

EXECUTIVE SUMMARY

Integrated Regional Water Management (IRWM) is an initiative by California’s resource management agencies and local agencies that promotes an informed, collaborative, locally-driven approach to water resource management. At the core of the IRWM program is an IRWM Plan (IRWMP or Plan) developed by self-forming Regional Water Management Groups (RWMGs). The state IRWM program under the direction of the Department of Water Resources (DWR) provides standards that guide Plan development but the region-specific goals, priorities, strategies are for the RWMG and stakeholders to establish through a comprehensive, consensus-based, planning process.

The first IRWM Plan for the Santa Cruz Region was adopted in 2005 by six partner agencies. That Plan integrated various existing studies and programs to provide a framework for managing this region’s water and water-related resources. The Plan characterized the region’s conditions, issues, and needs and identified resource management strategies and projects to incrementally address these issues. In 2006, the Region successfully applied for a \$12.5 million IRWM Implementation Grant from the State Water Resources Control Board (SWRCB). This award, paired with \$17 million in local funding, enabled the completion of high priority projects identified in the initial IRWM Plan. From 2008 – 2013, 65 projects were completed at more than 80 sites throughout the County.

Santa Cruz IRWM:

- Promotes regional collaboration in managing water resources across jurisdictional and political boundaries
- Provides a cooperative framework for integrated planning in the region
- Identifies strategies, programs, and projects to address the region’s needs
- Opens the door to state and federal funding opportunities

In 2012, the Santa Cruz RWMG initiated an update to the 2005 IRWM Plan to ensure that it remains current in addressing the region’s water resources challenges and that it complies with the standards contained in the state’s 2012 Integrated Regional Water Management Grant Program Guidelines. The update expands upon the 2005 IRWM Plan, responds to the guidelines, and identifies ongoing regional water resources-related challenges and opportunities. Financial assistance from a DWR IRWM Planning Grant and contributions from the participating Santa Cruz agencies funded the development of this Plan and key technical studies.

The purpose of the Santa Cruz IRWM Plan is to develop a cooperative regional framework for water resources management that supports the identification and implementation of high priority projects and programs to address the challenges facing the region. This IRWM Plan is not intended to supersede local planning efforts; rather the intent of the IRWM Plan is to reflect those efforts, provide a regional context, and to support stakeholders in the IRWM process. As regional goals, objectives, and priorities evolve over time, the IRWM Plan will be adapted and updated to meet the changing needs of the region.

CHAPTER 1: INTRODUCTION

This chapter provides background on the IRWM program, the 2002 state legislation that established the IRWM program, the formation of the Santa Cruz region, and a summary of the Region’s IRWM planning and implementation efforts.

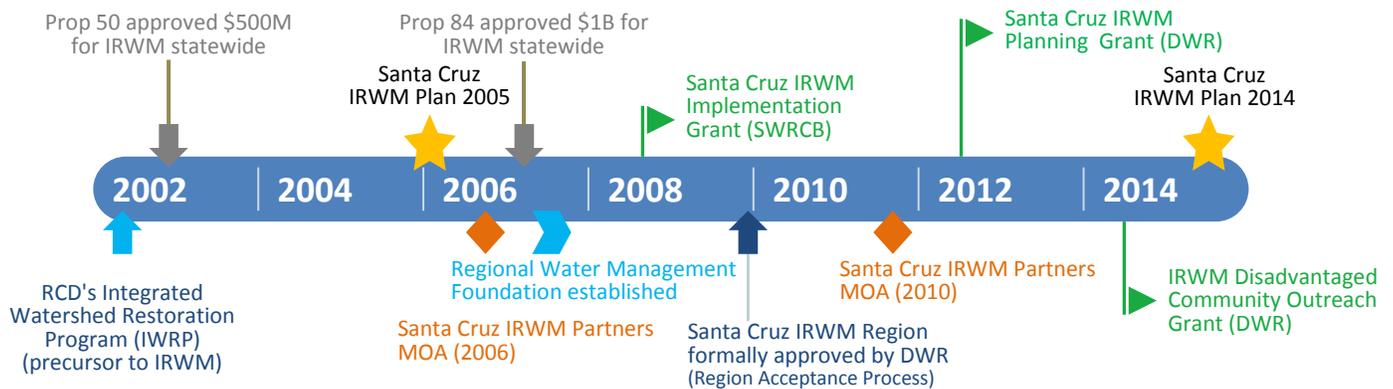


Figure ES-1. Timeline of Integrated Regional Water Management (IRWM) Program and Related Efforts

CHAPTER 2: GOVERNANCE

Chapter 2 describes the IRWM governance structure, the participating agencies and their management responsibilities, stakeholders, decision making, communications, opportunities for participation, and the process for future interim and formal Plan updates.

REGIONAL WATER MANAGEMENT GROUP

For the Santa Cruz IRWM program, the RWMG consists of nine local agencies with statutory authority over water management and related resources. They include:

- Central Water District
- City of Santa Cruz
- City of Watsonville
- County of Santa Cruz
- County Sanitation District
- Davenport County Sanitation District
- Resource Conservation District of Santa Cruz County
- Scotts Valley Water District
- Soquel Creek Water District



STEERING COMMITTEE

The IRWM Steering Committee is an active, decision-making sub-group of the RWMG that is designed to be broadly representative of the RWMG yet small enough to effectively make decisions in a timely manner. The Steering Committee is composed of three members selected from the RWMG, and appointed to ensure representation for each of the four functional planning areas – water supply, water quality, watershed resources, and flood and stormwater management. The Steering Committee currently consists of the County Water Resources division director, the executive director of the Resource Conservation District, and a water supply agency director/district general manager. The Steering Committee provides information and consults with the RWMG, and performs the following functions on behalf of the RWMG:

- guides IRWM Plan implementation;
- acts as a liaison to the Regional Water Management Foundation (see below) and all stakeholders, including state agencies, elected officials, and the public;
- coordinates funding proposals;
- promotes project integration of multi-benefit projects;
- ensures stakeholder participation; and,
- tends to administrative matters concerning IRWM efforts.

