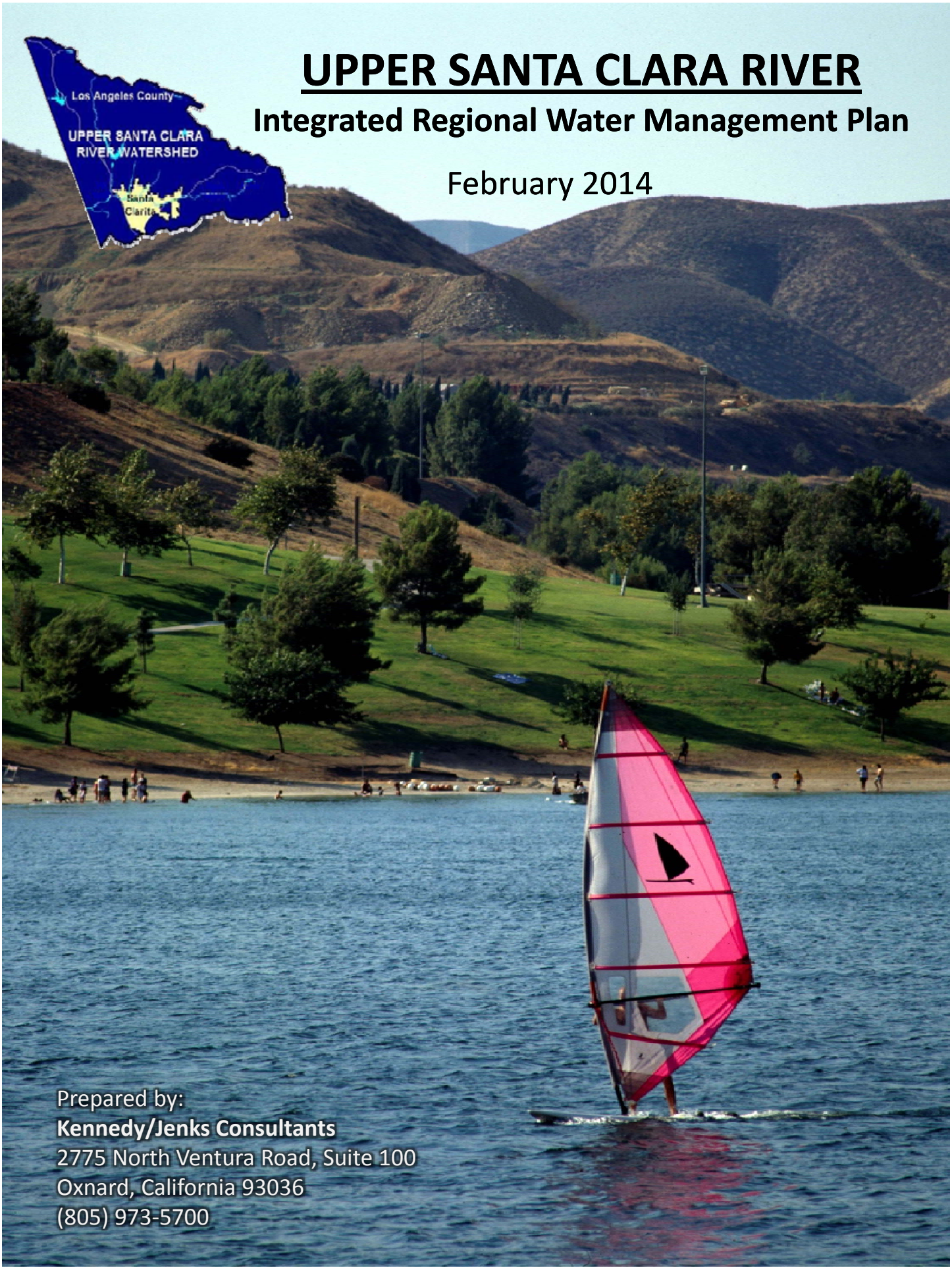

UPPER SANTA CLARA RIVER

Integrated Regional Water Management Plan

February 2014

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Section 1: Introduction

The Upper Santa Clara River Integrated Regional Water Management Plan (IRWMP) was completed and adopted by the Regional Water Management Group (RWMG) in 2008. This Plan updates and expands upon the original Upper Santa Clara River IRWMP, documents progress towards meeting IRWMP objectives, and identifies ongoing regional needs and issues.

This section provides an introduction to the Region covered by this IRWMP, the Stakeholders participating in development of this IRWMP, and the Stakeholder process utilized to develop this IRWMP.

1.1 Introduction to the Region

The Santa Clara River Watershed (Watershed) consists of approximately 1,634 square miles and contains the upper reaches of the Santa Clara River. The River, which is the largest natural river remaining in Southern California, travels through two counties, Los Angeles and Ventura.

The Region included in this IRWMP is located within the Upper portion of the Watershed (see Figures 1.1-1 and 1.1-2). The Region represents an area of approximately 654 square miles. The Upper Basin of the Santa Clara River, as defined for the purposes of this IRWMP, is bounded by the San Gabriel Mountains to the south and southeast, the Santa Susana Mountains to the southwest, the Transverse Ranges to the northeast, the Sierra Pelona Mountains to the east, and the Ventura County Line to the west. The Region encompasses the City of Santa Clarita, the unincorporated communities of Castaic, Stevenson Ranch, West Ranch, Agua Dulce, and Acton, as well as portions of the Angeles National Forest. The Upper Santa Clara River Watershed is a logical region for integrated regional water management due to its history of cooperative water management, the topography and geography of the Region and the similarity of water issues facing agencies in the Region. The Region is a contiguous geographic area and has been defined in a manner to maximize opportunities for integration of water management activities.

Upper Santa Clara River

Because the Santa Clara River travels through two counties, Los Angeles and Ventura, ongoing coordination of efforts is needed in order to address issues of mutual concern and benefit, such as water quality improvement. Therefore, representatives of the Region work with the stakeholders and agencies in the lower reaches of the Watershed, which lie in Ventura County, to include them in the IRWMP planning process and to coordinate efforts to protect the Watershed.

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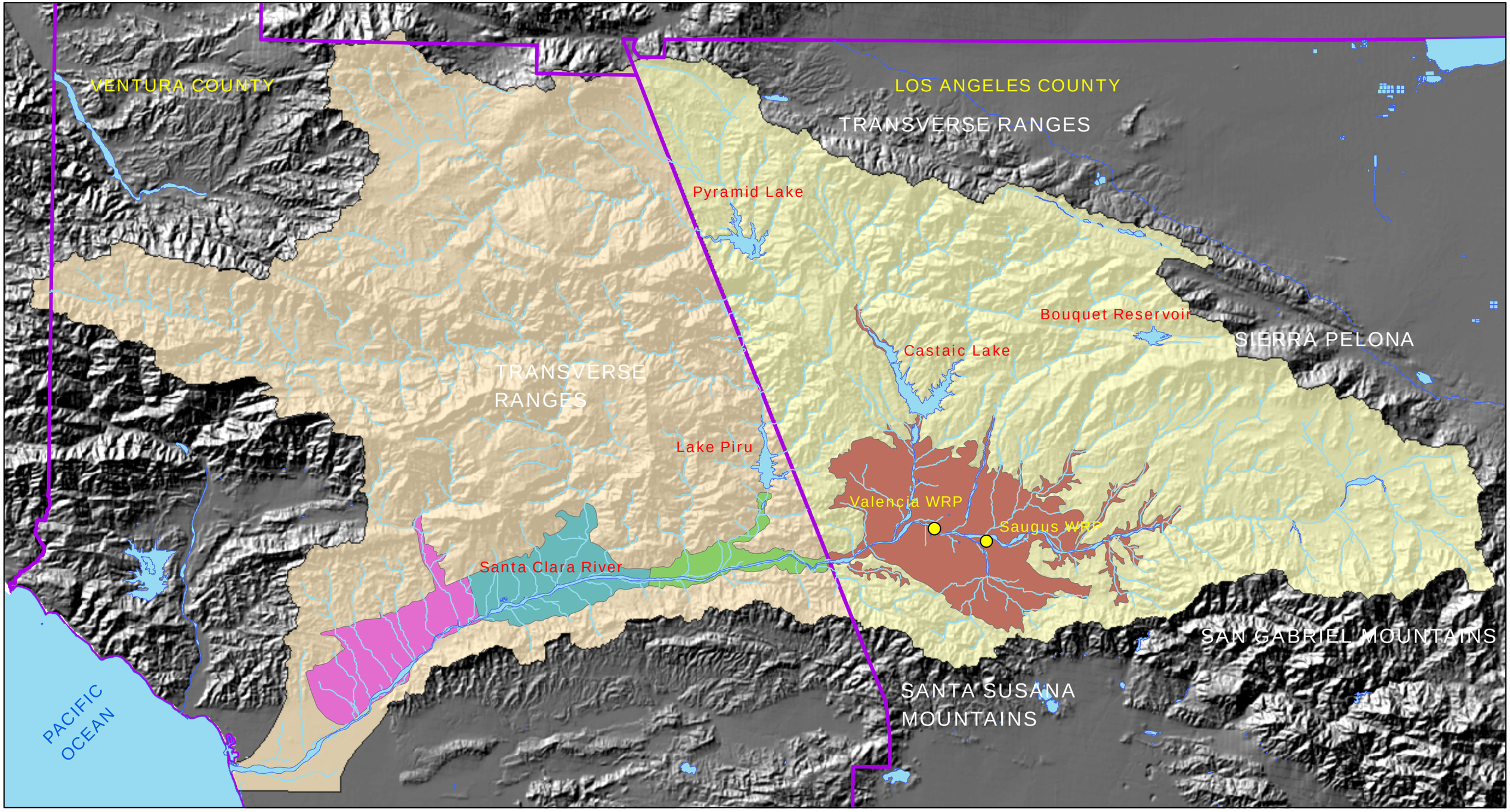


N
W E
S

Legend

Water Reclamation Plants

Groundwater Basin

- EASTERN
- PIRU
- FILLMORE
- SANTA PAULA

Watershed

- Lower Santa Clara River
- Upper Santa Clara River

0 5 10 20 Miles

Figure 1.1-1
Upper Santa Clara River Watershed
Hydrologic Features

QUAIL LAKE

CALIFORNIA AQUEDUCT

PYRAMID LAKE

ELIZABETH LAKE

HUGHES LAKE

BOUQUET RESERVOIR

CASTAIC LAKE

VENTURA COUNTY

LAFCD Boundary

SANTA CLARA RIVER

N

MPM-GIS Services

0 1.25 2.5 5 Miles

- Santa Clara River
- Streams
- LA Flood Control District Boundary
- CLWA
- San Districts selection
- Valencia Water Company
- L A County WaterWorks District 36
- LA County WaterWorks District 37
- Newhall County Water District
- Santa Clarita Water Division
- City of Santa Clarita
- National Forest Boundary
- Upper Santa Clara River Watershed

Figure 1.1-2
Upper Santa Clara River Watershed/IRWMP Region

Path: \\Pwgisfile\smpm\GIS_Services\MPMGIS\projects\mpm\wk_DrainageInfrastructure\Potential Fig\All FIGURE\1-1-2.mxd

1.1.1 IRWMP Regional Boundary

The Upper Santa Clara River IRWMP Region boundary, as defined, is an appropriate area for integrated regional water management. The Region has been working successfully since 2006 through IRWMP development and into Plan implementation. With the exception of the Watersheds Coalition of Ventura County (WCVC) IRWMP, which is immediately downstream of the Upper Santa Clara River subregion, no other region is within the watershed, allowing for inclusion into the Region all of the water resources, related infrastructure, key agencies, and stakeholder interests within the upper watershed. There is no overlap of this Region with any other integrated water management planning region, except for a small area in the northernmost portion of the Region that overlaps with the Kern IRWM region.

Because the Santa Clara River travels through two counties, Los Angeles and Ventura, ongoing coordination of efforts is needed to address issues of mutual concern and benefit, such as water quality improvement. Though there has been, and there continues to be coordination between the WCVC IRWMP and the Upper Santa Clara IRWMP regions, it has been mutually agreed that the two regions would remain separate for the reasons outlined below. The character of the Santa Clara River is different in the two counties; the upper areas within Los Angeles County have more ephemeral flows and there is separation near the county line by a “dry gap” which tends to isolate the low-flow surface water and geology which separates groundwater basins between the regions. The Ventura County side is characterized by more agricultural land use and perennial flows. In addition, the two regions have the following characteristics which lend themselves to continued separate regional efforts with cooperative co-existence:

1. The two regions are each functionally effective and successful at their current scales/sizes and with their respective organizations and stakeholder mixes.

2. The political boundary which separates the two regions also functions as the boundary between agencies with duties that impact water resources, including land use planning, flood control, water supply, etc.

Though there is agreement to remain separate entities, continued cooperation between the regions is expected to lead to greater mutual effort in IRWMP planning.

1.2 Purpose of the Upper Santa Clara River Integrated Regional Water Management Plan

The purpose of this IRWMP is to integrate planning and implementation efforts and facilitate regional cooperation with the goals of reducing potable water demands, increasing water supply, improving water quality, promoting resource stewardship over the long term, reducing negative effects from flooding and hydromodification, and adapting to and mitigating climate change. The intention of this IRWMP is not to duplicate existing and ongoing plans, but to better integrate these efforts and utilize the results and findings of existing plans to put forward the projects needed to address local objectives.

This IRWMP effort is funded entirely by local participating agencies and state grant funding. A number of individuals have contributed to the development of this IRWMP, including

representatives of State agencies, nongovernmental organizations, local agencies, city and county staff, and consultants. This IRWMP is a comprehensive plan that primarily addresses region-wide water management and related issues. This IRWMP complies with the State Guidelines for an IRWMP and provides for integration of project and program implementation strategies which best address the needs and objectives of the Region.

This IRWMP complies with Proposition 84, and IRWMP principles and criteria for integrated water management planning as set forth in the guidelines. In addition, development of this IRWMP includes the following:

- An inclusive and participatory public involvement process to ensure meaningful input (Section 1 and Appendix A)
- Appropriate level of scientific watershed assessment information (Sections 2 through 5)
- Integration and coordination of planning with other agencies and entities (Sections 1 and 11)
- Identification of multiple issues and objectives and potential solutions (Sections 2 through 6)
- A process for ongoing decision-making (Section 1)
- Phased implementation and staging of resources (Section 8)
- Ongoing monitoring of project and plan implementation (Section 10)
- A means for adaptive planning and management (Section 8)
- A long-term perspective

This IRWMP provides integration of projects that protect the natural resources of the Region and identifies additional projects that are critical to achieving Regional objectives.

PURPOSE AND GOALS OF THIS IRWMP:

- Integrate water and watershed-related planning efforts
- Facilitate regional cooperation
- Reduce potable water demand
- Increase water supply
- Improve water quality
- Promote resource stewardship
- Improve flood management
- Reduce greenhouse gas emissions and adapt to climate change

1.3 Development of the IRWMP

The RWMG oversees the development of this IRWMP, but this IRWMP reflects the input and effort of a broad stakeholder group. A broad stakeholder outreach process was crucial to ensure that this IRWMP identifies local issues, reflects local needs, promotes the formation of partnerships, and encourages coordination with State and Federal agencies. Residents of the Region are facing rapidly changing conditions, mainly related to urban growth, that create challenges in water resources management and the stewardship of environmental resources. Agencies and planning jurisdictions must work closely

together in order to assure the delivery of clean, reliable water supplies while maintaining the Region's quality of life and environmental values.

The stakeholder group is an integral group of participants in the IRWMP process, consisting of members of the RWMG as well as an extensive mix of many other agencies and organizations with an interest in improving water supply, water quality, flood management, and ecosystems in the Region. Specific ongoing efforts, including direct emails, mailings, face to face interaction, event participation, classroom instruction, flyers, notices, surveys, and presentations have been performed to get environmental groups, conservancy groups, well owner groups, disadvantaged communities (DACs), water suppliers, municipalities, the local sanitation and flood control districts, American Indian Tribes, developers, landowners, adjacent IRWMP areas, State agencies, elected representatives, and others to take part in the IRWMP (participating Stakeholders are listed below in Section 1.3.2). With the involvement of the stakeholders, including the collaborative review of draft document materials, the Upper Santa Clara River IRWMP has been able to incorporate a broad range of inputs and ideas.

Every stakeholder was, and continues to be, able to add projects to the list of candidate projects for implementation of the IRWMP. The greatest advantage of this broad stakeholder effort has been the conversations between stakeholders about partnering on proposed projects. This has created the opportunity for not only pooling resources, but also the generation of regional solutions to issues that the entire IRWMP area is trying to address. The IRWMP process has been a great addition to the collaborative efforts already occurring in this region and has created a forum for establishing mutually beneficial partnerships to further these efforts.

Table 1.3-1 provides an overview of the IRWMP development and implementation.

TABLE 1.3-1
OVERVIEW OF UPPER SANTA CLARA RIVER IRWMP DEVELOPMENT

Activity	Regional Water Management Group	Stakeholders
Plan Participation	• Monitors IRWMP requirements/progress toward goals • Makes administrative decisions (managing grant applications, consultant selection) • Stakeholder outreach • Communication with DWR • Communication and coordination with neighboring IRWMPs • Acts as grantee for IRWMP grants • Coordination and communication with local agencies	All Stakeholders including the RWMG members: • Select Plan objectives • Select applicable resource management strategies • Develop project review criteria • Submit candidate projects for consideration • Review candidate projects and identify opportunities for integration • Review and provide input on all chapters of the IRWMP
Plan Adoption	Adopt plan through Board/Council resolution	Stakeholders that are not members of the RWMG submit letters of support for the completed IRWMP
Updating and Amending the Plan	The RWMG will re-adopt the IRWMP at a minimum every five years, or within one year of the following: (1) significantly changed conditions impacting objectives, (2) achievement of a regional objective requiring development of an additional regional objective, or (3) need to set a new regional objective	All Stakeholders including the RWMG members: • Update Plan objectives • Update applicable resource management strategies • Update project review criteria • Submit new candidate projects for consideration • Review candidate projects and identify opportunities for integration • Review and provide input on all chapters of the updated IRWMP

TABLE 1.3-1 (cont.)

