coordination activities.
Other Strategies		
25. Crop Idling for Water Transfers	Not currently applicable	In light of climate-change projections of climate drying and more precipitation and less snowmelt, this management strategy, while currently not in use, may be considered in the future to enhance water supply reliability, enhance water quality, and protect and restore fish and wildlife resources. While this strategy is not currently employed, the Yuba County Board of Supervisors made the determination that crop idling could not be used as a strategy to facilitate water transfers outside of the Yuba County IRWM region.

26. Irrigated Land Retirement	Yes	In light of climate change projections of climate drying and more precipitation and less snowmelt, this management strategy may be considered to enhance water supply reliability, enhance water quality, and protect and restore fish and wildlife resources.
27. Land Use Planning and Management	Yes	The Yuba County Planning and Community Services division is actively engaged in the Yuba County IRWMP Update. Land use planners and water managers will continue to coordinate activities, particularly when considering population growth projections for the region.

13.4 Regional RMSs that Address Climate Change Vulnerabilities

The climate change working group, known as the Core Group, articulated and prioritized regional climate change vulnerabilities and adaptive management strategies, as described in Chapter 11 *Climate Change*. **Table 13-4** identifies applicable regional RMSs that address high-priority climate change vulnerability issues.

Table 13-4. Regional Resource Management Strategies that Address Climate Change Vulnerabilities		
Climate Change Vulnerability	Description of Possible Impacts of Vulnerabilities	RMS Addressing Climate Change
Water Supply/Demand	<ul style="list-style-type: none"> ▪ Camptonville and other foothill communities/rural areas currently suffer water shortages ▪ Camptonville’s summer user demand and Title 22 requirements exceed the capacities of the water treatment system ▪ Reduced water supply reliability ▪ Agriculture water use may be the most vulnerable to climate change ▪ Environmental flows also will likely be affected by increasing temperatures, erratic rainfall, and earlier snowmelt ▪ Reservoir storage levels decline for the summer months and some lack carryover capacity (>2 years) ▪ Declining snowpack increases the risk of supply uncertainty ▪ Changes will be required for basin-wide management and storage of water, especially for irrigation ▪ Groundwater extraction in reaction to climate change has the potential to affect wetland-dependent, riparian, and aquatic habitats ▪ State water policies and out-of-region demands (e.g., Delta) could affect water supply as much as the impacts from climate change ▪ Increased frequency of water transfers within the context of a finite water supply ▪ Ability to deliver water transfers may be jeopardized ▪ Out-of-region diversions may decrease ▪ State water policies and out-of-region demands (e.g., Sacramento-San Joaquin Delta) could affect water supply management as much as the direct effects of climate change ▪ Climate change-related surface water decreases could increase future groundwater demands and out-of-area transfer demands ▪ Urbanization; changes in technology; and timing of crop planting, development, and harvest could result in altered timing and demand for irrigation water ▪ Conflicts may increase among agricultural, domestic, flood control, hydrogeneration, and environmental water management 	<ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Delta ▪ Conveyance Local/Regional ▪ Ecosystem Restoration ▪ Forest Management ▪ Irrigated Lands Retirement ▪ Land Use Planning and Management ▪ Matching Quality to Use ▪ Recharge Area Protection ▪ Recycled Municipal Water ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Urban Water Use Efficiency ▪ Water Transfers ▪ Watershed Management

	<ul style="list-style-type: none"> ▪ Further data is needed to fully manage the region’s groundwater 	
Water Quality	<ul style="list-style-type: none"> ▪ Camptonville’s water quality suffers during heavy rain events, requiring the treatment plant to be shut down due to turbidity ▪ Increased algae could reduce delivery capacity and increase the need for filtering of irrigation infrastructure in localized areas ▪ Peak storm events may increase transport of mercury from stream channels, with related potential for increased methylmercury ▪ Decreased overall supply would likely result in a higher concentration of pollutants ▪ Increased water temperatures may significantly impact aquatic ecosystems ▪ Fluctuating reservoir water levels due to increased climate variability could result in increased sedimentation and reservoir storage and maintenance problems ▪ Removal of vegetation from increased wildfire could result in increased erosion and sedimentation 	<ul style="list-style-type: none"> ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Pollution Prevention ▪ Urban Run-off Management ▪ Watershed Management
Infrastructure (water storage and conveyance)	<ul style="list-style-type: none"> ▪ Water storage infrastructure was designed for a historic demand, and may not accommodate increased winter peak flows, or have adequate carryover storage for drought periods ▪ The conveyance system was designed for a certain demand; therefore, inadequate peaking capacity may exist during times of extraordinary heat (for irrigation demand) ▪ Conflicts over storage may increase among agricultural, domestic, hydropower, flood control, and environmental needs 	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Surface Storage Regional/Local ▪ Conveyance Delta ▪ Conveyance Regional/Local ▪ Flood Risk Management ▪ Land Use Planning and Management ▪ System Reoperation ▪ Water Transfers ▪ Watershed Management
Flooding	<ul style="list-style-type: none"> ▪ Increased storm intensity and severity puts communities, critical infrastructure, and protective levees at greater risk ▪ Responses to increased flood risk could impact water delivery for regional demands and hinder YCWA’s ability to transfer stored water ▪ Flooding infrastructure was designed for historic flood regimes and to protect substantially less human development, and may increase conflicts/complexity in managing for both storage and flood control 	<ul style="list-style-type: none"> ▪ Conveyance Regional/Local ▪ Flood Risk Management ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Water Transfers ▪ Watershed Management
Species and Habitat	<ul style="list-style-type: none"> ▪ Vegetative communities are expected to move upslope with significant loss of subalpine and alpine vegetation and large increases in hardwoods and grasslands ▪ Climate variation is projected to affect foothill woodland and chaparral vegetation and the rare and unique species they support ▪ Decreases in surface flows may threaten fish and other aquatic life 	<ul style="list-style-type: none"> ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Delta ▪ Conveyance Regional/Local ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Recharge Area Protection ▪ System Reoperation