REGIONAL WATER MANAGEMENT FOUNDATION

The Regional Water Management Foundation (RWMF) was created in 2007 to serve an administrative role for the first IRWM Implementation grant awarded to the region and has subsequently provided a similar role on IRWM Planning grants. The RWMF is a separate 501(c)(3) tax-exempt nonprofit organization established as a subsidiary of the Community Foundation Santa Cruz County. In addition to serving as the fiscal agent, the RWMF also provides ongoing management and administration for the IRWM grants awarded to the region. The RWMF is guided by a seven-member Board of Directors consisting of four members appointed by the Community Foundation and the three members of the IRWM Steering Committee.

STAKEHOLDERS

The intent of IRWM stakeholder engagement is to engage, inform and provide opportunities for the region's diverse range of resource agencies, municipalities, local districts, interest groups, and residents to actively participate in IRWM efforts by providing opportunities to participate on an ongoing basis. The stakeholder engagement sought to ensure the diverse interests and perspectives were considered in establishing the region's water management goals, objectives, strategies and priorities. Local agencies, organizations, and stakeholders had opportunities for input on Plan development and specific projects through meetings and workshops and the broader community informed through boards, advisory groups, meetings and events.

MEMORANDUM OF AGREEMENT

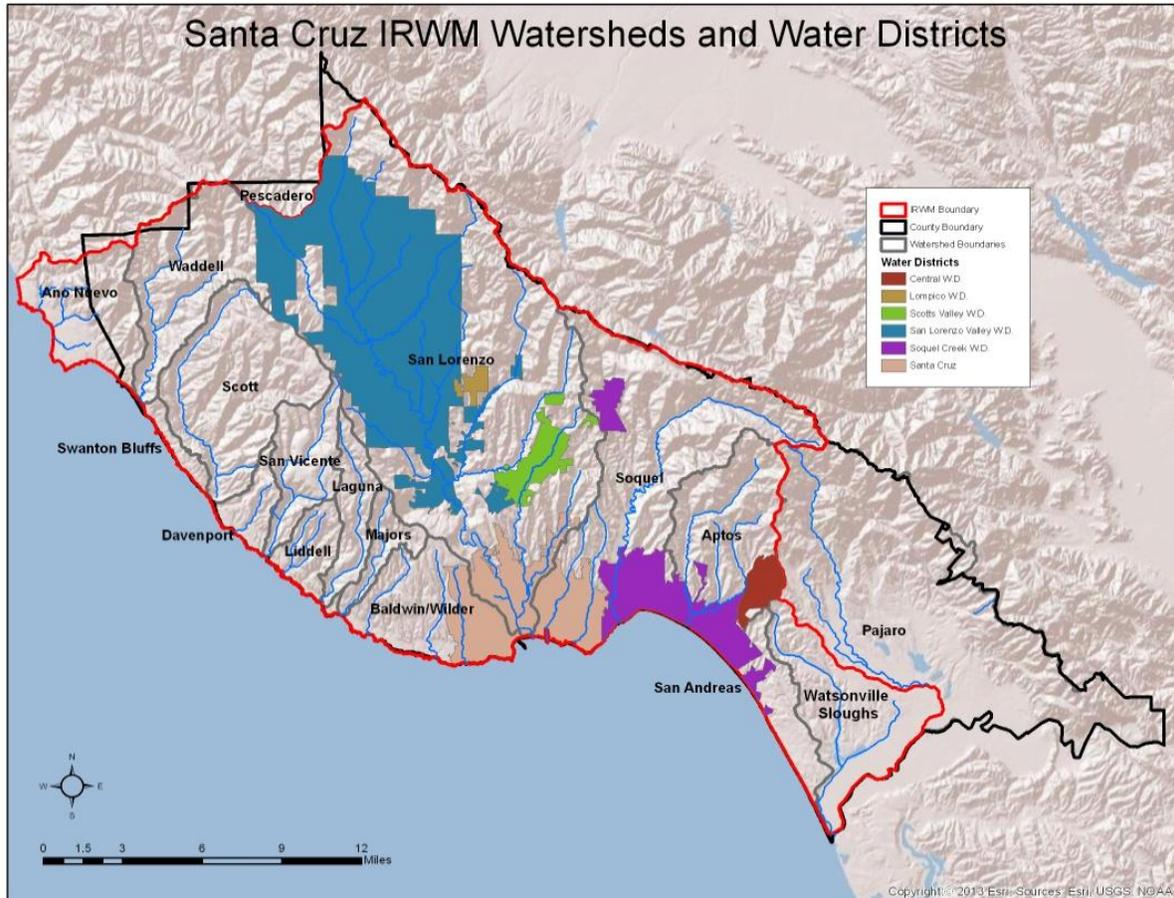
Each of the nine RWMG members is signatory to the 2010 Memorandum of Agreement for the Santa Cruz Integrated Regional Water Management Plan (MOA). The MOA establishes the institutional framework for the joint efforts of the participating agencies in developing, implementing, and updating the IRWM Plan.