Activity	Regional Water Management Group	Stakeholders
Communication	Major communication for the IRWMP occurs through: • Established email list maintained by RWMG. All meeting agendas are sent out via this email list. The list is also used to provide information on local, state, and federal funding opportunities; other public outreach activities; opportunities to provide input on topics of general interest (e.g., public meetings of the Regional Water Quality Control Board, meetings of/with neighboring IRWMPs). • IRWMP website: www.scrwaterplan.org • Newspaper notices: prior to kickoff of the IRWMP Update, a notice of intention to prepare the IRWMP was published in local newspapers. Prior to adoption of the IRWMP Update, a notice of intention was published in local newspapers. • Regular Stakeholder Meetings. Stakeholder meetings were held every other month during the development of this IRWMP Update. All Stakeholders were asked to introduce themselves at each meeting. The purpose of each Stakeholder meeting was to take input on IRWMP topics. Each Stakeholder meeting provided opportunities for any stakeholder or the general public to provide input to the Plan. • Regular RWMG Meetings. RWMG meetings were held every other month during the IRWMP Update. The primary purpose of the RWMG meetings was to develop the agenda and meeting materials for the broader Stakeholder meetings. • Regular Salt/Nutrient Management Plan Task Force Meetings. Meetings were held to keep tasks on track and move forward on the completion of the Salt/Nutrient Management Plan. Focused discussions were held on progress made, data needs, and other topics such as data management and sharing. • Regular communication with neighboring IRWMP regions. Inclusion of neighbor IRWMP leadership in meeting notices and hearing notices.	
Decision Making	Both the original 2008 IRWMP and the 2014 Update were developed through a collaborative, consensus-based process. However, if necessary, future decisions will be made through a vote of the overall stakeholder group.	

1.3.1 Regional Water Management Group

The RWMG, the governing body and group responsible for development of the Plan, was initially established by a Memorandum of Understanding (MOU) in May 2007 between seven parties, in addition to one ex-officio member. A new MOU was entered into in 2011 by all eight parties, now all official members, to re-establish the governance structure for the IRWMP Update. The 2011 MOU prescribes the roles and responsibilities of the RWMG for the IRWMP Update including complying with the IRWMP sections of the Water Code (the 2011 MOU is included in Appendix B). The members of the RWMG that are signatories to the MOU are listed in Table 1.3-2 below.

Stakeholder Meeting

The RWMG members have contributed funding, in various amounts as described in the MOU, to retain a consultant to prepare and update the IRWMP for the Upper Santa Clara River, including developing hand out materials for discussion in Stakeholder meetings, in cooperation with RWMG members. The RWMG governance structure and approach has been effective in creating and updating the IRWMP and has ensured collaborative IRWMP efforts by encouraging Stakeholder involvement beyond the MOU signatories, through frequently scheduled Stakeholder meetings.

The formation of the RWMG has strengthened the ability of the Region to address common needs and challenges. These participants' roles and responsibilities for managing water/natural resources and land use within the Region are summarized in Table 1.3-2.

The Upper Santa Clara River RWMG includes the participation of at least three public agencies, two of which have statutory authority over water management. The RWMG will incorporate new members into the governance structure by expanding outreach efforts to invite new groups of stakeholders, as required in the California Water Code, and requesting their attendance/input at stakeholder meetings. Additional parties may enter into the MOU by amendment and approval of all RWMG members. As the stakeholder process continues and the project database is populated with more projects that will help achieve the regional goals and objectives, if deficiencies in RWMG expertise or water management representation are discovered, entities that can provide the desired expertise or representation will be sought out and invited to participate. Researching which entity might provide the missing expertise/representation could include seeking references from existing stakeholders or other Regions, or seeking DWR advice as to how other Regions have filled any similar voids.

TABLE 1.3-2
ROLES AND RESPONSIBILITIES OF THE REGIONAL WATER MANAGEMENT GROUP

Agency	Roles and Responsibility
Castaic Lake Water Agency (CLWA)	Wholesale water supplier
City of Santa Clarita	Municipal government that provides open space and land use planning as well as stormwater management, water conservation efforts on City-owned properties, and creek restoration within City borders.
Los Angeles County Flood Control District (LACFCD)	Provides flood management services within the District's boundaries
Newhall County Water District (NCWD)	Provides groundwater and imported water to portions of the City of Santa Clarita and unincorporated communities in Los Angeles County
Rivers and Mountains Conservancy (RMC)	Acquires parks and open space, restores natural parks and open space, provides watershed improvements, and provides low impact recreation improvements within the conservancy area (1,600 square miles in Eastern Los Angeles County and Western Orange County)
Santa Clarita Water Division of CLWA (SCWD)	Provides groundwater and imported water to portions of the City of Santa Clarita and unincorporated communities in Los Angeles County
Santa Clarita Valley Sanitation District of Los Angeles County (SCVSD)	Provides wastewater management services and produces high-quality recycled water for the City of Santa Clarita and unincorporated communities in Los Angeles County
Valencia Water Company (VWC)	Provides groundwater, imported water, and recycled water to portions of the City of Santa Clarita and unincorporated communities in Los Angeles County

1.3.1.1 RWMG Functions

While roles and responsibilities are prescribed in the MOU, the general RWMG structure and member functions that shall be performed for effective IRWMP Planning consist of the following:

1. Total membership of the RWMG may be up to 11 entities and comprised of agencies/organizations whose primary mission is consistent with one or more of the IRWMP main objectives.

2. The RWMG will include at least three agencies, two of which have statutory authority over water resources.

3. RWMG membership within each of the main Regional objectives will be re-evaluated every three years to verify that an adequate number of agencies/groups whose primary duty is related to each particular objective are represented on the RWMG.

4. The RWMG will strive to ensure balanced representation across the IRWMP objectives, as well as geographic diversity across the Region.

5. RWMG members will be recommended by the Stakeholder group to achieve the balance described above.

6. The RWMG should annually select or reaffirm a Chair and a Vice-Chair to conduct meetings.

7. In the event a clear consensus cannot be reached each RWMG member will have a single vote at RWMG meetings.

8. RWMG members must have authority to enter into a legal agreement to form a RWMG (e.g., MOU, joint powers authority, or other legal document) and will seek legal counsel to prepare a formalized governance document as needed to provide for the ongoing IRWMP's governance and implementation of the regional objectives.

9. Members of the RWMG are expected to contribute some level of financial or in-kind services towards IRWMP preparation/update and need to allow for considerable staff time during normal working hours to work on plan preparation and to attend meetings. Exceptions may be made on a case-by-case basis.

10. RWMG members shall commit to all of the responsibilities and activities of a Stakeholder.

11. RWMG will review and comment on all versions of the IRWMP and any grant application(s) and will decide on the disposition of conflicting comments.

12. RWMG will help to determine project priorities and maintain prioritized project lists.

13. RWMG will provide oversight to the IRWMP and resolve significant issues among the Stakeholder group.

14. RWMG will direct the Chair to call Stakeholder meetings as needed and will consult on a periodic or as needed basis with the Stakeholder group.

15. Provide outreach to local entities and communities to ensure adequate input from all Stakeholders.

16. RWMG will hire consultant(s) as needed (e.g., to update IRWMP, prepare grant application, aid in performing Grantee responsibilities, provide Stakeholder facilitation services, etc.).

17. RWMG will monitor IRWMP progress toward achieving objectives and decide whether significant changes in conditions warrant an update and subsequent re-adoption of the IRWMP.

18. RWMG will re-adopt the IRWMP a minimum of every five years, or within one year of one or more of the following conditions: (1) significantly changed conditions impacting

objectives, (2) achievement of a regional objective requiring development of an additional regional objective, or (3) need to set a new regional objective.

19. RWMG will identify and pursue funding opportunities.

20. RWMG will select a Grantee from within the RWMG members.

21. Based on results of the project prioritization process and Stakeholder input, RWMG will make a final decision on the project suite to be submitted for funding to any funding agencies.

22. RWMG will represent the Region's needs to the State including sustaining an open dialogue with the funding agency (State Department of Water Resources) regarding progress on the Upper Santa Clara River IRWMP implementation and continuing to provide feedback on project progress with cooperation from the Local Project Sponsors.

1.3.1.2 RWMG Chair Roles and Responsibilities

1. Call and attend RWMG, RWMG subcommittee, and Stakeholder meetings, and prepare and distribute agendas.

2. Act as primary liaison between Upper Santa Clara River IRWMP Region, RWMG, Stakeholders, other IRWMP Regions, and funding agencies.

3. Be selected or reaffirmed annually by RWMG.

1.3.1.3 RWMG Vice-Chair Roles and Responsibilities

1. Assume role of Chair in the absence of the Chair.

2. Assist Chair when needed.

1.3.1.4 Grantee Roles and Responsibilities

1. Apply for grant funding on behalf of the IRWMP Region.

2. Provide administration of any grant funds to help implement the IRWMP.

3. Work with Local Project Sponsors to solicit feedback on the grant administration process and help to resolve any disputes if needed.

4. Ensure effective communication between the funding agency and the Local Project Sponsors.

5. Maintain an open dialogue with the funding agency regarding progress on the Upper Santa Clara River IRWMP implementation and continue to provide feedback on project progress with cooperation from the Local Project Sponsors included in the successful grant application.

1.3.1.5 Subcommittees

Subcommittees that focus activities within the RWMG to support plan development and implementation are created on an as needed basis. There have been three subcommittees of the RWMG formed to date. The Governance Subcommittee, comprised of Los Angeles County Flood Control District, Castaic Lake Water Agency, Santa Clarita Water Division, and the Santa Clarita Valley Sanitation District, was tasked with defining and recommending a governance structure to succeed the governance structure formalized in the 2007 MOU. The Disadvantaged Community Subcommittee, comprised of Los Angeles County Department of Public Works, City of Santa Clarita, and the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, is an ongoing committee tasked with identifying, seeking input from, and communicating with disadvantaged communities within the IRWMP Region. The Salt and Nutrient Management Plan Task Force is comprised of the RWMG and any interested Stakeholders. The Salt and Nutrient Management Task Force has met as needed to provide input into preparation of the Salt and Nutrient Management Plan and to provide review of work products as they are developed (water balance, water quality projections, monitoring plan). The activities of subcommittees are reported at each stakeholder meeting.

1.3.1.6 Financing RWMG and IRWMP Activities

One expectation of becoming a RWMG member in the past has been an ability to contribute some level of financial or in-kind services towards IRWMP preparation/updates, and other administrative activities undertaken by the RWMG (holding stakeholder meetings, developing the IRWMP, etc.). The expectation is not meant to exclude any entity from having a "vote" if the entity does not have an ability to pay. On the contrary, requiring the RWMG members to bear the burden of the cost of the IRWMP program is intended to benefit all stakeholders by allowing everyone's participation and voting at stakeholder meetings without regard to their ability to contribute financially, while still guaranteeing enough funding to implement the IRWMP. One example of the necessity to make an exception to the expectation of funding contributions is the membership by the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC). The budget problems facing the State of California have severely impacted RMC's ability to attend meetings due to staffing layoffs. Every effort has been made to continue to inform and seek input from the RMC based on their importance to the Region. Rather than sharing the costs of the IRWMP update, as is done across the other seven RWMG members, RMC will provide grant funds, as specified in the MOU, if IRWMP update expenses are greater than anticipated. To date, the RWMG has not sought funding from general stakeholders, but based on economic realities, the long term funding strategy for this Region may include requesting contributions from the stakeholders that are not RWMG members.

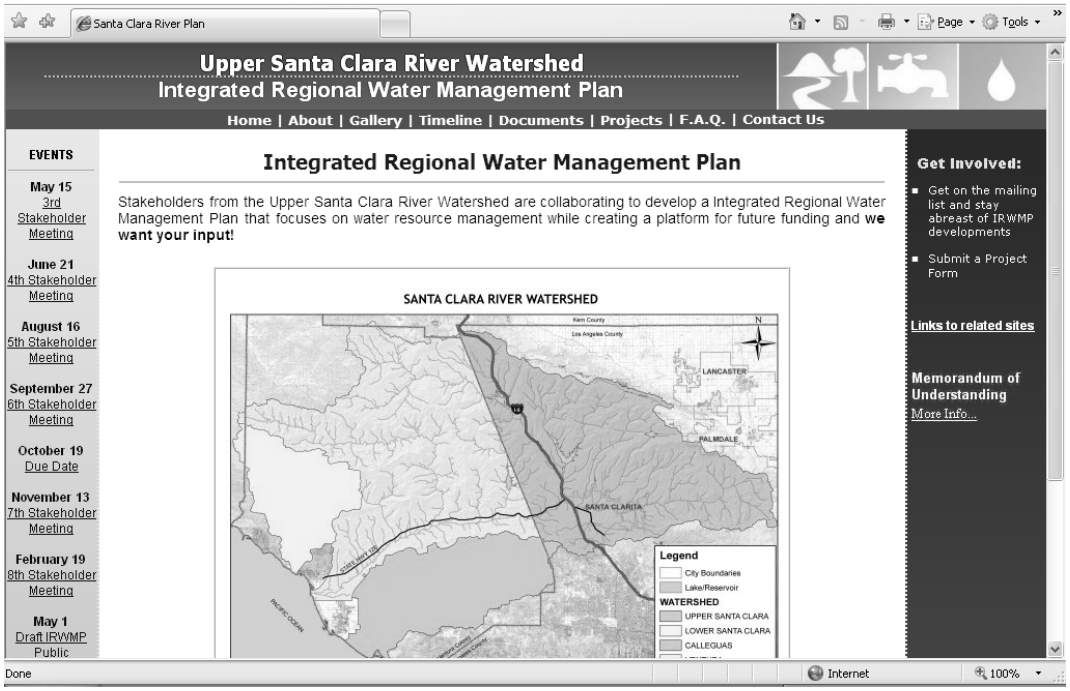
1.3.2 Stakeholders

The Stakeholder group has met periodically since February 2007 to discuss issues facing the Region. The purpose of the group is to identify regional objectives and strategies to meet the identified objectives, as well as to provide advice and feedback to assist with the development and update of the IRWMP, including developing projects to implement the IRWMP.

Stakeholders were identified during preparation of the 2008 IRWMP and revisited during the 2014 IRWMP Update through their involvement or interest in water, environment, and similar projects in the past. Brainstorming sessions were used to identify potential stakeholders. These

entities were sent a letter asking for participation in the IRWMP process. These groups in turn were asked to identify other potentially interested groups. By this process, a varied and broad group was invited to become stakeholders, and this group included entities, like well owners, that were not necessarily involved with any past efforts. Stakeholders have continued to hold regular meetings throughout the update of the IRWMP to provide an opportunity for any interested party to participate in plan development and implementation.

Stakeholder meetings are open to the public and all other interested parties. Notifications via email and the website have been used to keep the Stakeholder group informed of meetings and updates.



The IRWMP website is an important tool for facilitating communication.

1.3.2.1 Participating Stakeholders

The following subsection lists all of the Stakeholders grouped into several categories and describes their specific roles in the planning process. The broad array of participants includes the agencies that comprise the RWMG, as well as an extensive mix of town councils, regulatory, environmental, agricultural, and land use planning entities that represent all areas of the Region. A brief discussion of coordination efforts with local planning, State, and Federal agencies is also provided where appropriate.

Table 1.3-3 provides a list of the stakeholders and their mission statements.

TABLE 1.3-3
STAKEHOLDER GROUPS

Stakeholder	Mission Statement
Municipal and County Government Agencies	
City of Santa Clarita	To deliver the best and most cost-efficient municipal service to the citizens and City Council of Santa Clarita.
County of Ventura	To provide public infrastructure, services, and support so that all residents have the opportunity to achieve a high quality of life and enjoy the benefits of a healthy economy.
Los Angeles County Department of Public Works (LACDPW)	To provide public infrastructure and municipal services to protect and enrich the daily lives of over ten million people in Los Angeles County.
Los Angeles County Supervisor's Office	To support the Board of Supervisors in serving the people of Los Angeles County.
Los Angeles County Department of Regional Planning	To improve the quality of life through innovative and resourceful physical and environmental planning, balancing individual rights and community needs.
Water Suppliers/Wastewater Management/Special Districts	
CLWA	A public agency providing reliable, quality water at a reasonable cost to the Santa Clarita Valley.
LACFCD	To provide for the control and conservation of the flood, storm and other waste waters of the Flood Control District.
SCWD	A public agency providing reliable, quality water at a reasonable cost to the Santa Clarita Valley.
SCVSD	To provide environmentally sound, cost-effective wastewater management, and in the process, convert wastewater into recycled water, a valuable water resource for the Santa Clarita Valley.
NCWD	To provide quality water service at a reasonable cost by practicing careful stewardship of natural resources, utilizing innovative measures, and providing a quality working environment.
VWC	To deliver a dependable supply of safe reliable water to existing and future customers at a reasonable cost.
Business Organizations	
Building Industry Association (BIA)	To promote and protect the industry to ensure our members' success in providing homes for all Southern Californians.
Newhall Land and Farming Company	To provide a better quality of life for those who live and work in the master planned communities of Valencia and Newhall Ranch.