		<ul style="list-style-type: none"> ▪ Watershed Management
Wildfire	<ul style="list-style-type: none"> ▪ Fire risk is projected to rise significantly at higher elevations by 2085 ▪ Local conditions exacerbate future fire risks for Yuba County ▪ Research has identified high fire hazards in even-aged silvicultural systems (clear-cut conifer plantations) such as those located north and east of New Bullards Bar Reservoir 	<ul style="list-style-type: none"> ▪ Ecosystem Restoration ▪ Forest Management ▪ Land Use Planning and Management ▪ Watershed Management
Socioeconomics	<p><u>Public Health and Safety</u></p> <ul style="list-style-type: none"> ▪ Increased potential for flood risk could result in human and economic losses ▪ Flooding and heat waves may have the greatest effects on disadvantaged/under-represented communities ▪ The northern two-thirds of the county’s critical facilities are exposed to fire-threat hazard ▪ Residential development is taking place in fire-adapted vegetation, increasing potential for human and economic loss ▪ Increased fire-threat hazards will increase fire management costs <p><u>Agriculture</u></p> <ul style="list-style-type: none"> ▪ Greater evapotranspiration may lead to conditions less suitable for traditional crop types ▪ Heat-sensitive crops and livestock likely will be vulnerable to prolonged high temperatures ▪ Lost revenues from climate-related events will potentially negatively affect regional income, employment, and tax revenues ▪ Water deficits could hasten conversion of agricultural land to urban uses <p><u>Hydropower Production</u></p> <ul style="list-style-type: none"> ▪ Climate impacts on high-elevation hydropower production would have wide-ranging effects ▪ Climate adaptation will likely require a combination of operating changes to hydrogeneration facilities, with related secondary impacts to water facilities and delivery; even so, generation losses are probable ▪ Revenue losses from hydropower are projected. Decreased hydropower production coupled with increased summer energy demands could affect the local economy <p><u>Recreation</u></p> <ul style="list-style-type: none"> ▪ Recreational pursuits and tourism could be affected by low flows ▪ Projected low flows may not be sufficient to sustain FERC-licensed rafting flows, having secondary negative effects on the local economy ▪ Recreational forest resources are likely to be affected by 	<ul style="list-style-type: none"> ▪ Agricultural Lands Stewardship ▪ Agricultural Water Use Efficiency ▪ Conjunctive Management and Groundwater Storage ▪ Conveyance Regional/Local ▪ Economic Incentives ▪ Ecosystem Restoration ▪ Flood Risk Management ▪ Forest Management ▪ Land Use Planning and Management ▪ Surface Storage Regional/Local ▪ System Reoperation ▪ Water-Dependent Restoration ▪ Watershed Management

	<p>changes in flow regime</p> <p><u>Timber Harvest</u></p> <ul style="list-style-type: none"> ▪ Potential climatic changes are expected to affect type, location, and amount of timber inventories, but may generate need for alternative timber management/production and fuels reduction project 	
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13.5 Integrating RMSs into Project Application, Development, and Review

RMSs were integrated into all aspects of project application, development, and review. The RMS framework was used extensively to ensure a linkage between issues, RMSs, goals and objectives, adaptive management strategies, and individual project development.

The Yuba County IRWMP application form (*Project Solicitation Form*) included an RMS section requiring project sponsors to indicate which applicable state RMSs were employed by the proposed projects. The project proponents were further asked to provide a brief explanation of how the projects incorporated the named RMSs. Following the initial application, the project team collaborated with each project sponsor to refine their strategies, ensuring that each project considered the full range of applicable RMSs and applied the appropriate tools or strategies to the development of their projects. Finally, RMSs constitute one of the nine criteria used to review projects for IRWMP inclusion. In the Project Review Criteria, Project Integration and Multiple Resource Management Strategies are combined to form one criterion. Please Refer to Chapter 14 *Project Application, Development, and Review* for more information.