FUTURE PLAN UPDATES

This IRWM Plan is intended to be a living document to be updated as conditions change, new issues arise, or as new projects need to be added. Minor changes to the Plan will be addressed by the Steering Committee through informal, interim amendments. Formal updates will occur for significant changes to the Plan, such as organizational structure and governance, water management conditions, or goals and objectives, and will require approval of the RWMG. An IRWM Plan update is a time and resource intensive undertaking. State guidelines encourage IRWM regions to formally review, revise, and adopt the IRWM Plan no less frequently than every five years. The RWMG will strive to adhere to this recommendation.

CHAPTER 3: REGION DESCRIPTION

Chapter 3 describes the physical, environmental, social, and demographic characteristics of the Region, provides an overview of its water systems, and identifies key issues and challenges facing the Region.



Although relatively small geographically, the Santa Cruz IRWM region features a complex mix of entities involved with water resources management who face a number of water supply, environmental, and social issues. The Region generally mirrors Santa Cruz County, and includes approximately 95% of the population and 85% of the geographic extent of County. The eastern and western boundaries are defined by the ridgeline of the Santa Cruz Mountains and the coastline of the Pacific Ocean, respectively. The northern boundary is roughly based on the County's boundary and the boundary between the Whitehouse Creek and Gazos Creek watersheds, which straddle the County line. The southern boundary is an overlapping border with the Pajaro River IRWM Region. Most of the Santa Cruz County portion of the Pajaro River watershed is addressed by the adjacent Pajaro River Watershed IRWM Region with the exception of the Watsonville Sloughs, for which both regions share management responsibilities. Specifically, the Santa Cruz IRWM Plan is responsible for water quality and watershed resource management in the shared area whereas the Pajaro IRWM Plan is responsible for water supply and flood management.

The following sections describe general and specific water resource issues and challenges in the Santa Cruz Region.

WATER SUPPLY

The Region relies entirely on rainfall, surface water, and groundwater within watersheds located in the County; no water is imported from outside the region. Water supply is not sustainable within the Region in years with normal precipitation, a situation that is exacerbated when below average water years occur. On average, the City of Santa Cruz obtains 79% of its supply from the San Lorenzo River and North Coast streams and 17% from Loch Lomond Reservoir on Newell Creek. The reliance upon surface water makes this supply vulnerable during dry years when there is inadequate supply to meet demands and aquatic habitat needs. Groundwater is the primary source of supply for agencies and residents in the mid and southern portion of the county. Groundwater basins are in a state of overdraft from long-term extraction rates exceeding the natural rate of recharge and replenishment. Streams and groundwater basins are both subject to extraction by private pumpers and agricultural users.

SURFACE WATER QUALITY

Water quality impairments caused by elevated bacteria and sediment levels are among the most pressing water quality concerns in the region. Elevated bacteria levels in surface waters can limit recreational activities and create human health threats. The supply of sand-sized sediment to streams significantly degrades the aquatic habitat quality, resulting in a myriad of negative ecosystem impacts that particularly affect the spawning and rearing habitat of sensitive salmonid species.

GROUNDWATER QUALITY

Seawater intrusion is occurring in the mid-County and Watsonville Sloughs watersheds, jeopardizing that source of supply. Much of the Region's groundwater has naturally high concentrations of arsenic and chromium VI, and newly proposed regulations by the State of California may require significant investments in treatment infrastructure to meet the new standard.

WATERSHED RESOURCES

Riparian encroachment and hydrologic modifications of wetlands, streams, estuaries, and lagoons impact the preservation and quality of habitat by affecting circulation (water quality), habitat structure (geomorphology), and the exchange of energy and nutrients.

FLOOD AND STORMWATER MANAGEMENT

Several areas of the Region have experienced flooding resulting in loss of life and significant economic impacts. Stormwater nuisance flooding is an ongoing concern in several low-lying areas, and stormwater regulations present a significant, unfunded mandate.

CLIMATE CHANGE

Findings from a 2012 U.S. Geologic Survey¹ study showed strong evidence for temperature increases in the future for the Santa Cruz Region along with altered patterns of rainfall and runoff and reduced recharge. Projected sea level rise will also challenge portions of water-related infrastructure and increase potential for flooding of coastal areas and channels.

¹ Flint, L.E., and Flint, A.L., 2012, Simulation of climate change in San Francisco Bay Basins, California: U.S. Geological Survey Scientific Investigations Report 2012-5132, 55 p.

CHAPTER 4: GOALS AND OBJECTIVES

Chapter 4 presents the goals and objectives for the Plan, and describes how they were developed. In 2012, as part of the Plan Update, the vision, goals, and objectives were revised through a year-long planning process to ensure objective-based decision making and strategy prioritization for the IRWM Plan. This collaborative process was led by a working group of representatives from the RWMG and stakeholders. The draft objectives were presented to the RWMG in 2012 as well as to stakeholders at a public workshop on August 16, 2012, which provided an opportunity for oral and written comments. The draft goals and objectives were posted to the Santa Cruz IRWM website and brought to the RWMG for review and comment prior to their finalization.

The Santa Cruz IRWM Plan goals are intended to be a general summary of the desired state that regional strategies are collectively working to achieve. The following are the goals for the Santa Cruz IRWM Plan:

- Provide a safe, reliable, and affordable water supply to meet current and expected regional demand without causing undesirable environmental impacts.
- Maintain and improve regional surface and groundwater quality to protect beneficial uses.
- Improve the condition of riparian and aquatic ecosystems to support the native species, watershed functions, and regional water needs.
- Reduce flood hazards and manage stormwater runoff through economical policies and projects that enhance natural hydrologic function and protect communities.