Stakeholder	Mission Statement
Atkins Environmental	To be a resource for environmental, health & safety issues. To provide sparkling service with professionalism, honesty, integrity, trust, and respect. To seek to balance the demand for resources with the needs of the community.
Recreational and Open Space Entities	
Rivers and Mountains Conservancy	To preserve open space and habitat in order to provide for low-impact recreation and educational uses, wildlife habitat restoration and protection, and watershed improvements within our jurisdiction.
Nature Conservancy	To preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.
Los Angeles County Department of Parks and Recreation	To provide the residents and visitors of Los Angeles County with quality recreational opportunities that promote a healthy lifestyle and strengthen the community through diverse physical, educational, and cultural programming, and to enhance the community environment by acquiring, developing, and maintaining County parks, gardens, golf courses, trails, and open space areas.
Mountains Recreation and Conservation Authority	To acquire, develop, and conserve additional park and open space lands with special emphasis on recreation and conservation projects, the protection and conservation of watersheds, and the development of river parkways.
Regulatory and Resource Agencies- State and Federal	
California Department of Fish and Wildlife (CDFW)	To manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.
California Department of Transportation (Caltrans)	Improve mobility across California.
California Department of Water Resources (DWR)	To manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.
Los Angeles Regional Water Quality Control Board (RWQCB)	To preserve and enhance the quality of California's water resources for the benefit of present and future generations.
Natural Resources Conservation Service (NRCS)	“Helping People Help the Land,” by providing products and services that enable people to be good stewards of the Nation’s soil, water, and related natural resources on non-Federal lands.

Stakeholder	Mission Statement
US Army Corps of Engineers (US ACE)	To provide quality, responsive engineering services to the nation including: planning, designing, building, and operating water resources and other civil works projects (Navigation, Flood Control, Environmental Protection, Disaster Response, etc.); designing and managing the construction of military facilities for the Army and Air Force (Military Construction); providing design and construction management support for other Defense and federal agencies (Support for Others).
US Fish and Wildlife Service (US FWS)	To work with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.
US Forest Service-Angeles National Forest	To sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.
Non-Profit Organizations and Other Stakeholders	
Acton Town Council	To provide a stronger local voice in community development, and to try to ensure the continuation of Acton's country lifestyle.
Association of Water Agencies of Ventura County	To develop and encourage cooperation among entities for the development, protection, conservation and improvement of the total water resources for Ventura County.
Agua Dulce/Acton Country Journal	To be a resource for existing, new, and future residents of the Agua Dulce/Acton community.
Agua Dulce Town Council	To serve as a common meeting place for the free expression of all views and for the coming together of diverse opinions into a consensus; to discuss issues concerning Agua Dulce, to invite participation by the public, civic, and private organizations; to serve as Agua Dulce's representatives and to speak on behalf of the community; to review public and private proposals that may affect the community; to neither support nor oppose any political party or candidate.
Castaic Area Town Council	To act as an advisory board presenting community points of view to the Los Angeles County Board of Supervisors and various County departments such as Regional Planning, Public Works, and Parks & Recreation.
Santa Clarita Organization for Planning the Environment	To promote, protect, and preserve the environment, ecology, and quality of life in the Santa Clarita Valley.

Stakeholder	Mission Statement
Santa Clarita Valley Well Owners Association	Preserve our present and future water supply by working together to promote sustainable water consumption by all stakeholders in the aquifer's resource; protect our rights as private well owners and our collective parity as stakeholders in the management of the areas' subterranean water resources; educate our members in matters relative to water rights, quality, resources, historical data and any other information relevant to owning and maintaining a private water well system; advocate on behalf of the rights of private well owners collectively and individually.
University of California Cooperative Extension	The welfare, development, and protection of California agriculture, natural resources, and people.
Ventura County Resource Conservation District (VCRCD)	To provide assistance to help both rural and urban communities to conserve, protect, and restore natural resources.
Santa Clara River Watershed Conservancy	Non-profit land trust and wildlife conservation organization, formed to advocate for and acquire undeveloped land in the Santa Clara River watershed.

1.3.2.1.1 Municipal and County Government Agencies

Municipal and county government agencies include local jurisdictions and land use planning agencies that have been involved in the identification of issues, formation of objectives, and development of projects to implement this IRWMP. Their participation provides a link between local planning agencies and this IRWMP by offering discussion in meetings, providing accurate, consistent land use planning information, and incorporating local planning documents and goals into the project objectives. The City of Santa Clarita, the Los Angeles County Department of Regional Planning, the County of Ventura, LACDPW, and the Los Angeles County Supervisor's Office are examples of land use agencies and entities participating in the meetings.

1.3.2.1.2 Water Suppliers/Wastewater Management/Special Districts

The water suppliers, wastewater management agencies, and special districts of the Region have been involved in the development and implementation of the objectives and projects for this IRWMP. Their participation has focused particularly on the water supply issues pertaining to the Region. These agencies include CLWA, LACFCD, SCWD, SCVSD, NCWD and VWC. Additionally, the Sierra Pelona Mutual Water Company and the Lake Elizabeth Mutual Water Company have been invited to participate in the process.

1.3.2.1.3 Business Organizations

The Building Industry Association's (BIA) interest is in land-use planning and growth management within the Region. The building industry entities involved include the Greater Los

Angeles/Ventura Chapter of the BIA. Agricultural and farm interests for the Region have been represented by the Newhall Land and Farming Company. Their role is to ensure that agricultural and farm interests are incorporated in this IRWMP. Input was also solicited from the broader business community at the start of the Stakeholder process.

1.3.2.1.4 Recreational and Open Space Entities

The role and responsibility of the recreational and open space entities is to ensure that issues and goals related to conservation and protection of the natural resources and habitat within the Region are incorporated in this IRWMP. Those involved include the Rivers and Mountains Conservancy and the Nature Conservancy. Input was also solicited from the Los Angeles County Department of Parks and Recreation, the Mountains Recreation and Conservation Authority, and City of Santa Clarita's Open Space Preservation District.

1.3.2.1.5 Regulatory and Resource Agencies - State and Federal

Several State and Federal regulatory agencies have been involved in the identification of issues, formation of objectives, and development of projects for this IRWMP. Coordination with these regulatory agencies is essential to the development and implementation of all recommended projects due to the need for regulatory and environmental approval prior to implementation. Their roles and responsibilities are to ensure that regulatory compliance standards and goals are incorporated in this IRWMP. The agencies include: CDFW, Caltrans, DWR, Los Angeles RWQCB, NRCS, US ACE, US FWS, and US Forest Service - Angeles National Forest.

1.3.2.1.6 Other Stakeholders/Non-Profit Organizations

Other Stakeholders involved in the development and implementation of the objectives for this IRWMP include the following: Agua Dulce/Acton Country Journal, Agua Dulce Town Council, Atkins Environmental, Castaic Area Town Council, Foothills Associates, Santa Clara River Watershed Conservancy, Santa Clarita Organization for Planning for the Environment, Santa Clarita Valley Well Owners Association, University of California Cooperative Extension, Town Councils of Acton and West Ranch, and the VCRCD.

1.3.2.1.7 Stakeholder Group Roles and Responsibilities

The following is a list of roles and responsibilities for the Stakeholder group.

1. Attend and participate in stakeholder meetings.
2. Be an agency/organization with an interest in a watershed related issue.
3. Offer suggestions for meeting IRWMP objectives.
4. Propose and/or sponsor projects.
5. Provide input on the project prioritization framework development.

6. Make recommendations regarding project ranking within the process outlined in the project prioritization framework.

7. Review and comment on all versions of the IRWMP.

8. Represent each agency/organization having a single vote at a Stakeholder meeting.

9. Be able to show support for the IRWMP (e.g., adopt it [if the Stakeholder meets the requirements for adoption as set forth in the funding guidelines], sign a resolution in support of it, or submit a letter of support to the RWMG for inclusion in the adopted IRWMP).

1.3.2.2 Ground Rules and Operating Procedures

In order to guarantee a fruitful process and foster full participation, Stakeholder meetings are governed by a set of agreed-upon "ground rules" and "operating procedures" as listed below.

1.3.2.2.1 Ground Rules for Participation

1. Cooperate with the process, including the scope and intent of our planning effort together and specific agenda topics.

2. Work toward shared goals, proposing strategies that relate to the goals and that may be acceptable to all stakeholders.

3. Base your opinions, ideas and comments on facts and experience rather than on perception.

4. Participate fully in the group discussion.

5. Keep your comments brief and constructive.

6. Focus on issues instead of people or personalities.

7. Reference the past if needed, but look to the future.

8. Be respectful of differing perspectives and opinions.

9. Stay with the topic at hand or hold your comment and yield to someone who has a comment on the topic at hand.

10. Be open to new ideas and be expansive in your thinking.

1.3.2.2.2 Operating Procedures

1. Stakeholders will abide by the agreed upon participation ground rules and operating procedures during this process.

2. We will strive for mutual agreement but note when we have a minority opinion.

3. Stakeholders are encouraged to participate consistently and attend all meetings. If unable to attend, a Stakeholder may send an alternate to ensure the organization's consistent participation.

4. Stakeholders who are participating based on their organizational affiliation represent the organization; their opinions should be consistent with and as authorized by the organization.

As described in the following sections, participants in the Upper Santa Clara River IRWMP have been able to address, discuss and recommend regional objectives and strategies and propose projects to meet those objectives.

1.3.3 Relationship with Neighboring IRWMPs

The Upper Santa Clara River IRWMP Region is adjacent to four planning regions that are currently represented by IRWMPs. These consist of the Antelope Valley IRWMP in the North/South Lahontan-Funding Region, the Kern County area in the Tulare/Kern-Funding Region, the Greater Los Angeles County Region IRWMP in the Los Angeles-Funding Region; and as described earlier, the WCVC IRWMP, also within the Los Angeles-Funding Region. These four plan areas surround the Region (however none overlap with the Upper Santa Clara IRWMP Region except for a minor portion of the Kern IRWMP). Therefore, the Upper Santa Clara River IRWMP plays an integral role in completing watershed analyses for the Los Angeles-Funding Region and providing an important link to the neighboring North/South Lahontan and Tulare/Kern-Funding regions. The collective efforts of these interconnected IRWMPs will not only benefit their respective regions, but each other and the watersheds of Southern California as a whole.

1.3.3.1 The WCVC IRWMP Region

The WCVC and Upper Santa Clara River IRWMP regions have undertaken separate, but coordinated, planning efforts since 2006. The two regions are currently cooperating on a number of programs and working together through their respective stakeholder processes, planning efforts, projects, and programs to ensure that the entire Santa Clara River watershed is protected and managed appropriately, despite the division of the county boundary. Specific collaborations include:

1. Joint Stakeholder Meetings – To coordinate and share plan and project implementation, the Upper Santa Clara River and WCVC IRWMP regions regularly hold joint stakeholder meetings, alternating meeting locations in both Ventura and Los Angeles counties.

2. Climate Change Workshop – A common stakeholder outreach and input meeting was held for the Upper Santa Clara IRWMP, WCVC, and the Santa Barbara Countywide IRWMP. The workshop educated stakeholders on climate change and climate change vulnerabilities and acted as a forum to identify opportunities to share data.

3. Watershed U – Collaboration throughout the Santa Clara River Watershed led by U.C. Cooperative Extension with participation in both counties.

4. Memorandum of Understanding between United Water Conservation District and water agencies in the Upper Santa Clara River Watershed regarding groundwater modeling, water rights, quality and quantity.

5. Upper and Lower Santa Clara River Conservation Plans prepared by the Nature Conservancy with participation in both counties.

6. Natural Flood Plain Management efforts, including land acquisition for easements in the flood plain, led by the Nature Conservancy with participation in both counties.

7. Santa Clara River Parkway Project – Led by California Coastal Conservancy with participation in both counties.

8. Santa Clara River Enhancement and Management Plan –Joint planning effort with entities in both counties and the Army Corp of Engineers.

9. Army Corps Feasibility Study – A geomorphology assessment that included a joint effort with both counties and the Army Corps of Engineers.

10. Land use planning – Ongoing discussions between Ventura and Los Angeles counties' land use planning agencies regarding land development projects in the Upper Santa Clara River Watershed.

11. Ongoing efforts to improve habitat and provide stewardship for resources in the entire watershed. Some local environmental groups cover the entire watershed.

12. Ongoing coordination between Los Angeles and Ventura Counties regarding flood control projects.

Over the past several years multiple alternatives for compliance with the chloride TMDL have been evaluated by all Stakeholders, including members of the USCR and WCVC Regions. On October 28, 2013, the Santa Clarita Valley Sanitation District certified the Final Chloride Compliance Facilities Plan and associated Environmental Impact Report and approved a project consisting of ultraviolet disinfection, advanced treatment using reverse osmosis, and deep well injection for brine disposal, that complies with the final wasteload allocations of the chloride TMDL.

1.3.3.2 Kern IRWMP

At the northernmost portion the Upper Santa Clara River IRWMP shares a very small piece of boundary with the Kern IRWMP. The consultant team for the Kern Region, which also prepared the Upper Santa Clara River IRWMP, has consulted with the RWMG for the Upper Santa Clara River IRWMP regarding this small shared area, and has not identified issues needing further coordination between the two planning regions.

1.3.3.3 Antelope Valley IRWMP

To the northeast, the Upper Santa Clara River IRWMP shares a boundary with the Antelope Valley IRWMP. Common stakeholders of the two IRMWP regions include the Waterworks

Districts of Los Angeles County and Sanitation Districts of Los Angeles County. Frequent communication occurs also with staff from the Los Angeles County Flood Control District and the Los Angeles County Sanitation Districts working on the neighboring IRWMPs. Though there is some overlap in water resource agency jurisdiction, the areas are separated by a significant watershed boundary and the Antelope Valley IRWMP region is outside of the Santa Clara River watershed.

1.3.3.4 Greater Los Angeles County IRWMP

The Greater Los Angeles County IRWMP resides to the south of the Upper Santa Clara IRWMP. There is some overlap in water resource agency jurisdiction (e.g., Los Angeles Department of Public Works); however, these two IRWMPs do not have common local water resources. The Upper Santa Clara River IRWMP interacts with the Greater Los Angeles Region as part of the Roundtable of Regions. Additionally, the Upper Santa Clara River IRWMP has actively participated with both WCVC and the Greater Los Angeles regions in efforts to develop a funding formula for the Los Angeles-Funding Region.

1.3.4 Void or Excluded Areas

The Upper Santa Clara River IRWMP region does not have any voids or excluded areas immediately outside or within its boundaries with the exception of a small area of Arroyo Simi in the western portion of Los Angeles County within the watershed of Calleguas Creek. This area lies outside of the IRWMP management at this time. If required to belong in an IRWMP region, either WCVC or the Greater Los Angeles areas would be appropriate since the Arroyo Simi is within a WCVC watershed and also within the same political boundary (City of Los Angeles) as the Greater Los Angeles IRWMP region.

Section 2: Region Description

2.1 Introduction and Overview

This section discusses why preparation of an IRWMP for this Region is appropriate, describes the physical and environmental characteristics of the Region, describes social and demographic characteristics of the Region, and provides an overview of the Region's water system.

The major water bodies in the Region include the Santa Clara River and its tributaries. The principal tributaries are Castaic Creek, San Francisquito Creek, Bouquet Creek, Mint Canyon and the South Fork of the Santa Clara River. Upper tributaries also contribute to the riparian network, including, but not limited to Gorman Creek and Amargosa Creek. Additionally, the Santa Clara River receives tertiary-treated recycled water discharged from the Saugus and Valencia water reclamation plants, which are operated by the SCVSD. The main channel of the Santa Clara River is the last major undammed river system in Southern California, a situation that makes its preservation extremely important to the stakeholders. Figures 1.1-1 and 1.1-2 map the Region boundaries and the key hydrologic features. As shown in Figure 2.1-1, the Santa Clara River is divided into various reaches; within the Upper Santa Clara River there are four defined reaches (as defined by the Los Angeles RWQCB Basin Plan):

- Reach 5 (Blue Cut). Upstream of the USGS Blue Cut Gauging Station to the West Pier Highway 99 (now the Old Road Bridge)
- Reach 6 (Highway 99). Upstream of Highway 99 (now Old Road Bridge) to Bouquet Canyon Bridge
- Reach 7 (Bouquet Canyon). Upstream of Bouquet Canyon to Lang Gauging Station
- Reach 8 (Above Lang Gauging Station). Lang Gauging Station to headwaters