Objectives for the Santa Cruz IRWM Region are listed below, according to the four functional areas. Each objective is measurable by means of “objective indicators,” which are specific, quantifiable, time-limited statements that enable performance of the IRWM Plan to be measured over time. The Santa Cruz IRWM Plan objectives consist of the following:

Water Supply

- Ensure a reliable and sustainable local water supply through strategies that diversify the supply portfolio, develop production from alternative/supplemental sources, protect and enhance surface and ground water, protect against seawater intrusion, and maximize efficient delivery and use.
- Reduce water demand as technically and economically feasible, particularly in relation to the cost of additional sources.

Water Quality

- Reduce the sources of harmful pollutants (e.g., sediment, bacteria, nitrate, persistent organics and other toxic constituents) and their impacts on aquatic resources.

Watershed Resources

- Increase the habitat quality and quantity of critical aquatic ecosystems (i.e., streams, tidal wetlands, and freshwater wetlands).

Flood/Stormwater Management

- Implement integrated flood management strategies that reduce hazards and impacts from floods and, where feasible, provide multi-benefits (e.g., improve stormwater quality, ecosystem benefits, Low Impact Development (LID) / redevelopment and groundwater recharge).

CHAPTER 5: RESOURCE MANAGEMENT STRATEGIES

Within the context of IRWM planning, a resource management strategy is a project, program, or policy that helps local agencies manage their water and related resources. The IRWM Program Guidelines require the RWMG to evaluate the resource management strategies identified in the California Water Plan Update 2009 when considering which resource management strategies to include in the Region's portfolio. The intent is to promote a diversification of water management approaches in the region.

Santa Cruz IRWM Plan resource management strategies were developed specifically to address the region's objectives and include the following:

Objective	Strategy (<i>high priority</i> ; moderate priority)
<p>Ensure a reliable and sustainable local water supply through strategies that diversify the supply portfolio, develop production from alternative/supplemental sources, protect and enhance surface and ground water, protect against seawater intrusion, and maximize efficient delivery and use.</p>	<i>Develop production from alternative/supplemental sources</i>
	<i>Increase production from existing resources</i>
	<i>Implement system inerties</i>
	<i>Construct and maintain groundwater recharge facilities</i>
	<i>Shift groundwater pumping from coastal zone</i>
	Update/replace aging infrastructure
	Remove impervious coverage in recharge zones
<p>Reduce water demand as technically and economically feasible, particularly in relation to the cost of additional sources.</p>	<i>Support low impact development (LID)/redevelopment</i>
	<i>Utilize tiered rates /conservation pricing</i>
	<i>Conduct education/outreach on conservation strategies</i>
	<i>Implement policies to minimize additional demand from new growth</i>
	Implement groundwater management that includes non-municipal pumpers, to promote sustainable groundwater use.
	Utilize rebate/retrofit programs
<p>Reduce the sources of harmful pollutants (i.e. sediment, bacteria, nitrate, persistent organics and other toxic constituents) and their impacts on aquatic resources.</p>	Utilize temporary use restrictions as needed during critical supply shortages.
	<i>Conduct irrigation management and water conservation</i>
	<i>Perform rural road improvements and maintenance</i>
	<i>Implement BMPs related to timber harvest activities</i>
	<i>Implement erosion control / sediment capture BMPs for row crops / vineyard / orchards</i>
	<i>Implement fertilizer and irrigation management measures</i>
	<i>Implement septic system upgrades, provide incentives for upgrades and/or maintenance</i>
Perform sewer system upgrades and maintenance	
Promote/implement private property sewer lateral upgrades and maintenance	

Objective	Strategy (<i>high priority</i> ; moderate priority)
	<p>Restore riparian zones</p> <p>Remove homeless encampments from riparian zones</p> <p>Conduct street sweeping</p> <p>Conduct regular infrastructure cleaning and maintenance</p> <p>Implement exclusion of (livestock from riparian zones.</p> <p>Implement livestock waste management BMPs</p>
<p>Increase the habitat quality and quantity of critical aquatic ecosystems (i.e. streams, tidal wetlands and fresh water wetlands).</p>	<p><i>Reduce stream withdrawals and increase base flow at critical times to achieve streamflow targets</i></p> <p><i>Identify and eliminate illegal diversions</i></p> <p><i>Restore natural stream form & function</i></p> <p><i>Restore riparian zone through acquisition/easements</i></p> <p><i>Reduce riparian encroachment</i></p> <p><i>Reduce erosion and sedimentation from public and private roads, unpermitted grading, and other sources.</i></p> <p><i>Restore lagoon /wetland structure and biotic habitat complexity</i></p> <p><i>Increase/enhance wetland edge habitat</i></p> <p>Conduct riparian revegetation</p> <p>Remove or retrofit fish passage barriers</p> <p>Preserve or enhance large woody material in streams and riparian zone</p> <p>Remove non-native species</p> <p>Promote natural sand bar function</p> <p>Improve wetland hydrology</p> <p>Support education/outreach/technical training programs</p> <p>Support volunteer stewardship programs</p> <p>Support environmental education programs for schoolchildren</p> <p>Reduce illegal dumping</p>
<p>Implement integrated flood management strategies that reduce hazards and impacts from floods and, where feasible, provide multi-benefits (e.g., improve stormwater quality, ecosystem benefits, Low Impact Development (LID) / redevelopment and groundwater recharge).</p>	<p><i>Utilize riparian zones for flood management through acquisition or easement</i></p> <p><i>Maintain and improve levee conditions for flood management and environmental quality</i></p> <p><i>Increase channel width and floodplain function</i></p> <p><i>Remove channel constrictions</i></p> <p><i>Maintain storm drain conveyance efficiency</i></p> <p><i>Improve stormwater infrastructure & conduct maintenance</i></p>