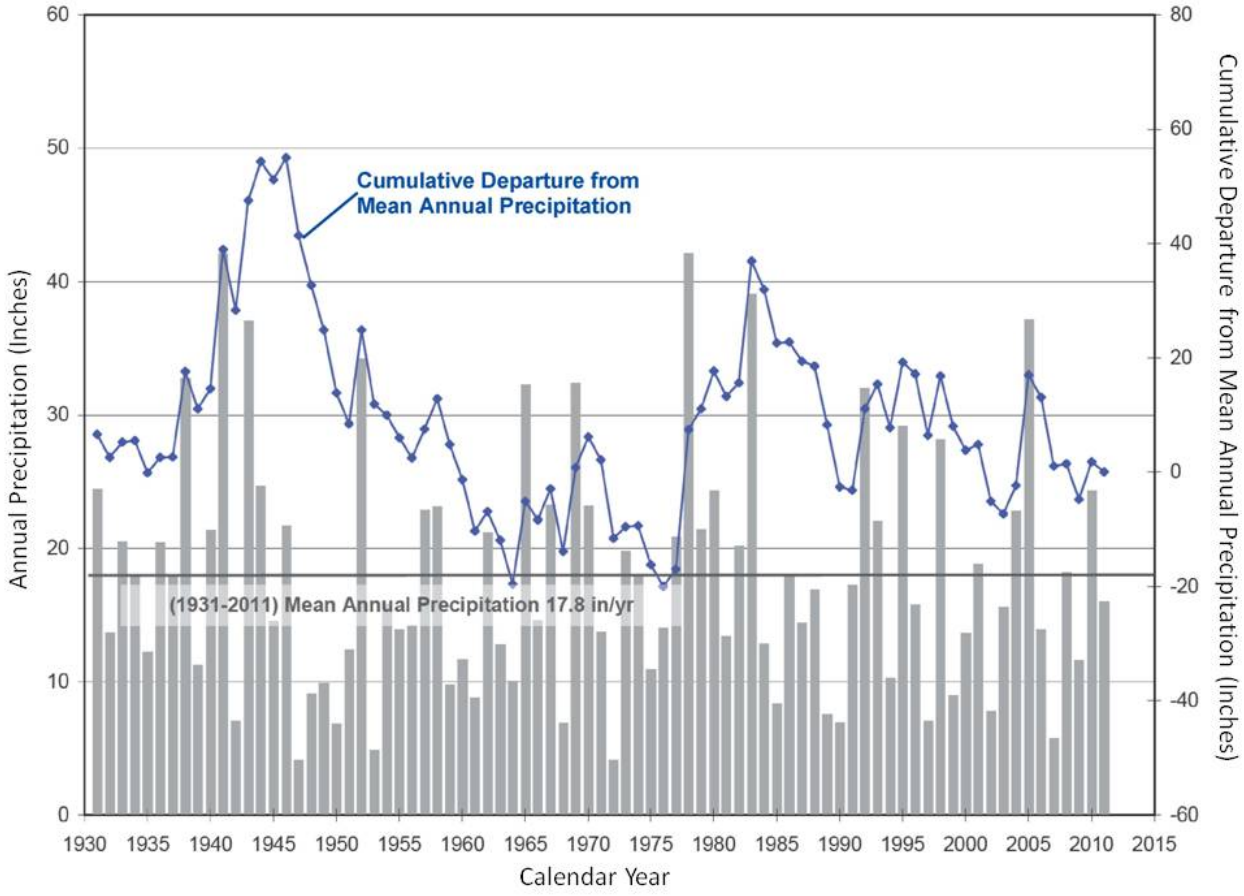
The upper portion of the Santa Clara River and its tributaries are typically ephemeral streams, having intermittent surface flows only during, and immediately after, periods of intense precipitation. The geologic characteristics of the alluvial sediments in the riverbed in this section of the river provide excellent percolation, and flowing water quickly recharges to the underground aquifers below the river. Perennial flows begin near the Old Road Bridge, due to both recycled water discharges and unique geologic conditions that force groundwater to rise to the surface. However, downstream of Blue Cut a "dry gap" from near Blue Cut to Piru Creek exists for much of the year, making the Upper Santa Clara River a hydrologically independent system from the Lower Santa Clara River for much of the year. Because of these characteristics and due to its history of cooperative water management, the topography and geography of the Region and the similarity of water issues facing agencies within the Region, the Upper Watershed is a logical region for integrated regional water management.

2.2 Climate

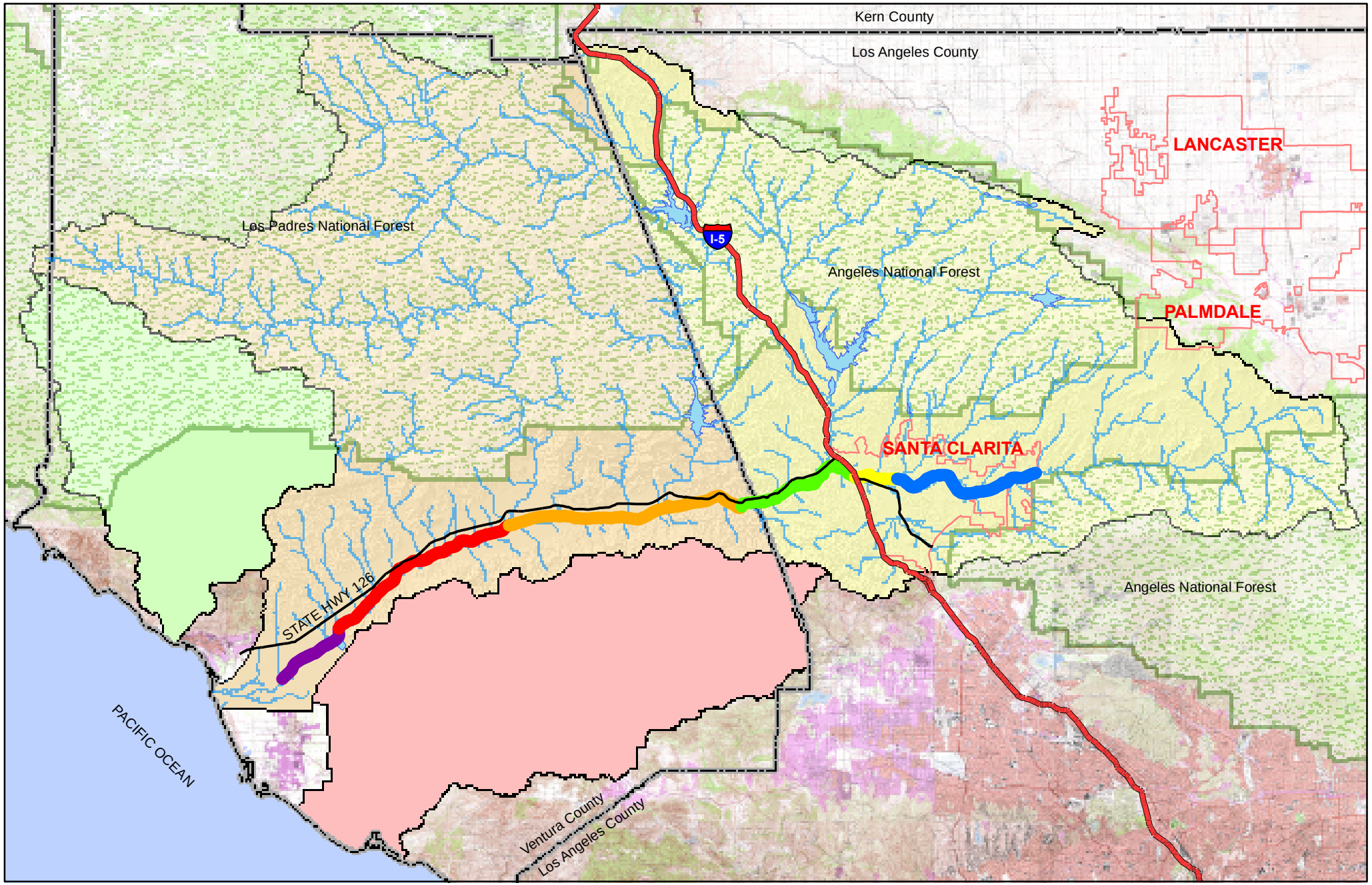
The watershed is characterized by an arid climate. Intermittent periods of less-than-average precipitation are typically followed by periods of greater-than-average precipitation in a cyclical pattern, with each wetter or drier period typically lasting from one to five years. The long-term

average precipitation is 17.8 inches (1931-2010), as shown in Figure 2.2-1 for the Newhall-Soledad 32c gage. The National Climatic Data Center (NCDC) and LADPW have maintained records for the Newhall-Soledad 32c gage since 1931. In general, periods of less-than-average precipitation are longer and more moderate than periods of greater-than-average precipitation. Recently, the periods from 1971 to 1976, 1984 to 1991, and 1999 to 2003 have been drier than average; the periods from 1977 to 1983 and 1992 to 1996 and year 2005 have been wetter than average. Starting in 2006, the Region has experienced drier than average conditions, with a minimum annual precipitation of less than 14 inches measured at the Newhall-Soledad gauge in 2007. Year 2008 was an exception with average rainfall, as was year 2010 with above average precipitation of over 24 inches (CLWA et al. 2012). However, 2011 was again below average with approximately 16 inches (LADPW 2012).

FIGURE 2.2-1
ANNUAL PRECIPITATION



Source: CLWA, et al. 2012 (*SCV Water Report)*.



Legend

WATERSHED

- UPPER SANTA CLARA
- LOWER SANTA CLARA
- CALLEGUAS
- VENTURA

- SCR Reach 7
- SCR Reach 6
- SCR Reach 5
- SCR Reach 4
- SCR Reach 3
- SCR Reach 2

- City Boundaries
- Lake/Reservoir
- Forest Boundaries

0 2.5 5 10 15 20 Miles

Figure 2.1-2
Santa Clara River Reach Boundaries

As part of this IRWMP Update a Climate Change Technical Study was prepared. The Climate Change Technical Study provides details on the potential effects of climate change (changes in temperature, changes in precipitation), describes the Region's vulnerability to climate change, and identifies strategies for adapting to climate change. The Climate Change Technical Study is Chapter 5 of this IRWMP Update.

2.3 Land Use

Major existing land use categories identified in the 2011 *City of Santa Clarita General Plan* and the 2011 *Santa Clarita Valley Area Plan, described in Section 2.3,* within the Region include the following:

- Residential: Residential uses include a mix of dwelling units developed at varying densities and with varying housing types. Residential uses in the Region include single-family – detached and attached, multiple-family, mobile home, senior housing, as well as live-work units and group living facilities.

- Commercial: This category includes retail and offices that offer goods and services to the general public, and wholesale and service uses provided to businesses. This category also includes food services, personal services, automobile services, entertainment, and hospitality services, day care services, and regional commercial uses such as big box retailers and auto malls.

- Mixed Use: This category includes commercial retail, office, and service uses intermingled with higher density residential uses, within a master-planned complex designed to ensure that residents are not adversely impacted by commercial operations or traffic, and that businesses benefit from the proximity of customers living nearby.

- Industrial: The industrial category includes heavy manufacturing and light industrial uses found in business, research, and development parks. Light industrial activities include warehousing, wholesale trade and some types of assembly work. This category may also include fabrication and assembly of large items, resource extraction, processing of raw or recycled materials, and businesses that use or generate hazardous materials.

- Public /Institutional: Government buildings, hospitals, libraries, schools, fire and police stations, solid waste facilities, cultural and community centers and other public institutions are found in this category. Uses in this category support the civic, cultural, and educational needs of residents. Special uses such as correctional facilities are also grouped in this category.

- Transportation, Communication, and Utilities: This category includes freeways and major roads, bikeways, railroads, park and ride lots, truck terminals, airports, communication facilities, and similar uses. (This category is included under the Public/Institutional category in the Santa Clarita General Plan.)

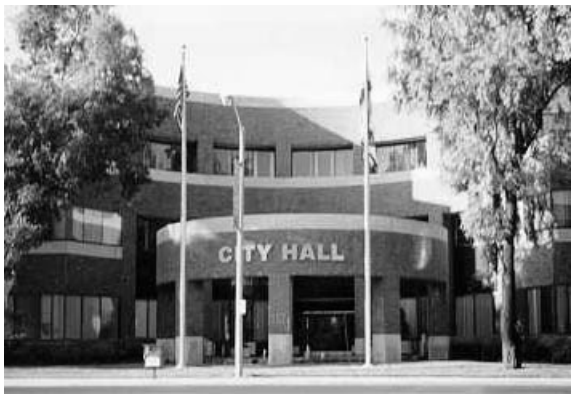
- Open Space and Recreation: This category encompasses the Angeles National Forest and land used for private and public recreational facilities, conservancy land and other land set aside for preservation of open space and natural resources, and local and

regional parks and multi-purpose trails. Recreational areas, including golf courses and water bodies and water storage.

- Rural: The rural lands category includes low-density residential uses on large lots, in areas characterized by rural development interspersed with natural open space. Agricultural uses in rural lands include grazing horticulture, row, field, and tree crops, and limited keeping of livestock, horses and other large animals.

2.3.1 Land Use Policies

There are three land use jurisdictions in the Region; the City of Santa Clarita, the unincorporated areas of Los Angeles County, and the Angeles National Forest. The land use policy documents that govern the Region and their areas of jurisdiction are as follows:



City of Santa Clarita City Hall

- 2011 *City of Santa Clarita General Plan*. This plan encompasses the City of Santa Clarita and the communities of Newhall, Canyon Country, Valencia, and Saugus.

- *Los Angeles County General Plan 2035 (Draft)*. This document covers all of the unincorporated County. Two components of this plan are the Santa Clarita Valley Area Plan and the Antelope Valley Area Plan.The Santa Clarita Valley Area Plan covers the unincorporated portions of the Santa Clarita Valley and includes the communities of Castaic, Agua Dulce, San Francisquito Canyon, Val Verde, West Ranch, Stevenson Ranch, Westridge, Violin Canyon, Hasley Canyon, Hillcrest, and the future Newhall Ranch. Several Antelope Valley Area Plan communities within the Santa Clara River Watershed include Gorman, Acton, Three Points, The Lakes, and Green Valley.


Los Angeles County Hall of Administration

- 2005 *Southern California National Forests Land Management Plans*. A large portion of the watershed includes the Angeles National Forest and also a portion of the Los Padres National Forest, which are covered by their respective Forest Plans developed by the US Forest Service.

Concurrently with the 2011 adoption of the City of Santa Clarita General Plan, the County of Los Angeles adopted the One Valley One Vision (OVOV) Santa Clarita Valley Area Plan. OVOV is a joint effort between the County, the City of Santa Clarita, and Santa Clarita Valley (Valley) residents and businesses to create a single

vision and defining guidelines for the future growth of the entire Valley Planning Area[1]. The OVOV effort is intended to achieve enhanced cooperation between the County and the City, coordinated land use planning, improved infrastructure and natural resource management, and enhanced quality of life for those who live and work in the Valley. The Vision and Guiding Principles formulated as part of the process serve as a framework for the preparation of consistent Plans for the Valley by both the City of Santa Clarita and Los Angeles County. The updated Santa Clarita Valley Area Plan is consistent with both the County's comprehensive General Plan and with the City's General Plan. It does not include all of the mandatory General Plan elements, as these are addressed on a Countywide basis by the County's General Plan. OVOV policies will be implemented and managed by the County of Los Angeles through adoption of the updated Area Plan as part of its General Plan and based on goals and policies contained in the Area Plan. The portions of the planning area within the incorporated boundaries of the City of Santa Clarita will be regulated by the City's updated General Plan, which like the Area Plan, reflects the common goals and policies agreed to as part of the OVOV effort (County of Los Angeles 2011, City of Santa Clarita 2011). In connection with the Santa Clarita Valley Area Plan Update, an Environmental Impact Report (EIR) was also completed.

The individual General Plans of the County and City of Santa Clarita and the Valley Area Plan contain policies which govern the decision-making entity as to how they review and condition individual development projects and formulate their future improvements. Typically, such policies are grouped together into elements including "Air Quality" and "Transportation." Water management has typically been included in the "Open Space and Conservation" section.

One of the results of this IRWMP is an inventory of water-related policies and programs in order to assist each jurisdiction in planning its water management efforts. Such an inventory has been collected, discussed, and redistributed to these jurisdictions and is found in Appendix C. By heightening the awareness of those directly responsible for the jurisdictions' General Plans, it is expected that additional and more effective policies and programs will be introduced into their decision-making/review processes.

For example, the City of Santa Clarita, the County of Los Angeles, and National Forest Service respective land use plans have a number of adopted programs, policies and procedures which affect water management including:

- The Los Angeles County General Plan, under its "General Goals and Policies" and in the "Conservation and Open Space Element," contains specific goals and policies governing water supply, water conservation, water quality, and natural watershed processes and protection.

- The Santa Clarita Valley Area Plan and City of Santa Clarita's General Plan have generally coinciding "Conservation and Open Space" elements which provide policies on water resources, specifically addressing issues related to surface water, groundwater and long-term water supply, as well as flood control, water conservation, and water quality.

[1] In the initial planning phases of the One Valley, One Vision process, the community of Acton was included within the planning area. The 2004 Technical Background Report was prepared assuming inclusion of Acton in the planning area. However, since 2004, Acton has joined the Antelope Valley Planning Area.

- The Forest Plans outline several goals and objectives to strategically manage the forests and their water resources, including watershed and riparian system improvements and groundwater management.

While these planning documents contain some strategies for water management, it is recognized that additional strategies may be available to further water management. The information compiled by, and contained in, this IRWMP will help the jurisdictions working together to better manage water resources.

In addition to the authority vested in public land use planning agencies, other entities including water agencies, LAFCO, and the Southern California Association of Governments (SCAG) also influence land use. Under State law (Senate Bill 221 [Chapter 642 Statutes of 2001] and Senate Bill 610 [Chapter 643 Statutes of 2001]), land use planning agencies must consult with local water agencies to determine if adequate supplies of water are available to serve proposed land developments. Additionally, water agencies must coordinate with land use planning agencies in the development of their urban water management plans, which include projections of future water demand and water supply availability during normal and dry periods. Water agencies and land use planning agencies within California are working together to ensure adequate management and planning for water supplies to meet the needs of growing communities.

The 2008 Regional Comprehensive Plan, developed by SCAG, is a holistic, strategic plan for defining and solving inter-related housing, traffic, water, air quality, and other regional challenges. The plan identifies the following regional challenges with respect to water resources:

> "Recent projections indicate that nearly half of the state's population will reside within the SCAG region by 2030. This underscores the importance of questions about Southern California's future water supply, and of reliably meeting our urban water demands in a way that is sensitive to both ecological imperatives and the evolving emphasis on sustainable development. We also face challenges in how we assure a high quality water supply for consumption, recreational, habitat, and other needs.
>
> Eliminating water quality impairments throughout the region's urban watersheds is a major challenge. These impairments (usually caused by "non-point" source pollutants) are largely caused by urban and stormwater runoff and must be cleaned up under the Clean Water Act. As a result, water quality regulators are imposing significant and costly pollution control measures on local agencies with compliance deadlines."

The Regional Comprehensive Plan focuses on three strategies and goals for addressing these water supply and water quality issues.

First, is the development of sufficient water supplies to meet the water demands created by continuing regional growth through promoting policies that encourage environmentally sustainable imports, local conservation and conjunctive use, and reclamation and reuse.

Second, is to improve water quality by implementing land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste through more concentrated and clustered developments.

Third, the region needs to improve comprehensive and collaborative watershed planning that yields water wise programs and projects.

This IRWMP directly helps to meet the first and third strategies.

Preparation of this IRWMP was coordinated with local land use agencies; details of this coordination appear in Section 11 of this IRWMP.

2.3.1.1 City of Santa Clarita Climate Action Plan

In 2011, as part of the OVOV plan process, the City of Santa Clarita began developing a Climate Action Plan (CAP), which will serve as a component of the general plan document for the City to address greenhouse gas (GHG) emissions. The State of California requires all cities updating or creating a new general plan document to consider its impacts on GHG emissions, which requires completion of a CAP. The CAP must achieve the emission reduction goals outlined in the Global Warming Solutions Act of 2006 (AB 32), requiring statewide GHG emissions to be reduced to 1990 levels by 2020. Regional targets to enable meeting statewide goals are set according to SB 375, the Sustainable Communities and Climate Protection Act of 2008, and served as a guideline for the City's CAP.

The purpose of the CAP is to measure the amount of GHG emissions generated within the City and to develop strategies to reduce future emissions. Year 2005 baseline year GHG emissions were used, as established by SB 375, to conduct an inventory for the entire community from all sources, primarily from vehicles and energy use in buildings. On-road vehicle emissions made up the majority of baseline year GHG emissions with 60 percent.

Several strategies, consistent with the goals and objectives outlined in the new General Plan, were identified for reducing GHG emissions as part of the CAP mitigation plan. It was determined that the largest portion of total GHG emission reductions, 65 percent, can be achieved by decreasing vehicle miles traveled in the City via changes in land use patterns and increased emphasis on transit and alternative transportation programs. Creation or acquisition of new vegetated space, including tree planting could contribute to 21 percent of emission reductions. Water efficiency measures could account for 11 percent of reductions and include recycled water use, SMART controllers for irrigation and other water conservation measures. Finally, energy conservation through increased use of solar and wind power is estimated to contribute to 3 percent of total emission reductions.

Implementation of the developed mitigation plan would result in 2020 net emissions approximately 4 percent below 2005 City baseline levels, and thereby exceeding the AB 32 statewide GHG emission reduction mandate.

The efforts associated with the Climate Action Plan and this IRWMP are highly complementary and strategies from both plans clearly align. Regional climate change impacts and vulnerabilities that have been assessed as part of this IRWMP update are described in Section 5.

2.4 Ecological Processes and Environmental Resources

This section describes the basic environmental resources and ecological processes of the Watershed, and also describes relevant issues and existing and potential venues for resolution of these issues.

The principal natural features of the Upper Santa Clara River Region include the Santa Clara River, Aliso Canyon, Soledad Canyon, the Santa Clarita Valley, Castaic Valley, San Francisquito Canyon, Bouquet Canyon, Placerita Canyon, and Hasley Canyon, as well as the open space and forest resources of the Angeles National Forest. This complex topography provides a natural setting that supports a diverse assemblage of biotic communities. As one of the last free-flowing natural riparian systems remaining in Southern California, the Santa Clara River provides breeding sites, traveling routes and other essential resources for wildlife, thereby contributing to the great diversity and abundance of organisms in the Region. The Upper Santa Clara River Region is home to a range of endangered, threatened and rare species, including fish species such as unarmored threespine stickleback (*Gasterosteus* aculeatus *williamsoni*).

The natural ecosystem, comprised of a wide variety of biological resources (plant and animal species), as well as physical attributes (land, water, air and other important natural factors), is a vital resource contributing to the economic and physical well being of the communities of the Upper Santa Clara River. Disruption of one factor may intrinsically affect another due to its inter-relationship, and the significance of those effects is difficult to determine without consideration of the whole system. All native species and ecosystems are of aesthetic, ecological, educational, historic, recreational and scientific value.

Ecological processes in the Region which are influenced and improved by water management measures are numerous. Of major concern in the Upper Santa Clara River Region is natural water production and watershed protection, which is critical to maintaining a healthy and balanced ecosystem, one which protects plant and wildlife species and provides for regionally valuable recreational uses (e.g., hiking, camping, hunting, and many other forms of outdoor recreation).

NATURAL FEATURES OF THE UPPER SANTA CLARA RIVER

- Angeles National Forest
- Aliso Canyon
- Bouquet Canyon
- Castaic Valley
- Hasley Canyon
- Placerita Canyon
- San Francisquito Canyon
- Santa Clara River
- Santa Clarita Valley
- Soledad Canyon
- Vasquez Rocks

The Upper Santa Clara River system is largely defined as an ephemeral stream with highly variable flows, depending on precipitation levels. It can also be prone to flooding, as was observed during the 2004-05 rainy season, which resulted in damage to many agricultural and urban properties. However, some flood control and prevention measures can have negative impacts on natural habitat, particularly riparian habitat.

Water reclamation, aerial deposition, imported water use, as well as urban and agricultural land practices can affect water quality (see Section 3). Impaired waterbodies in the Upper Santa Clara River Region are listed in Section 2.8.1 of this IRWMP. Implementation of programs such as the TMDL program, National Pollutant Discharge Elimination System (NPDES) and the Nonpoint

Source Pollution Control Program are key to integrated water management to protect water quality and beneficial uses of the State's waterbodies.

Part of the intent of IRWM program is to create a framework and a collaborative process whereby conflict between different water uses can be avoided or reduced. In the past, development of water supply for human use was done without due regard for habitat preservation or restoration. However increasing priority is being given to changing the process of water resource development and human use to conduct these activities in ways which will not damage natural resources, and to restoring damaged natural habitats so that they not only survive but thrive. A large and growing preservation and restoration movement is underway in the Region which has local jurisdictions working in conjunction with habitat preservation advocacy groups, in an attempt to restore balance and improve water quality of one of the last large, natural riparian ecosystems in Southern California.

2.4.1 Sensitive Biological Resources

The Region is host to at least 26 special status plant species and 46 special status wildlife species. These are species of plants and animals that are designated endangered, threatened or rare by the California Fish and Game Commission or the U.S. Department of the Interior and Department of Commerce. A federally listed endangered species is one facing extinction throughout all, or a significant portion of, its geographic range. A federally listed threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy; and a threatened species as one present in such small numbers throughout its range that it may become endangered if its present environment worsens. The Rare species designation applies only to California native plants.

Additionally, there are many species whose survival and reproduction in the wild are in immediate jeopardy and are considered to be sensitive to further intrusion upon their habitat. Species that are not listed under the Federal Endangered Species Act or the California Endangered Species Act, but which nonetheless are declining at a rate that could result in a designation of Endangered, Threatened or Rare, are classified as Species of Special Concern.

The vegetation and habitat types in the Region that merit "special status" because they are considered unique, are limited in distribution in the Region, or provide particularly high wildlife value include: native grassland, coast live oak riparian forest, southern willow scrub, big-cone spruce-canyon oak forest, southern sycamore-alder woodland, southern cottonwood-willow riparian woodland and forest, freshwater marsh, alluvial fan sage scrub, and vernal pool (CLWA 2007 and County of Los Angeles 2012). In addition, coastal and desert biomes meet in this Region, allowing breeding and cross pollination of otherwise isolated species. Following are descriptions of these significant plant communities:

- **Native grassland** communities consist of low herbaceous vegetation dominated by grasses, often mixed with native bulbs and other herbaceous species. Representative native grasslands in the Region include the significant patches of needlegrass and melic grass species.

- **Coast live oak riparian forest** consists of dense overstory formations of coast live oak generally occurring in narrow formations along water channels. Common understory species include the willow, California bay, mulefat, and other riparian understory species common to Southern California.

- **Southern willow scrub** occurs along seasonal or permanent water courses and is comprised of dense thickets of broad-leafed winter-deciduous riparian species. This community's 'scrub' formation is maintained by frequent heavy over-flooding. Dominant species of this community include mulefat, sandbar willow, and arroyo willow.

- **Big-cone spruce-canyon oak forest** generally consists of shade-loving species such as big-leaf maple and California bay, and occurs in higher elevations on north-facing slopes. Chaparral species generally dominate the understory.

- **Southern sycamore-alder woodlands** in the Region are generally found on broad plains with heavy alluvial substrates along creeks and streams with permanent flows. This community only occurs in the upper reaches of the watershed, in areas within Bear, Sand, Placerita and Aliso Canyons.

- **Southern cottonwood willow riparian natural areas** are dominated by Fremont cottonwood and provide broad-leafed winter-deciduous habitat. This community forms mature overstory areas along many reaches of the Santa Clara River and its main tributaries. Extensive formations occur just west of Acton in Upper Aliso Canyon and lower San Francisquito Canyon.

- **Freshwater marsh** communities in the watershed are dominated by the perennial, emergent cattail or bulrush, which often grows dense enough to form a closed canopy. Freshwater marsh generally develops in areas of still or slow-moving permanent freshwater and occurs in scattered ponds and slow-flow reaches of the Santa Clara River and its tributaries.

- **Alluvial fan sage scrub** is made up of a variety of shrubs that can establish themselves and persist within floodplains, alluvial plains, or alongside seasonal streams, where infrequent flooding occurs. Dominant shrubs vary depending on location but include scalebroom, Great Basin sage brush, rabbitbrush and foothill yucca. High diversity stands exist around Acton, Sand Canyon, Santa Clarita, and in lower San Francisquito Canyon.

- **Vernal pools** are seasonal bodies of standing water, generally formed in closed basins where a heavy clay layer holds surface water following rain events, and are very rare in the Los Angeles County and the Upper Santa Clara River Watershed. Two verified vernal pools have been identified on Cruzan Mesa and Plum Canyon. Additionally, a small seasonal pond with typical vernal pool characteristics is known to exist near the Placerita Canyon-Sand Canyon divide.

Yellow Warbler

Extensive patches of high quality riparian habitat, including

southern cottonwood-willow riparian forest and mulefat scrub are present along the length of the Santa Clara River and its tributaries. These plant communities provide nesting and foraging habitat for many sensitive bird species including the endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*), and State species of special concern, including the yellow-breasted chat (*Icteria virens*) and the yellow warbler (*Dendroica petechia brewsteri*). They are also habitat areas for the federally and state-listed endangered fish species unarmored threespine stickleback. The riparian scrub habitats in Mint Canyon and other tributaries to the Santa Clara River may also support the State endangered slender-horned spineflower (*Dodecahema leptoceras*) (VCWPD 2005).

California red-legged frog

The Angeles National Forest, a large portion of which is located within the watershed, is also occupied by approximately 45 known species that are deemed sensitive by the US Forest Service, and provides shelter for at least 16 federally listed threatened and endangered plants and animals. Many of these are found in few other places. The forest is a critical habitat for the arroyo toad (*Bufo californicus microshapus*), mountain yellow-legged frog (*Rana muscosa*), California red-legged frog (*Rana aurora draytonii*), and several species of fish. Sensitive species such as the California spotted owl (*Strix occidentalis*) and Nelson bighorn sheep (*Ovis canadensis nelsoni*) are also found there (US Forest Service 2003).

Pressures for growth and recreational activities in the Region have been linked to significant declines in sensitive species. Growth of urban areas results in loss of available or suitable habitat for sensitive species. Besides loss of habitat, proximity to human development can be harmful to sensitive species. Human development introduces roadway traffic, pesticides, urban runoff and non-native species, which degrade habitat and food sources for sensitive species. Land use practices, such as cattle and sheep grazing and mining are also considered harmful to many species. Recreational uses, such as off-highway vehicle use are known to conflict with sensitive species habitat. Improper disposal of food wastes and trash by recreational users often attracts predators of the sensitive species, such as common ravens. Dogs brought onto public lands by recreation can also disturb, injure, or kill sensitive species.

2.4.2 Wetland Habitat

Wetland habitats are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water due to underlying soils, geography and topography. Wetlands include, but are not limited to, marshes, bogs, sloughs, vernal pools, wet meadows, river and stream overflows, mudflats, ponds, springs, ephemeral springs, and seeps. Wetlands may also include open water habitats like lakeshores.

Important wetland systems found in the Region include, but are not limited to, freshwater marshes, vernal pool systems and other perennial overflow areas. Freshwater marsh develops in areas of still or slow-moving permanent freshwater, and therefore occurs in scattered pond areas and slow-flow portions of the Santa Clara River and its tributaries. Vernal pools are seasonal bodies of standing water that typically form from spring runoff, dry out completely in

the hotter months, and often refill in the autumn. Vernal pools range from extensive, densely vegetated lowland bodies to smaller, isolated upland bodies with little permanent vegetation. The identified vernal pools and vernal-like seasonal pond are unique biotic communities in the Region.

The variety of riparian and wetland vegetation types that exist within the Region provide habitat for a diverse assemblage of plant and animal species. Supported species include vascular plants, vertebrates and invertebrate communities. Slope wetlands in the region support native grasslands such as needlegrass species and melic grasses, and seeps found in chaparral areas frequently support stands of giant rye. Vernal pools provide important breeding habitat for many terrestrial or semiaquatic species such as frogs, salamanders, and turtles. Wetlands found throughout the Region support communities of invertebrates such as native fairy shrimp, craneflies, stoneflies, water boatmen, and various beetle species. The health of the more sensitive of these invertebrate species serves as an important indicator of the overall integrity of the riverine, riparian and wetland ecosystems.

Many of the Region's special status and sensitive species are dependent upon wetland habitats for their survival. The EIR completed in association with the Santa Clarita Valley Area Plan Update lists many of the animal species known to occur within the Region that have been federally listed or highlighted by the state as endangered, threatened, protected, or of special concern. Listed wetland species include vascular plants such as the spreading navarretia (*Navarretia fossalis*), found in the Newhall area, and California Orcutt grass (*Orcuttia californica*), and invertebrates, such as the Riverside, vernal pool and San Diego fairy shrimp (*Streptocephalus woottoni, Branchinecta lynchi, Branchinecta sandiegoensis,* respectively) primarily found in the identified vernal pools. The southwestern pond turtle (*Clemmys marmorata pallida*) is found in Ben Canyon and Vasquez Rocks, and several records indicate the presence of the two-striped garter snake (*Thamnophis hammondii*) in perennial waters of the Upper Santa Clara River. Sensitive bird species reliant on wetland habitat and known to occur or commonly migrate to the Region include the western least bittern (*Ixobrychus exilis hesperis*), northern harrier (*Circus cyaneus*), and the merlin (*Falco columbarius*).

2.4.3 Wildlife Corridors

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals.

The River is a Valuable Wildlife Corridor

In addition, such islands often provide the only available habitat for species that occupy the corridor area. Biologists have identified areas that experience recurrent aquatic, riparian, or terrestrial species movement that are crucial to these species as wildlife "corridors" or habitat linkages. These corridors encourage

preservation of plant and animal populations by allowing greater access to food and water and a larger gene pool.

The river corridor acts as a landscape linkage and escape route, providing for wildlife movement between and among habitat patches from the San Gabriel Mountains to the Pacific Ocean. The Region hosts a wide diversity of wildlife including mammals, birds, amphibians, reptiles, fish and invertebrates, as described above. Some of these species migrate along ridgelines in the mountainous terrain where there are fewer interfaces with urban uses. Other species migrate along the arroyos, rivers and other riparian and wetland corridors, where urban development is nearer, and the potential for adverse impacts much greater, when these natural habitats are encroached upon.

Habitat loss and fragmentation are the leading threats to biodiversity. This highlights the need to conserve well-connected networks of large wildland areas where natural processes can continue operating over large spatial and temporal scales. Adequate landscape connections allow these ecosystems to respond appropriately to natural and unnatural environmental perturbations, such as fire, flood, climate change, and invasions by non-native species.

Maintaining wildlife corridors helps compensate for fragmentation of habitats. Several key wildlife movement corridors within the region have been identified and several ongoing efforts are targeting preservation of these lands through acquisition (City of Santa Clarita and County of Los Angeles 2011).

Within the Region, the Angeles Linkage Conceptual Area Protection Plan (CAPP) was developed as part of an extensive partnership effort involving representatives from CDFW, US FWS, US Forest Service, Bureau of Land Management (BLM), Southern California Wetlands Recovery Project, Caltrans, Los Angeles RWQCB, RMC, Santa Monica Mountains Conservancy, The Nature Conservancy, Trust for Public Land, Friends of the Santa Clara River, South Coast Wildlands, and others. The principle goal of the CAPP is to preserve essential open space and viable connections for wildlife movement between two core habitat areas, the San Gabriel Mountains and the Castaic Ranges (including the Sierra Pelona), both part of the Angeles National Forest managed by the US Forest Service. The land between these two core habitat areas encompasses a unique ecological transition zone between coastal and desert habitats. Coastal sage scrub and chaparral blankets the hillsides in the western part of the CAPP, with dense coast live oak woodlands in canyons, and high quality riparian scrub and woodlands at lower elevations. The easternmost part of the linkage has a strong desert influence dominated by desert scrub, with scattered juniper and Joshua tree woodlands (Penrod et al. 2004). Within this CAPP, a system of mostly unaltered natural hydrological features currently supports these vegetation types in the upper watershed; the demand for housing and infrastructure development poses a threat to this resource and to wildlife movement. A main feature of the proposed CAPP is the Santa Clara River as it acts as a natural linkage.