Objective	Strategy (<i>high priority</i> ; moderate priority)
	Reduce directly connected impervious area
	Implement low impact development/redevelopment
	Conduct education and outreach on flood and stormwater issues
	Increase riparian setbacks
	Conduct vegetation management

CHAPTER 6: INTEGRATION AND PROJECT REVIEW PROCESS

This chapter describes the process in place to coordinate and integrate separate efforts to promote a more unified regional planning approach and promote greater institutional, stakeholder, resource and project integration. An example of integration of effort is the involvement of multiple public agencies, organizations, and private property owners in the development and promotion of stormwater infiltration practices that provide increased groundwater recharge, reduced runoff, and improved water quality.

This chapter also describes the methodology for evaluating projects that serves as a tool to help project proponents, stakeholders, and the State to categorize, describe, and assess the status, benefits, feasibility, and costs of the numerous projects in the Santa Cruz IRWM Plan. The RWMG has developed a suite of potential projects to address the objectives and strategies of the IRWM Plan.

76 projects were submitted in response to the call for projects for the 2014 Plan Update. These projects were evaluated using a methodology developed by the Steering Committee, which sought to characterize the extent to which projects:

- Address multiple high and/or moderate priority Santa Cruz IRWM Plan strategies
- Demonstrate partnership, geographic, and resource management integration
- Will be ready to proceed within a reasonable timeframe
- Demonstrate technical feasibility
- Will be able to demonstrate an effective cost/benefit ratio
- Will be able to demonstrate project effectiveness
- Assist the region in adapting to effects of climate change or in mitigating effects
- Directly address a critical water supply or water quality need of a DAC or Tribal interest, and/or address an environmental justice issue

In the event of future solicitations for IRWM funding applications, the Santa Cruz IRWM Steering Committee will work with the RWMG to develop an application derived from the 2014 list of projects. The Steering Committee will consider strategic aspects of plan implementation in determining which projects to include in an application, including selecting the projects that implement high and moderate level strategies in order to best enable the Region to achieve its objectives. Projects may also be submitted for other grant applications, depending on the specific criteria of those solicitations and the priority needs of the RWMG and its partner agencies at that time.

The current progress and trajectory of project implementation is described in the last section.

CHAPTER 7: BENEFITS AND IMPACTS

This chapter presents a summary of the anticipated benefits and impacts that will result from implementing in the IRWM Plan. There are numerous potential benefits from the strategies and projects in the Plan as they are implemented to achieve the stated goals and objectives. A summary of benefits by area is presented below.

Water Supply

- A more reliable water supply. If alternative water supplies are developed, (e.g., recycled water, increased use of winter streamflow, desalination) then water supply reliability would be enhanced and impacts on streamflows and groundwater would be reduced.
- Water system infrastructure improvements (repairs or upgrades to conveyance, storage, treatment, or distribution) would yield benefits to water supply, supply reliability, water use efficiency, and energy efficiency.
- Infrastructure improvements would provide greater operational flexibility and conveyance capacity and could improve delivery flexibility and redundancy.
- Upgraded and/or new treatment and storage facilities could improve drinking water quality (e.g., Chromium 6 wellhead treatment; water storage tank aerators)
- Diversification of the water supply portfolio and/or system interties could benefit water supply reliability under normal and emergency conditions.
- Groundwater recharge and conjunctive use would benefit groundwater aquifers and yield benefits for stormwater runoff management.
- Increased use of recycled water would benefit the reliability of regional water supplies and provide a comparatively more drought resistant source of water than surface water supply.

Water Conservation and Demand Management

- Continuation and/or expansion of water conservation strategies (retrofits; rebates; education/outreach; tiered rates; greywater use; rain capture) reduces overall water demand, and benefits water supply sources in the region with reduced impacts on summer stream flows, less groundwater extraction and improved drought preparedness.
- Water conservation and reduced consumption provides benefits from reducing water-related energy use (less water treatment and transport) and decreasing greenhouse gas emissions.

Water Quality

- Programs and projects to protect and improve surface water and groundwater quality benefits human health, aquatic species, ecosystem health, recreational opportunities, and the economy.
- Projects to maintain/improve septic systems, sewer systems, sewer laterals, and storm drain infrastructure would yield benefits by reducing potential sources of bacteria, pathogens, and nutrients.

Watershed Stewardship and Aquatic Ecosystems

- Programs and projects include measures to protect existing high quality habitat and restore and enhance impaired habitat with benefits to watershed conditions in critical aquatic ecosystems and native species.

- Projects to protect and enhance aquatic ecosystems and restore natural stream form and function promote the recovery of threatened and endangered species, notably keystone salmonid species.
- Programs to restore riparian zones through acquisitions/easements and reduce riparian encroachment provide benefits to aquatic habitat and species.
- If alternative water sources are developed (e.g., recycled water, increased use of winter streamflow, desalination) then impacts on streamflows and groundwater could be reduced. In addition to reduced diversions, reducing withdrawals could increase stream base (summertime) flow and benefit aquatic habitat and species.
- Efforts to identify and eliminate illegal stream diversions could increase streamflow and provide benefits to habitat and aquatic species.
- Projects to reduce erosion and control sediment will provide both habitat and water quality benefits.
- Riparian and wetland habitats provide benefits to water quality. These habitats also can delay and reduce peak flood flows, reducing localized flooding, with benefits to stormwater management as well as public health and safety.

Flood and Stormwater Management

- The benefits of implementing integrated flood management strategies include reducing the hazards and impacts from floods and, where feasible, provide multiple benefits (e.g., maintaining and improving levee conditions for flood management and environmental quality; stormwater capture and recharge).
- Infrastructure improvements which reduce impervious area directly connected to storm sewers with low-impact development measures can benefit stormwater management by reducing runoff volumes and peak flood events with the benefit of reducing flooding and improving public safety.

Enhanced Collaboration

- A benefit of IRWM that is less tangible but of significant value is fostering positive collaboration and strengthening partnerships amongst agencies, organizations, and stakeholders.
- The planning process encourages new partnerships and provides opportunities to identify multi-benefit projects that may achieve a multitude of goals and objectives for different entities.
- Integrated planning and collaboration can achieve cost savings through project cost-sharing, resource sharing, economies of scale, and the avoidance of duplication of efforts.

Some adverse environmental impacts may occur from implementation of the IRWM Plan. Adverse impacts would be purposefully minimized during the project planning and permitting process. Construction-related impacts may include temporary and localized disturbances to air and water quality, habitat, noise, and other environmental factors. Economic impacts may include increased costs associated with water infrastructure financing.

Project specific impacts and benefits will be analyzed in more detail prior to implementation of specific projects. For projects to be implemented, environmental review will be conducted in accordance with the California Environmental Quality Act (CEQA) and, if applicable, the National Environmental Policy Act (NEPA).

CHAPTER 8: PLAN PERFORMANCE AND MONITORING

This chapter documents the metrics by which IRWM Plan effectiveness will be evaluated and the institutional structure through which these evaluations will be carried out. This IRWM Plan is a dynamic document and its success is related to how well its goals and objectives are accomplished, at both the project and plan levels.

Plan performance will generally be evaluated through two mechanisms. First, project-specific monitoring will be done to demonstrate that projects were implemented as designed and functioning as intended. Second, broad, interdisciplinary environmental trends analysis for key parameters will evaluate the integrated effort as a whole. As resources allow, ideally at least once every three years, the RWMF will conduct an assessment of overall IRWM Plan performance using the indicators described in this chapter. The RWMG will use an adaptive management approach to incorporate lessons learned from project-specific monitoring into the IRWM Plan in terms of objectives, resource management strategies, or other aspects of the Plan or planning process.

CHAPTER 9: DATA MANAGEMENT

Chapter 9 discusses data management needs associated with the IRWM Plan. This section provides an overview of data needs in the Region, discusses data collection techniques, and the approach to data management and dissemination. Existing data collection and monitoring efforts are described, and data gaps with potential new data collection programs are identified. This section also discusses supporting statewide data needs via the abundance of information collected by the RWMG.

As part of IRWM Plan implementation, information and data will be collected and compiled at several levels, including: the IRWM programmatic information (e.g., meeting agendas, workshop notices, website); the project information (e.g., who, where, what, how much); and ambient environmental data (e.g., water quality, streamflow). At each of these levels, the RWMG considers effective data management and dissemination critical to successful implementation of the IRWM Plan.

CHAPTER 10: FINANCING

Chapter 10 identifies various funding sources, including their associated requirements and guidelines, which may be available to assist with implementation of Plan projects. The chapter also provides a summary of funding opportunities from local, state, and federal sources. The challenge of project funding is not unique to Santa Cruz, and is a major obstacle for the implementation of projects. Demands on limited local funds continue to increase, construction costs continue to rise, and existing infrastructure continues to require upgrades to meet growing demands. In this economic climate, agencies are challenged to balance costs associated with ensuring the highest standards of water quality and supply reliability for existing customers while protecting and enhancing the sensitive ecosystems within the region.

Historically, financial support for IRWM Plan development has come from the participating agencies. The original, 2005 Northern Santa Cruz IRWM Plan was funded by contributions from each agency. State grants through voter-approved bonds have funded a number of IRWM projects. With regard to projects and programs which form the Santa Cruz IRWM Plan, the estimated costs of projects range from several tens of thousands of dollars to multi-million dollars. Many of the project proponents have not yet

identified local funding sources to support implementation, as well as ongoing operations and maintenance, of their proposed projects.

CHAPTER 11: TECHNICAL ANALYSIS

This chapter documents that the IRWM Plan is based on sound technical information and analyses. It provides a description of the plans, studies, and methodologies used to shape the RWMG and Steering Committee's understanding of water management in the Santa Cruz IRWM Region. The Santa Cruz IRWM Plan was developed through collaborative discussions regarding regional water issues and proposed projects to address them. The basis for many of these discussions were the numerous studies, assessments, and planning documents prepared for the various stakeholders in the Region, which in turn included public review and comment. As the various regional stakeholders shared their needs and objectives, similarities and opportunities for collaboration were identified. During Plan preparation and development, particularly through the development of the Plan's conceptual framework, data and water management strategies were collected from a number of existing local and/or sub-regional planning documents, and were integrated into the regional strategies presented in this document. Examples of local planning documents reviewed during the IRWM Plan development and update include urban water management plans, water supply master plans, capital improvement plans, recycled water master plans, project environmental impact reports/environmental impact statements, and grant applications for other state and federal programs.