The CAPP is intended to secure a functional landscape level connection between the San Gabriel and Castaic core areas and help to ensure the ecological integrity of areas already protected in the linkage. There is a number of existing conservation investments (e.g., BLM, County Parks, City of Santa Clarita, etc.) in the linkage, covering 1,514 acres, which are protected from habitat conversion. The CAPP encompasses a total of 8,697 acres on 392 parcels, which have been targeted for acquisition or conservation easements in the County. To date, the City has secured and preserved over 1,000 acres of wildlife corridor lands, including

243 acres in Agua Dulce Canyon, which is considered to be a crucial linkage within the CAPP area.

2.4.4 Locally Important Species and Communities

The diverse topography and climate of the Upper Santa Clara River Watershed and environs provide an environment that sustains certain plant and animal species or communities not found elsewhere; these are considered locally important as they are characteristic of or unique to the Region. Locally important communities identified for the Region include types of coastal sage scrub and oak and riparian woodlands, among others. Certain species found within these habitat types are considered candidates for designation by the California Fish and Game Commission or the U.S. Secretary of Commerce, if they are not already so designated.

Important habitats and biological resource areas within the Region include (City of Santa Clarita 2011):

- Land within the Angeles National Forest, and wildlife corridors within the Santa Clara River Valley, the Santa Susana Mountains and the San Gabriel Mountains and the southern slopes of the Sierra Pelona range.
- Santa Clara River system, as one of the last free-flowing natural riparian systems in Southern California, supports a diversity of wildlife and vegetation, providing breeding sites, traveling routes, and other important ecosystem services.
- Canyon areas, including San Francisquito Canyon, Soledad Canyon, and Bouquet Canyon, which provide important habitat (water, food and shelter) and biological resources.
- Habitat for federally and state-listed endangered, threatened or rare plant and wildlife species within the river channels, the open upland areas and the National Forest lands, including those associated with riparian woodlands in the Santa Clara River, and in chaparral and coastal sage scrub vegetation.
- Open water habitat provided by Castaic Lake, Castaic Lagoon, Bouquet Reservoir, and isolated locations along the Santa Clara River.
- Oak communities located within and outside the City of Santa Clarita, riparian scrub and woodlands and other diverse vegetation located within and around National Forest lands.
- Habitat and associated biological resources in the five significant ecological areas (SEAs) designated by the County, and described below in Section 2.4.5.

The Angeles National Forest has some unique topography that also affects its plant and animal life. Lower elevations of the forest are covered with dense chaparral and riparian vegetation along stream channels, while the high mountains are blanketed by evergreen forests of pine, fir, and cedar (US Forest Service 2005).

2.4.5 Significant Ecological Areas

SEAs are defined by the County and generally encompass areas that are valuable as plant or animal communities and often important to the preservation of threatened or endangered species. Preservation of biological diversity is the main objective of the SEA designation. SEAs are neither preserves nor conservation areas, but areas where the County requires development to be designed around the existing biological resources (County of Los Angeles 2012). Design criteria in SEAs include maintaining watercourses and wildlife corridors in a natural state, set-asides of undisturbed areas, and retaining natural vegetation and open space.

The City and County have designated the following five SEAs within the Santa Clarita Valley (see Figure 2.4-1):

- *Cruzan Mesa Vernal Pools SEA:* This SEA lies in the southeastern portion of the Liebre Mountains, north of the Santa Clara River, and southeast of Bouquet Canyon. The boundaries of the SEA encompass the watershed and drainages of the Cruzan Mesa and Plum Canyon vernal pools, which support both of the regionally unique vernal pools. The two vernal pool areas together form one ecologically functional unit. This designated area includes a wide range of natural features, including mesas, canyons, and interior slopes, as well as the Plum Canyon creek which crosses the SEA to the south. The SEA maintains a variety of valuable biological resources, including several sensitive species and habitats. The seasonally wet vernal pools, surrounding open coastal sage scrub and chaparral, and topographical features, such as steep cliffs and crevices, harbor a variety of migrant and resident bird species, including birds of prey, sensitive amphibians, Riverside fairy shrimp (*Streptocephalus woottoni*) and other native sage scrub vertebrate species. These vernal pools are among only three or four identified such pools in Southern California and as such support sensitive resources that are locally and regionally unique.

- *Santa Clara River SEA:* This is the largest SEA in the Santa Clarita Valley and encompasses the entire length of the Santa Clara River and the significant tributary drainages, including Piru Creek, Sespe Creek, Santa Paula Creek, and Wheeler Creek. The SEA embraces the river corridor and east-west linkage zones that have historically served as primary connections for wildlife movement between the Pacific coastline and coast and interior ranges. Due to the extensive acreage of natural open space and great diversity of habitat types present within this designated area, wildlife within this SEA is plentiful, including abundant and diverse amphibians, reptiles and other herpetofauna, birds and other native mammals. As one of the last free-flowing natural riparian systems remaining in Southern California, the Santa Clara River provides breeding sites, traveling routes and other essential resources for wildlife, thereby contributing to the great diversity and abundance of organisms in this SEA and the entire Region. Sensitive plant communities and habitat types present in this SEA include big-cone spruce-canyon oak forest, coast live oak riparian forest, southern willow scrub, freshwater marsh, and native grassland. Sensitive species found within this SEA include the slender-horned spineflower (*Dodecahema leptoceras*), Riverside fairy shrimp, unarmored threespine stickleback, California red-legged frog, California Condor (*Gymnogyps californianus*), and ringtail cat (*Bassariscus astutus*).

- *Santa Felicia* SEA: This SEA encompasses nearly the entire Los Angeles County portion of the Santa Felicia watershed draining into Lake Piru, consisting of largely undeveloped lands with vast stands of intact coast sage scrub and chaparral communities in the uplands and mixed riparian, oak riparian and coast live oak forests and alluvial scrub in the bottomlands. The wide variety of topographic features and diverse habitat types within the SEA support a wide variety of wildlife species, including large numbers of amphibians, diverse year-round, seasonal, migrant and song bird populations, and considerable native mammal populations. Sensitive habitat types within this SEA include coast live oak riparian forest, alluvial fan sage scrub, and native grassland. Sensitive species in the SEA include the California condor, California red-legged frog and arroyo southwestern toad (Bufo californicus). The Santa Felicia watershed provides an important wildlife corridor with movement occurring along and within the riparian systems between Piru Lake and the San Gabriel Mountain range and beyond.

- *Santa Susana Mountains/Simi Hills* SEA: This SEA is located northwest of the San Fernando Valley and includes much of the Santa Susana Mountains, Santa Susana Pass, Chatsworth Reservoir, and the eastern portion of the Simi Hills. The Santa Susana Mountains are one of several relatively small ridges (dominated by Oat Mountain at elevation 3,747 feet) that form the western end of the transverse ranges and blend eastward into the larger San Gabriel and San Bernardino mountains. The north slopes of the Santa Susana Mountains are within the Santa Clara River watershed which drains the Los Padres National Forest, the Angeles National Forest, and the Santa Susana Mountains. The remainder of the SEA is within the Los Angeles River watershed. The majority of the land within the SEA is natural open space with very sparse disturbances. The Santa Monica Mountains are also part of this system. Vegetation within the SEA consists of coastal sage scrub on the south facing sunlit slopes and dense chaparral on the north facing slopes. Due to the extent of natural open space, topographic complexity and combination of coastal and desert influences, this SEA supports a wide variety of habitat species and generally diverse and abundant wildlife, including an unusually high diversity of bird species. Unlike many other hills within the Los Angeles Basin, the SEA is large enough to support diverse and relatively stable large mammal populations. Riparian and oak woodland vegetation are found along stream drainages and within canyons, along with big-cone spruce (*Pseudotsuga macrocarpa*), bigleaf maple (*Acer macrophyllum*), and California walnut (*Juglans californica hindsii*). The oak woodland habitat is extremely diverse containing six species of oaks, one of which is found only in this area of the County (the Dunn Oak, *Quercus dunnii*). The interior portions of this SEA are largely undisturbed by the urbanization that has occurred both to the south (San Fernando and Simi Valleys) and north (Santa Clarita). The vast open space corridor is important for maintaining gene flow and wildlife movement between the Santa Monica, San Gabriel mountains, and Los Padres National Forest which are now largely isolated from one another by urban development.

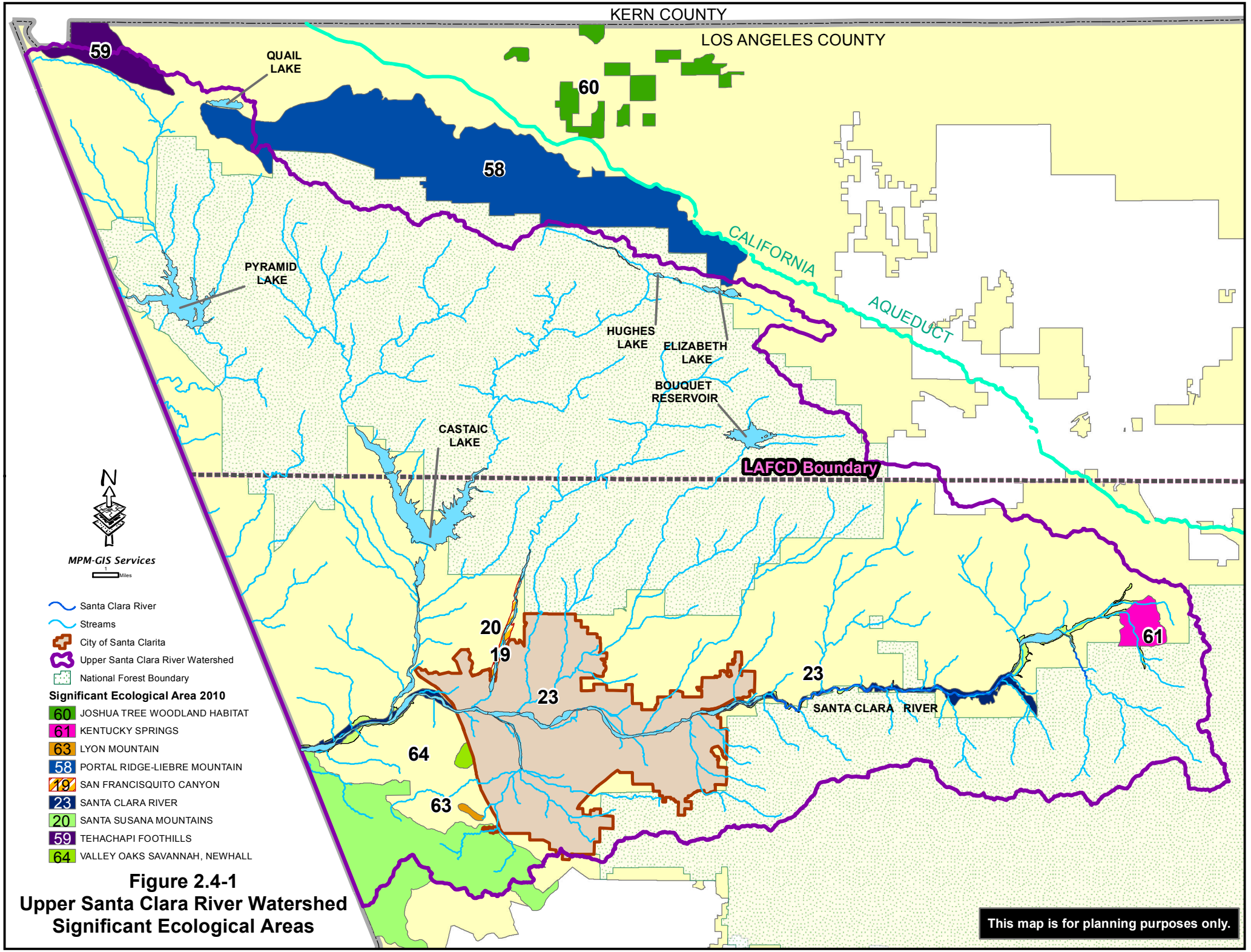


Figure 2.4-1
Upper Santa Clara River Watershed
Significant Ecological Areas

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- *Valley Oak Savannah:* The SEA is located west of Interstate-5, northeast of the Santa Susana Mountains and west of the Angeles National Forest. This SEA is almost completely undisturbed except for few dirt roads. Due to its small size, vegetation within the SEA is limited to a few community types. These factors will unlikely support highly diverse wildlife although the simple vegetative communities within the SEA and the mosaic of vegetative communities in adjoining areas create a functional ecosystem, part of the larger regional system. Also, while the SEA does not support regional corridors itself, adjacent lands may be important linkages for wildlife movement between the Santa Susana Mountains and the Santa Clara River. As a result this SEA may be important as a corridor buffer and/or adjacent foraging grounds. The majority of the vegetation within the SEA consists of valley oaks savannah containing over 1,000 trees and a small portion is covered by coastal sage scrub, both of which are sensitive plant communities, and non-native grasses. Sensitive species within the SEA include San Diego coast horned lizard (*Phrynosoma coronatum)*, sharp-shinned hawk (*Accipiter striatus)*, and Cooper's hawk (*Accipiter cooperi)*.

(City of Santa Clarita 2011, County of Los Angeles 2012, Los Angeles County 2006, Santa Clarita 1999, City of Santa Clarita and Los Angeles County 2004).

2.4.6 Recreation Resources

With its natural resources, in addition to parks, open spaces and reservoirs, the Region offers numerous opportunities for sports and outdoor recreation, including hiking, camping, hunting, fishing and swimming.

An extensive parks system exists within the Santa Clarita Valley with County parks totaling 578 acres throughout the Valley. These parks range from small neighborhood parks of five to ten acres to regional parks over 50 acres in size, such as the Val Verde Park in the western portion of the Region offering various sports facilities. Within the parks system are also nature and open space preserves covering over 10,000 acres to protect scenic and biological resources and open spaces, which provide outdoor recreation opportunities, such as hiking horseback riding and camping, as well as educational opportunities with nature centers and nature interpretation. Among these preserved lands are the Santa Clara River Open Space and the Placerita Canyon Open Space, the latter located adjacent to one of the Region's State parks.

There are three State parks within the Santa Clarita Valley that are operated by the County. Vasquez Rocks State Park includes a 750 acre reserve with unique red rock formations providing opportunities for climbing, hiking and camping among other things. The Placerita Canyon State Park includes the 350 acre wildlife sanctuary with extensive trails, a nature center, and restored historic facilities. The Castaic Lake Recreation Area centers around the state water reservoir, extending over 9,000 acres. This State park provides outdoor and water recreation opportunities, including camping, boating, fishing and swimming. Opportunities for water recreation are also available at Elizabeth Lake and Lake Hughes.

The City of Santa Clarita and the County of Los Angeles have also developed trail plans to be adopted as part of the General Plans, in compliance with State requirements, to enhance recreational opportunities and connectivity for recreationists in the Region (County of Los Angeles 2011).

2.5 Social and Cultural Characteristics

2.5.1 Demographics and Population

2.5.1.1 Santa Clarita Valley

A summary of Santa Clarita Valley demographics was prepared as part of the 2011 One Valley One Vision process. As described in the OVOV, the Santa Clarita Valley experienced significant growth from 1990 to 2000; nearly 39 percent in that period. With this growth, the Santa Clarita population also diversified. It is estimated that approximately 38.5 percent of the Santa Clarita Valley population is of Hispanic, Asian, African-American or mixed ethnicity (Los Angeles County 2011, based on 2000 Census). The Santa Clarita Valley reflects larger households which are indicative of young families with children (Los Angeles County 2011, based on 2000 Census). Figure 2.5-1 depicts the boundaries of the Santa Clarita Valley Planning Area, its census tracts, and relationship to the City of Santa Clarita as well as unincorporated County.

The unincorporated County areas are anticipated to grow at particularly high rates in all categories, while more moderate rates are anticipated for the City of Santa Clarita.

In Table 2.5-1, the OVOV projections and SCAG projections indicate a 1.6 to 1.8 percent annual growth rate of population for the Santa Clarita Valley for years 2010 to 2050.

TABLE 2.5-1
POPULATION COMPARISON[(a)]

Year	Total CLWA Service Area	OVOV[(b)]	Santa Clarita Valley Planning Area
2010	286,750	252,000[(c)]	267,299[(d)]
2015	318,199	278,000 - 280,750	319,715[(d)]
2020	345,873	304,000 - 309,500	352,336[(d)]
2025	372,967	330,000 - 338,250	384,217[(d)]
2030	401,223	356,000 - 367,000	397,112[(d)(e)]
2035	428,897	382,000 - 395,750	410,008[(d)]
2040	456,564	408,000 - 424,500	448,228[(f)]
2045	484,248	434,000 - 453,250	490,011[(f)]
2050	511,918	460,000 - 482,000	535,689[(f)]

Notes:
(a) Source: CLWA et. al. 2011, Table 2-10.
(b) Data from Los Angeles County OVOV EIR, as referenced in CLWA et. al. 2011, Table 2-10.
(c) The OVOV estimated population in 2008 was 252,000 which, for this analysis, was assumed to occur in 2010.
(d) 2010 and 2035 Projection for Santa Clarita Valley Planning Area are the sums of the City of Santa Clarita and unincorporated Los Angeles area. The unincorporated area provided by the County of Los Angeles Department of Planning from adjusted GIS data from U.S. Census Bureau & SCAG data provided by email communication, April 5, 2011.
(e) Year 2030 value adjusted. Actual GIS data had 2030 value of 414,612 which was higher than 2035 value. Used growth rate assumptions to correct.
(f) Years 2040-2050 assumed 2010-2035 growth rates.

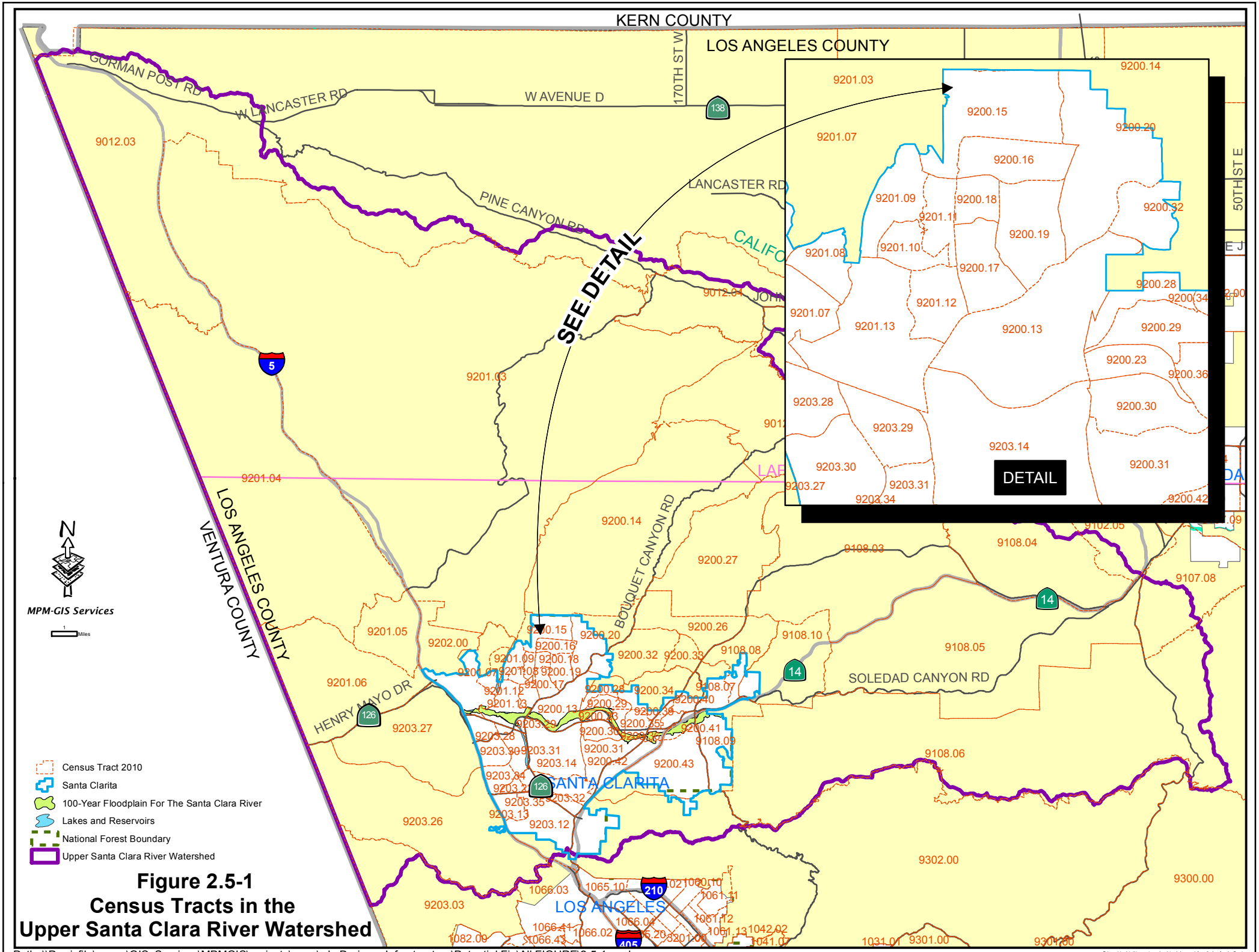

Figure 2.5-1
Census Tracts in the
Upper Santa Clara River Watershed

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2.5.1.2 City of Santa Clarita

City of Santa Clarita Residential Development

The City of Santa Clarita's population was 176,320 in 2010 (Census 2012), and falls into the category of one of the ten largest cities within the County. However, Santa Clarita differs from the rest of the entire Los Angeles County in general in almost every statistic. According to the City's website (http://www.santa-clarita.com), while the growth rate of County was 1.7 percent as of 2003, Santa Clarita saw a higher population growth rate of 3 percent. Between 2000 and 2010, the City of Santa Clarita's population grew by 16.7 percent. The mix of the City's population is not as diverse as the entire County's population. Based on 2010 Census data, close to 71 percent of Santa Clarita's population describes itself as White. Of the remaining 29 percent, major groups include Asian and African American, as well as other unspecified races, and those of two or more races. As Hispanics may be of any race, data include Hispanics in all applicable race categories. Of the City's total population, approximately 30 percent are of Hispanic or Latino origin. Santa Clarita is a more affluent city compared to the County as a whole. The 2009 median household income (MHI) for Santa Clarita was estimated at $82,602. In comparison, the MHI for the County was estimated at $54,375 (Census 2012). Table 2.5-1 shows projections regarding the City's population growth.

2.5.1.3 Unincorporated Areas of Watershed

To some extent, the outermost unincorporated areas of the watershed overlap with the Santa Clarita Valley Planning Area of the OVOV project (City of Santa Clarita and County of Los Angeles 2011). However, it appears that the planning area identified in that report does not reach the far eastern and northern portions of the watershed (see Figure 2.5-1).

Unincorporated areas of the watershed are likely best characterized by summarizing recent Census data (see Table 2.5-2). From evaluation of five census tracts located outside the Santa Clarita Valley Planning Area, but within the watershed, these areas are generally sparsely populated, rural communities. The total population of these five census tracts is approximately 14,000 people. MHI for these census tracts ranges from approximately $63,964 to $77,938.

TABLE 2.5-2
DEMOGRAPHICS OF OUTLYING AREAS OF WATERSHED

Census Tract	Total Number of Households	Total Population	Median Household Income
9012.03	719	1,864	$63,964
9201.03	1,500	4,331	$71,038
9108.05	1,644	4,384	$75,667
9012.06	478	1,283	$77,938
9012.04	943	2,200	$80,068

Source: U.S. Census Bureau, 2005-2009 American Community Survey.
Note: These five census tracts were included in the Region and analyzed in this section because the majority of their areas fell outside of the Santa Clarita Valley Planning Area boundary, but within the overall watershed boundary. Census tracts with the majority of their areas within the Santa Clarita Valley Planning Area were included in the Santa Clarita Valley analysis above. Those census tracts which partially fell within the watershed boundary, but with most of their areas beyond the watershed boundary, were not included in any of the analyses above and were not considered part of the Region.

2.5.2 Economic Factors

2.5.2.1 Santa Clarita Valley

The dominant job sectors in the Valley include services, retail trade and manufacturing, and construction which experienced significant growth between 2000 and 2005, with 3,900 additional jobs per year in those sectors (County of Los Angeles 2011). The services sector has accounted for the greatest number of new jobs between 1992 and 2005, with nearly half in business services, as well as growth in transportation and utilities, and retail trade. While construction jobs have significantly increased with development of the Valley, the rate of job growth in this sector is projected to decrease, while the manufacturing sector is projected to remain strong. Since 1992, the rate of job growth has far outpaced that of Los Angeles County. The Valley has a higher percentage of jobs in the agriculture and mining, construction, manufacturing, and retail trade sectors than the rest of the County, and is becoming a significant employment center for the County.

2.5.2.2 City of Santa Clarita

The local economy is primarily a service based economy with 42 percent of the businesses in that sector. An additional 22 percent of businesses are in retail trade and 11 percent are in finance, insurance, and real estate (SCV Chamber of Commerce 2011). Santa Clarita maintains one of the lowest unemployment rates in Los Angeles County. In 2007, the City's unemployment rates was 2.7 percent, compared to the County's 4.4 percent, whereas these rates have increased to current rates of 6.5% and 7.7%, respectively (Census 2010). The poverty rate in Santa Clarita is also substantially lower than the County with an estimated 7.6 percent of individuals living in poverty as of 2009. However, increasing housing costs are recognized as a potential problem, with some households paying a high percentage of their income toward housing or households with limited resources living in smaller housing units or sharing housing.

2.5.2.3 Unincorporated Areas of Watershed

Employment and economic factors are difficult to succinctly summarize for these areas. The projections for the Santa Clarita Valley would apply to most of the Watershed. However, 2010 Census data for five census tracts that lie outside of the Santa Clarita Valley Planning Area, but within the Watershed, best describes these outlying areas (see Table 2.5-3). There are many different job sectors within which individuals are employed and there is a range of incomes. Yet overall, these areas can be characterized as affluent as previously indicated with major job sectors including educational, health and social services; arts and entertainment; finance and real estate; professional, scientific, management and administrative services; information, construction and manufacturing.

2.5.3 Disadvantaged Communities

As defined by DWR, a disadvantaged community is a municipality, including, but not limited to a city, town or county, or a reasonably isolated and divisible segment of a larger municipality, that has an average MHI that is less than 80 percent of the statewide annual MHI. A MHI of less than $48,706 meets this threshold (DWR 2012). Using DWR's newly developed DAC mapping tool, which is based on American Community Service data between 2006 and 2010, it can be seen that none of the communities within the geographic areas described above including the County, the City of Santa Clarita, the Valley, and the outlying areas of the watershed meet this standard. This means that all areas reported average median household incomes greater than 80 percent of the statewide annual MHI for that period. The County had a reported MHI of $55,476 and the City of Santa Clarita had a reported MHI of $82,642 during that period. The Santa Clarita Valley Planning area had a reported average annual household income of $83,900 in 2004 (City of Santa Clarita and County of Los Angeles 2004). While no disadvantaged communities that met the strict state definition were identified, both the City of Santa Clarita and the County have identified areas where particular outreach efforts are merited, due either to substandard infrastructure, substandard housing, or similar concerns. These outreach efforts are detailed in Section 11 of this IRWMP.

TABLE 2.5-3
JOB SECTORS, UNEMPLOYMENT RATES, AND TOTAL POPULATIONS OF OUTLYING AREAS OF WATERSHED

Census Tract	Major Job Sectors	Unemployment Rate (%)	Total Population
9201.03	Educational, health, and social services, Arts and entertainment, Finance	6.2	4,331
9012.06	Construction, Finance, Educational, health, and social services	11.5	1,283
9012.04	Educational, health, and social services, Arts and entertainment, Manufacturing	5.4	2,200
9012.03	Construction, Educational, health, and social services, Professional services	7.9	1,864
9108.05	Construction, Educational, health, and social services, Information	3.1	4,384

Source: Census 2010.
Note: These five census tracts were included in the Region and analyzed in this section because the majority of their areas fell outside of the Santa Clarita Valley Planning Area boundary, but within the overall watershed boundary. Census tracts with the majority of their areas within the Santa Clarita Valley Planning Area were included in the Santa Clarita Valley analysis above. Those census tracts which partially fell within the watershed boundary, but with most of their areas beyond the watershed boundary, were not included in any of the analyses above and were not considered part of the Region.

2.5.4 Social and Cultural Values

One vision of the Valley for the next two decades is a young but maturing network of communities balancing rural and suburban neighborhoods, with areas that offer urban lifestyles. The Valley provides residents varied housing opportunities and offers multiple employment opportunities that result in a dynamic economy and appropriate job-housing balance. The Valley has developed excellent public services, all of which support a high quality of life.

Melody Ranch Motion Picture Studio

The communities of the Valley include Castaic, Val Verde, Valencia, Saugus, and Newhall. They have a lot of character and history, and they each have their own unique identities. However, common threads throughout these communities include the results of the influence of the old West on the area. These communities were mostly characterized as rustic and rural, and were ranching or mining communities that still maintain pride in those traditions. The influence of motion picture filming has been noted especially in Newhall with the use of Melody Ranch in movie making. The natural setting of the Valley, including its open space and surrounding canyons and trees, is closely associated with the identities of these communities according to residents. Valencia, while considered the most urban of these communities, still maintains a rural sense of place without the trappings of a large metropolitan area. All are characterized as tight-knit and family-oriented and supportive of a high quality of life (City of Santa Clarita 2002).

Unincorporated areas in the upper parts of the watershed (tributary canyon areas, Acton, Agua Dulce) tend to be rural in character, with large lot sizes. Many properties have small ranching or farming operations, and include equestrian properties. Agua Dulce has a private small general aviation airport - the only such facility located in the Upper Santa Clara River Watershed.

2.6 Overview of Water Supplies

Water supply in the IRWM Region comes from numerous sources, which include groundwater, imported water, recycled water and, when needed, banking programs. Of these sources, imported water, primarily State Water Project (SWP) supplies, makes up the largest portion, with over 50 percent of all supplies as of 2010. Local supplies, consisting primarily of local groundwater, make up approximately 45 percent. In comparison, recycled water currently makes up less than 1 percent (CLWA, et al. 2011, UWCD and CLWA 1996). Details on the Region's water supply are provided in Section 3 of this IRWMP.

2.7 Major Water Related Infrastructure

The following includes a discussion of the major water related infrastructure in the Region, shown in Figure 2.7-1.

2.7.1 State Water Project

The SWP is the largest state-built, multi-purpose water project in the country. It was authorized by the California State Legislature in 1959, with the construction of most initial facilities completed by 1973. Today, the SWP includes 28 dams and reservoirs, 26 pumping and generating plants, and approximately 660 miles of aqueducts. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Storage released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta (Delta). While some SWP supplies are pumped from the northern Delta into the North Bay Aqueduct, the vast majority of SWP supplies are pumped from the southern Delta into the 444-mile-long California Aqueduct. The California Aqueduct conveys water along the west side of the San Joaquin Valley to Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains and the aqueduct then divides into the East and West branches. CLWA takes delivery of its SWP water at Castaic Lake, a terminal reservoir of the West Branch. From Castaic Lake, CLWA delivers its SWP supplies to the local retail water purveyors through an extensive transmission pipeline system.

2.7.2 Bouquet Reservoir and Los Angeles Aqueduct

Bouquet Reservoir is a reservoir about 15 miles west of Palmdale in the County. It is at an elevation of 2,993 feet in the Sierra Madre Mountains. The reservoir has a capacity of 36,500 AF and is formed by the Bouquet Canyon Dam on Bouquet Creek, which is a tributary of the Santa Clara River. The dam was built by the City of Los Angeles in 1934. The reservoir is a part of the Los Angeles Aqueduct system, which is what supplies most of its water. The Los Angeles Aqueduct system moves water from the Mono Basin and Owens Valley to the City of Los Angeles.

2.7.3 Metropolitan Water District Foothill Feeder

The Metropolitan Water District Foothill Feeder is a pipeline that conveys SWP raw water from Castaic Lake to its terminus at the Joseph Jensen Filtration Plant in Granada Hills, located near the intersection of Balboa Boulevard and Interstate 5. The plant and feeder began operation in 1972. The feeder is capable of conveying up to 1,800 cfs of water, while the plant can treat up to 750 mgd. At the filtration plant, the Foothill Feeder control structure contains two hydroelectric power plants at 4.5 megawatts each. As the structure controls the water flow into the plant, the energy is harnessed and electricity is generated. Along the feeder, there are several blow-off structures that can release water into the Santa Clara River, Placerita Creek, San Francisquito Canyon, Charlie Canyon, and Castaic Lagoon.

2.7.4 Purveyor Water Infrastructure

CLWA owns and operates water conveyance pipelines and water treatment facilities to supply water delivered through the SWP to the four retail purveyors within its boundaries. DWR transports water via the California Aqueduct to Castaic Lake and releases water to the Agency through the outlet tower at Castaic Lake. The reservoir is a multiple use reservoir that is the terminal point of the west branch of the California Aqueduct, and it stores approximately 320,000 AF of water. The Agency's major facilities consist of the Earl Schmidt Intake Pump Station (ESIPS), the 56 mgd Earl Schmidt Filtration Plant (ESFP), the Rio Vista Intake Pump Station (RVIPS), the 66 mgd Rio Vista Water Treatment Plant (RVWTP), and a system of pipelines and ancillary facilities which convey treated water to the four retail purveyors: NCWD, SCWD, VWC, and LA County Waterworks District 36.

CLWA treats the imported water stored in Castaic Lake at either the ESFP or the RVWTP and delivers it to the water purveyors through a transmission system. The main transmission line, the Castaic Conduit, is located east of the Golden State Freeway, generally paralleling the Freeway and Magic Mountain Parkway from Castaic Lake to a point just north and west of Bouquet Junction where two laterals begin. The Honby Lateral roughly follows the north side of the Santa Clara River to the east, where it crosses to the south to serve Saugus. Headed in a southerly direction, the Newhall Lateral parallels San Fernando Road to serve Newhall and Valencia. At the present time, CLWA delivers water to the purveyors through 11 turnouts.