CHAPTER 12: RELATION TO LOCAL WATER AND LAND USE PLANNING

The 2012 IRWM Grant Program Guidelines require that the IRWM Plan describe the current relationship between land use and water resource managers (e.g., how water management input is considered in land use decisions and vice versa), identify current constraints to collaboration, and explore opportunities to facilitate improved collaboration between land use planners and water managers in the future. Local jurisdictions in the Santa Cruz Region have long sought to protect the environment, and specifically water resources, through ordinances and strong general plan policies. Water managers have relied upon the development and growth projections of local and regional land use agencies in projecting future water demands.

CHAPTER 13: STAKEHOLDER INVOLVEMENT

Ongoing public outreach to local agencies, organizations, and the general public about IRWM efforts has occurred since the development of the 2005 Plan and more actively following the 2008 IRWM Implementation grant award to the Region. A collaborative approach to regional water planning is not new to the Santa Cruz region, as local water districts, cities and the County share a history of working together that pre-dates the IRWM program by many years. However, the recent IRWM effort has provided a very effective vehicle to invigorate and create new relationships between agencies and stakeholders in the region and has provided a critical source of funding for planning and the implementation of more than 70 projects since 2008.

The intent of the stakeholder involvement process is to ensure that the wide range of interest groups and citizens are afforded the opportunity to participate in the IRWM Plan development and its implementation. Collectively, the identified stakeholders include a broad representation of water supply, water quality, wastewater, stormwater, flood control, watershed, municipal, environmental,

agricultural, regulatory, and community interests in the IRWM planning region, including non-governmental organizations, disadvantaged community representatives, Native American tribal contacts, and interested residents.

The list of stakeholders that have been notified of IRWM activities includes all of the major water resource management authorities in the region, as well as representatives from the neighboring Bay Area and Pajaro IRWM regions. The RWMG communicates through a website, meetings, workshops, email, and written correspondence and announcements. The participating agencies regularly conduct outreach with their own boards, councils, commissions, and constituents. Local agencies, organizations, and stakeholders are engaged through meetings, workshops and the broader community informed through boards, advisory groups, meetings and events.

CHAPTER 14: COORDINATION

This chapter presents an overview of the process to coordinate water management projects and activities with local, regional and state agencies, diverse stakeholders and neighboring IRWM regions. The intent of these efforts is to ensure an appropriate level of coordination is occurring within the region to avoid conflict and duplication of efforts, as well as to integrate planning efforts across agencies and jurisdictions to take advantage of efficiencies and optimize use of the region's water resources.

Within the region, IRWM-related planning and implementation activities are coordinated by the RWMG and include agencies with statutory authority over water management and related resources. The Santa Cruz IRWM region is bordered by the San Francisco Bay Area IRWM Region and the Pajaro IRWM Region. There is an open dialogue with these neighboring regions to coordinate on any projects that overlap regional boundaries, issues of mutual concern, and opportunities for collaboration. Coordination with numerous state and federal regulatory and resource agencies occurs in IRWM planning and implementation to ensure appropriate consideration of resource management, resource enhancement, and regulatory compliance. These agencies often play a critical role in the review and approval of IRWM projects in prior to implementation.

CHAPTER 15: CLIMATE CHANGE

Water managers in the Santa Cruz IRWM Region recognize the potential impact that climate change could have on local water resources resulting from increasing temperatures and changing patterns of precipitation. The potential impacts of these future climatic and hydrologic changes were evaluated in the context of each of the IRWM functional areas to identify opportunities for adaptation to reduce the vulnerability of water supply, water quality, aquatic ecosystems, and flood hazards in the region. In some instances projected changes may dramatically exacerbate the severity of local water issues, thus providing additional justification for the implementation of effective strategies now.

A 2012 U.S. Geological Survey study² of the Santa Cruz region indicated strong evidence for temperature changes in the future, but disagreement between simulation models for future precipitation patterns. Temperature projections show an increase of 3-4^o C for average monthly maximums and an increase in

² Flint, L.E., and Flint, A.L., 2012, Simulation of climate change in San Francisco Bay Basins, California: Case studies in the Russian River Valley and Santa Cruz Mountains: U.S. Geological Survey Scientific Investigations Report 2012-5132.

the variability (20-30% larger standard deviation) above the historic reference period (1971-2000), with spring and fall months experiencing warmer temperatures. While there is disagreement amongst climate model projections as to the timing of precipitation patterns, there is agreement that the future will be generally drier, resulting in a higher frequency of droughts and increased water demand for irrigation. Overall groundwater recharge in the Santa Cruz Region is projected to decline by 30% by 2100, which will reduce groundwater supplies and stream baseflow needed for water supply and aquatic habitat.

A 2009 report from the California Climate Change Center prepared by the Pacific Institute³ stated that rising sea levels will be among the most significant impacts of climate change to California, with climate model scenarios suggesting a very substantial increase in sea level over the coming century. Climate models indicate that sea level could rise by 3 feet by the year 2100, and will result in increased frequency of flooding, gradual inundation, increased rates of erosion, and exacerbated effects of storm surge, larger waves, and high tides.

³ California Climate Change Center, 2009, CEC-500-2009-024-F, Impacts of Sea-Level Rise on the California Coast.

PROJECT IMPLEMENTATION

Many of the sections of the Plan provide the information on the development of the Plan, according to a format specified by the State IRWM guidelines. This section on project implementation describes how project implementation in the Santa Cruz region is anticipated to proceed, based on the IRWM Plan and current RWMG and stakeholder efforts. The timing and pace of project implementation is a function of the goals, objectives, priority strategies, and funding sources. It is also influenced by the activities of the individual agencies, and may shift depending on timing, outcome of ongoing evaluations, and availability of funding.

Following is the current trajectory of project implementation for the major projects in the four functional areas.

Water Supply

- Soquel Creek Water District has declared a groundwater emergency and is implementing significant mandatory demand reduction and demand-neutral development while the District completes evaluation of the feasibility of various supplemental supplies, including desalination, wastewater recycling, water exchange, recharge enhancement.
- The Soquel Creek Water District and Central Water District are seeking to expand groundwater management programs to include the County, the City of Santa Cruz, Pajaro Valley Water Management Agency and private pumpers.
- Soquel Creek Water District, Central Water District and the City of Watsonville are evaluating methods to address naturally occurring chromium 6 in their current water sources that is in excess of the new drinking water standard by wellhead treatment or shifting pumping to other aquifers.
- Santa Cruz City Water Department is currently working with a Water Supply Advisory Committee to reevaluate the current supply and demand projections, consider the implications on water supply reliability of potential long term flow release commitments to restore fish habitat, and consider potential supplemental supply options to improve water supply reliability.
- Scotts Valley Water District is pursuing options to address overdraft of the Santa Margarita Groundwater Basin by optimizing use of its available recycled water supply, increasing groundwater recharge through stormwater retention and managed recharge projects, utilizing surface water through conjunctive use and water exchange.

Water Quality

- The County continues to implement wastewater management programs in the San Lorenzo Watershed and other parts of the county to identify and upgrade problematic onsite sewage disposal systems and promote improved function.
- The City of Santa Cruz is supporting management of watershed lands to protect and improve water quality for water supply and habitat.
- The County Sanitation District and the City of Santa Cruz have secured funding assistance to upgrade aging sewer infrastructure that has contributed leaks and spills of sewage into coastal waterways and beaches. More effort to improve private sewer laterals is anticipated.
- The County Public Works Department and Resource Conservation District are implementing a number of projects to improve drainage and reduce discharge of sediment from rural roads.

- The County Planning Department and other regulatory agencies are increasing efforts to prevent and correct illegal grading and land clearing.
- Various stormwater programs implemented by the Cities and County as described below will also result in water quality improvements.

Watershed Resources

- The Resource Conservation District continues to work with partner agencies to identify and implement priority projects through the Integrated Watershed Restoration Program. These projects include modification of fish passage barriers, restoration of streambank habitat, wetland restoration, and promotion of restoration projects on private land through permit coordination.
- The Watershed Resources Workgroup of the City of Santa Cruz Water Department implements the Watershed Resources Management Plan, which includes activities such as removing homeless encampments, educating school groups, maintaining the forestlands, patrolling City's watershed lands, and complying with environmental regulations.
- The County, City of Santa Cruz, and Resource Conservation District are working with the San Lorenzo River Alliance and other partners to assess riparian conditions and to develop priority implementation measures for the Coho and Steelhead Recovery Plans.

Flood and Stormwater Management

- The County, City of Santa Cruz, and City of Watsonville are enhancing monitoring and management programs to reduce stormwater runoff and pollutant loading and meet the new requirements of state stormwater regulations.
- The County, City of Santa Cruz, and City of Watsonville are implementing projects to infiltrate stormwater, reduce polluted runoff, improve groundwater recharge, reduce erosion and restore streambanks. For example, projects in the City of Santa Cruz are being designed to reduce polluted runoff and infiltrate storm water using Low Impact Development (LID) measures, such as vegetative drainage features and buffers. These measures reduce erosion and sedimentation which improves water quality, enhancing habitat for fish, aquatic, and riparian species. The City has increased its efforts to ensure that Low Impact Development (LID) design measures and both LID and Construction Best Management Practices are implemented during all phases of a construction project including: design, construction, and post-development long-term maintenance.
- The City of Santa Cruz is pursuing a project to repair and upgrade the Branciforte Creek flood control channel to improve fish passage and maintain flood protection.

CONCLUSION

The initial 2005 Santa Cruz IRWM Plan presented information and identified multi-benefit opportunities for addressing regional water resources issues in a collaborative manner. Much has been accomplished since that Plan was adopted, including the implementation of more than 70 projects, completion of key technical studies to inform resources management, and development of a framework to support effective IRWM implementation. The IRWM Plan 2014 incorporates the efforts to date, provides updated information and approaches to ensure it remains current in addressing the Region's challenges, and is compliant with the state's 2012 IRWM Plan Guidelines. The impacts of climate change on the Santa Cruz Region were evaluated through a U.S. Geologic Survey examining impacts upon rainfall, runoff and recharge. Efforts to engage stakeholders included the development of a new website

(www.SantaCruzIRWMP.org) and several community meetings and workshops where the public were encouraged to participate, review and comment on IRWM efforts. In 2014, ongoing resource management technical studies as well as outreach to assess water needs of local disadvantaged communities will continue to add breadth to the Plan. This IRWM Plan provides a framework for continued collaboration by describing the Region's most critical water resources challenges and identifying opportunities for regional collaboration. The implementation of the Santa Cruz IRWM Plan can better equip agencies to overcome future challenges by coordinating resources and more effectively meeting the needs of the region as a whole.