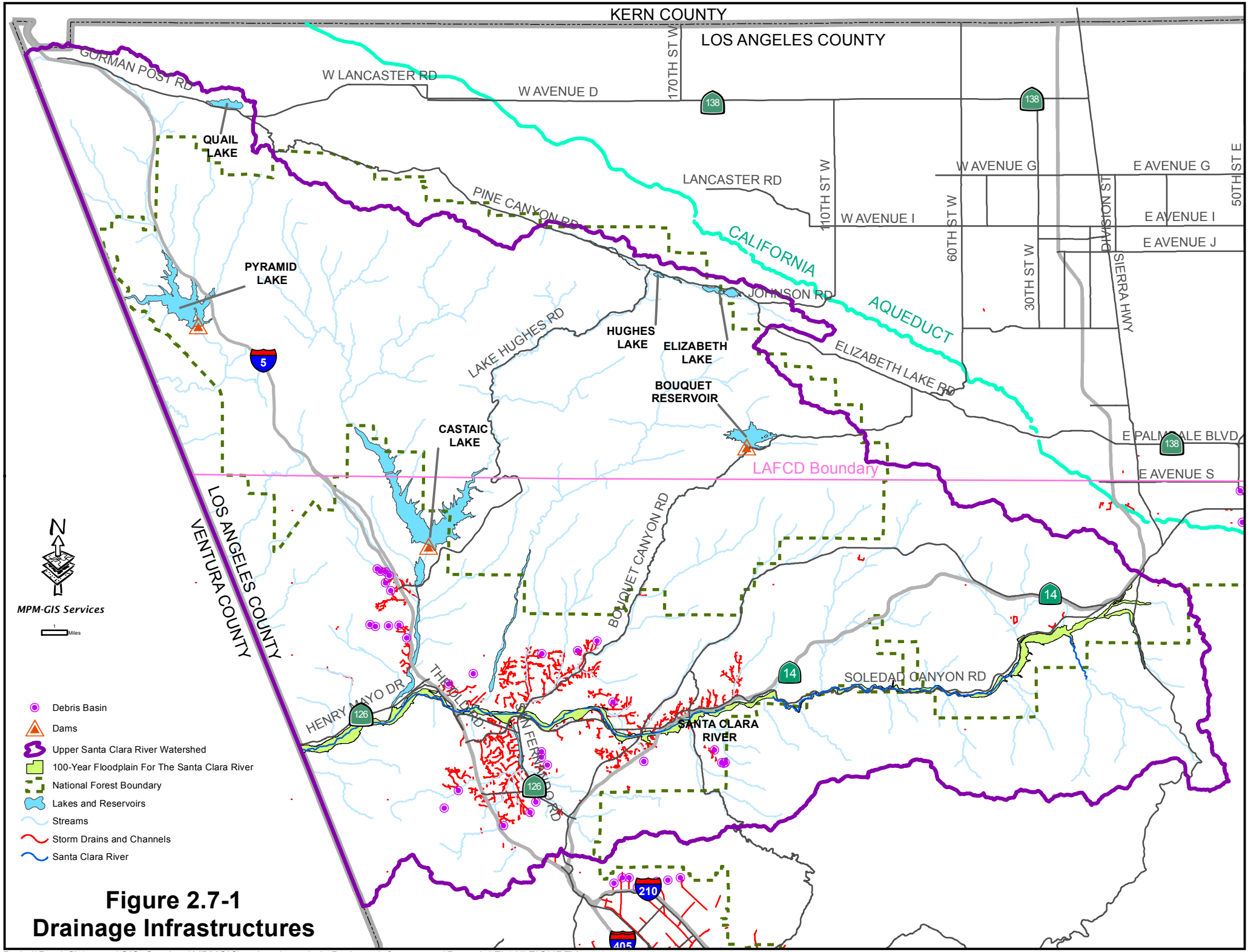

Figure 2.7-1
Drainage Infrastructures

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Section 3: Water Supplies and Water Demand

As summarized in Section 2, the Regional water supplies include groundwater, imported water, and recycled water. This Section describes the water resources available to the Region, the quality of these resources, and Regional demand for water. Information in this section is primarily based on the *2010 Santa Clarita Valley UWMP*, which provides additional details on these topics. The *2010 Santa Clarita Valley UWMP* is available at www.clwa.org/publications/2010-urban-water-management-plan.

3.1 Water Supply

This section describes the water resources available to the Region through 2050. The currently available and planned water supply sources are summarized in Table 3.1-1 and discussed in more detail below.

As used in this IRWMP and defined by DWR, a dry year is generally considered to be a year with below average runoff for a given watershed. The impact of low precipitation in a given year on a particular supply may differ based on how low the precipitation is and the previous year's hydrology. For the SWP, a low-precipitation year may or may not affect supplies, depending on how much water is in SWP storage at the beginning of the year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Region (thereby affecting local groundwater replenishment and production), local to northern California (thereby affecting SWP water deliveries), or statewide (thereby affecting both local groundwater and the SWP). When the term "dry" is used in this IRWMP, statewide drought conditions are assumed, affecting both local groundwater and imported supplies at the same time.

3.1.1 Groundwater

DWR delineates two groundwater basins in the Santa Clara River Floodplain: Acton Valley Basin and Santa Clara River Valley Basin, but locally additional groundwater areas are recognized:

- Acton Valley Groundwater Basin
  - Agua Dulce Groundwater Basin
- Soledad Canyon Alluvial Channel
- Santa Clara River Valley Basin, East Subbasin
  - Alluvium
  - Saugus Formation

TABLE 3.1-1
CURRENT AND PROJECTED WATER SUPPLIES IN THE REGION (AFY)[a]

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Existing Supplies									
Existing Groundwater[b]									
Acton Groundwater[c]	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000
East Subbasin - Alluvium	24,385	24,000	24,000	24,000	25,000	25,000	25,000	25,000	25,000
East Subbasin - Saugus Formation[d]	6,725	9,225	10,225	10,225	10,225	10,225	10,225	10,225	10,225
Total Groundwater	**65,110**	**67,225**	**68,225**	**68,225**	**68,225**	**68,225**	**68,225**	**68,225**	**68,225**
Recycled Water[e] **Total Recycled**	**325**	**325**	**325**	**325**	**325**	**325**	**325**	**325**	**325**
Imported Water									
State Water Project (CLWA)[f]	58,300	58,100	57,900	57,600	57,400	57,400	57,400	57,400	57,400
State Water Project (AVEK)[f]	2,630	2,630	2,630	2,630	2,630	2,545	2,545	2,545	2,545
Flexible Storage Accounts[g]	6,060	6,060	4,680	4,680	4,680	4,680	4,680	4,680	4,680
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607
Total Imported	**79,597**	**79,397**	**77,817**	**77,517**	**77,317**	**77,232**	**77,232**	**77,232**	**77,232**
Existing Banking Programs[h]									
Rosedale Rio-Bravo	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Semitropic	15,000	15,000	15,000	-	-	-	-	-	-
Semitropic - Newhall Land	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950
Total Banking	**39,950**	**39,950**	**39,950**	**24,950**	**24,950**	**24,950**	**24,950**	**24,950**	**24,950**
Planned Supplies									
Future Groundwater[i]									
East Subbasin - Alluvium	-	-	1,000	2,000	3,000	4,000	5,000	6,000	7,000
East Subbasin - Saugus Formation	-	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375
Total Planned Groundwater	**-**	**1,375**	**2,375**	**3,375**	**4,375**	**5,375**	**6,375**	**7,375**	**8,375**
Recycled Water **Total Planned Recycled**	**-**	**975**	**2,725**	**5,225**	**7,775**	**10,275**	**13,775**	**17,275**	**20,975**
Banking Programs **Total Panned Banking**	**-**	**-**	**-**	**10,000**	**10,000**	**20,000**	**20,000**	**20,000**	**20,000**

Source: *2010 Santa Clarita Valley UWMP* (CLWA, et al. 2011), Table 3-1.

Notes:

(a) The values shown under "Existing Supplies" and "Planned Supplies" are projected to be available in average/normal years. The values shown under "Existing Banking Programs" and "Planned Banking Programs" are the maximum capacity of program withdrawals.

(b) Existing groundwater supplies represent the quantity of groundwater anticipated to be pumped with existing wells.

(c) UWCD and CLWA 1996.

(d) SCWD's existing Saugus 1 and Saugus 2 wells resumed production in 2011 with the completion of the perchlorate treatment facility.

(e) Represents recycled water being delivered in 2010 with existing facilities. CLWA currently has 1,700 AFY recycled water under contract.

(f) SWP supplies are based on the Department of Water Resources "*2009 State Water Project Delivery Reliability Report*" as presented in the *2010 Santa Clarita Valley UWMP.* It is assumed 3 percent imported water delivered to the Antelope Valley East Kern Water Agency available to Region. Updated projections from the *2011 State Water Project Delivery Reliability Report* differ from values presented here, however adequate supplies are anticipated to be available throughout the planning horizon.

(g) Includes both CLWA and Ventura County entities flexible storage accounts. Initial term of agreement with Ventura County entities expires after 2015.

(h) Supplies shown are annual amounts that can be withdrawn and would typically be used only during dry years.

(i) Planned groundwater supplies represent new groundwater well capacity that may be required by an individual purveyor's production objectives in the Alluvium and the Saugus Formation.

3.1.1.1 Acton Valley Groundwater Basin

The Acton Valley Groundwater Basin encompasses an area of approximately 13 square miles (DWR 2002a) in the northeastern portion of the Upper Santa Clara River watershed. It is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east and west. It is drained by the Santa Clara River. The Acton Valley Groundwater Basin is an alluvial basin consisting of two water bearing geologic units: the Holocene age undifferentiated alluvium and the Pleistocene age stream terrace deposits. Groundwater in these deposits is unconfined.

3.1.1.1.1 Hydrogeology

Alluvial deposits are encountered in the town of Acton and its vicinity, and along upper Soledad Canyon, beginning just southwest of Soledad Pass. They are thickest in the Santa Clara River channel, and reach their maximum thickness of 225 feet near Acton, thinning east and west of the town. Alluvial deposits consist of unconsolidated, poorly bedded, poorly sorted to sorted sand, gravel, silt and clay with some cobbles and boulders. Specific yield in the alluvium ranges from ten to 19 percent (DWR 2002a).

Terrace deposits occur in the northern part of the basin, north of Acton, where they reach the maximum thickness of 210 feet (Slade 1990). They consist of crudely stratified, poorly consolidated, only locally cemented, angular to subangular detritus of local origin (DWR 2002a). Specific yield in terrace deposits ranges from three to five percent (DWR 2002a).

The Acton Valley Groundwater Basin is transected by numerous faults. Three of the principal faults are the northwest-trending Kashmere Valley and Acton faults, and the northeast-trending Soledad fault system. The geologic history and seismic activity of these faults are not known. Although these faults offset the basement rocks, they have not been shown to offset younger alluvial and terrace deposits (UWCD and CLWA 1996). No groundwater measurements data are available to determine whether these faults form barriers to groundwater flow in the basement complex. DWR does not consider these faults to be barriers to groundwater flow in the alluvium (DWR 1993).

3.1.1.1.2 Groundwater Flow

The groundwater within the basin flows toward the channel of the Santa Clara River. It then flows in the southwest direction toward Soledad Canyon at an average gradient of 64 to 91 feet per mile. The gradient varies seasonally, with the lowest gradient during dry seasons, and the highest during wet seasons. The Soledad Canyon forms the only outlet for groundwater underflow and for surface water outflow from the basin.

3.1.1.1.3 Recharge (Replenishment) Areas

The basin is recharged largely by deep percolation of direct rainfall and rainfall runoff captured in the Acton Valley, Santa Clara River and its tributaries. Deep percolation of water from excessive irrigation of lawns and agricultural areas, and from private onsite septic tanks and leachfield systems, provide additional amounts of replenishment (UWCD and CLWA 1996; DWR 2002a).

3.1.1.1.4 Groundwater Quantity

The total storage capacity of the basin is estimated at approximately 40,000 to 45,000 AF (UWCD and CLWA 1996; DWR 2002a). Historically, the estimated amount of groundwater in storage ranged from 14,883 AF for a relatively dry period (1965) to 34,395 AF for a relatively wet period (1945) (UWCD and CLWA 1996). There are several water-supply wells that extract groundwater from the alluvium at rates greater than 100 gallons per minute (GPM), and numerous small-volume domestic water supply wells scattered throughout the basin region. The major water pumpers are the Los Angeles County Water Works District No. 37 (LACWWD No. 37), Acton Camp, a trailer park, and a few large private wells installed in the southern part of the basin (UWCD and CLWA 1996). Since 2000, LACWWD No. 37 pumping has ranged between 977 and 2,118 AFY.

Historical groundwater elevations within the main alluvial channel of the Upper Santa Clara River have ranged from about 2,570 feet above mean sea level (AMSL) at Acton Camp to 2,997 feet AMSL in the northern portion of the basin during a relatively dry hydrologic period (1964-65), and from 2,616 feet AMSL at Acton Camp to 3,085 feet at the Vincent Fire Station during the 1984-85 wet period (UWCD and CLWA 1996, Slade 1990). In general, groundwater levels declined during the 1950s through the mid 1970s, rose during the late 1970s to the mid 1980s, and continued to decline after the 1980s (Slade 1990).

3.1.1.2 Agua Dulce Groundwater Basin

Although not formerly recognized as a groundwater basin by DWR until 2003, and then only as a portion of the Acton Valley Groundwater Basin, the Agua Dulce groundwater basin consists of potentially water-bearing alluvial type sediments over an area of approximately 4,620 acres within Sierra Pelona Valley (Slade 2004), northeast of the Santa Clarita Valley. Pumping occurring within the Agua Dulce portion of the Acton Valley Groundwater Basin includes pumping for the Agua Dulce Winery and Vineyards, the Sierra Pelona Mutual Water Company (which serves the Sierra Colony Ranch Estates Tract 34038) and six other small water systems (Slade 2004), all of which are regulated by the Los Angeles County Environmental Health Department.

3.1.1.3 Soledad Canyon Alluvial Channel

The Soledad Canyon Alluvial Channel is approximately nine miles long. It is bordered by the Acton Valley Groundwater Basin on the east, and by the Santa Clara River Valley Groundwater Basin on the west (UWCD and CLWA 1996). DWR does not designate the Soledad Canyon Alluvial Channel as a groundwater basin. The water-bearing formation of the Soledad Canyon Alluvial Channel consists of alluvium deposited in the Santa Clara River bed. Twenty one private water-supply wells extract groundwater throughout the channel. Groundwater extraction data, groundwater storage, and yield data are not currently available (UWCD and CLWA 1996).

3.1.1.4 Santa Clara River Valley East Subbasin

The groundwater basin generally beneath the Valley is identified in DWR's Groundwater Bulletin 118 as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin No. 4-4.07). The Santa Clara River Valley East Groundwater Subbasin encompasses an area of approximately 103 square miles (DWR 2002b). It is bordered by the Piru Mountains on the north, on the west

by impervious rocks of the Modelo and lower Saugus Formations, and a constriction in the alluvium, by the San Gabriel Mountains on the south and east, and by the Santa Susana Mountains on the south. It is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek (DWR 2002b).

3.1.1.4.1 Hydrogeology

The Santa Clara River Valley Groundwater Basin, East Subbasin, consists of two aquifer systems, which are the Alluvium and the Saugus Formation. The Alluvium generally underlies the Santa Clara River and its several tributaries, where it reaches a maximum thickness of about 200 feet. The Saugus Formation underlies practically the entire Upper Santa Clara River area, to depths of at least 2,000 feet. There are also some scattered outcrops of Terrace deposits in the basin that likely contain limited amounts of groundwater. However, since these Terrace deposits are located in limited areas that are situated at elevations above the regional water table and are also of limited thickness, they are of no practical significance as aquifers for municipal water supply. Consequently, Terrace deposits have not been developed for any significant water supply in the basin (CLWA, et al. 2011 and 2012).

3.1.1.5 Adopted Groundwater Management Plan for Santa Clara River Valley East Subbasin

CLWA prepared a groundwater management plan in accordance with the provisions of Water Code Section 10753, which was originally enacted by Assembly Bill (AB) 3030 (Chapter 903, Statutes of 1991). The general contents of CLWA's groundwater management plan (GWMP) were outlined in 2002, and a detailed plan was drafted and adopted in 2003 to satisfy the requirements of AB 134 (Chapter 929, Statutes of 2001). The plan both complements and formalizes a number of existing water supply and water resource planning and management activities in CLWA's service area, which effectively encompasses the East Subbasin of the Santa Clara River Valley Groundwater Basin. Notable, CLWA's GWMP also includes a basin-wide monitoring program, the result of which provide input to annual reporting on water supplies and water resources in the East Subbasin, as well as input to assessment of basin yield for water supply as described below. The GWMP contains four management objectives, or goals, for the basin including:

(1) Development of an integrated surface water, groundwater, and recycled water supply to meet existing and projected demands for municipal, agricultural, and other water uses;

(2) Assessment of groundwater basin conditions to determine a range of operational yield values that use local groundwater conjunctively with supplemental SWP supplies and recycled water to avoid groundwater overdraft;

(3) Preservation of groundwater quality, including active characterization and resolution of any groundwater contamination problems; and

(4) Preservation of interrelated surface water resources, which includes managing groundwater to not adversely impact surface and groundwater discharges or quality to downstream basin(s).

In 2001, out of a willingness to seek opportunities to work together and develop programs that mutually benefit the region as well as their individual communities, several agencies prepared and executed an MOU prior to preparation and adoption of the GWMP. Those agencies were CLWA, Los Angeles County Waterworks District No. 3636 (LACWWD No. 36), NCWD, SCWD, VWC, and United Water Conservation District (UWCD) in neighboring Ventura County. The MOU is a collaborative and integrated approach to several of the aspects of water resource management included in the GWMP. As a result of the MOU, the cooperating agencies integrated their respective database management efforts and continued to monitor and report on the status of basin conditions, as well as on geologic and hydrologic aspects of their respective parts of the overall stream-aquifer system. Following adoption of the GWMP, the water suppliers developed and utilized a numerical groundwater flow model for analysis of groundwater basin yield and for analysis of extraction and containment of groundwater contamination (CLWA, et al. 2011).

The adopted GWMP includes 14 elements intended to accomplish the East Subbasin management objectives listed above. In summary, the plan elements include:

- Monitoring of groundwater levels, quality, production and subsidence
- Monitoring and management of surface water flows and quality
- Determination of East Subbasin yield and avoidance of overdraft
- Development of regular and dry-year emergency water supply
- Continuation of conjunctive use operations
- Long-term salinity management
- Integration of recycled water
- Identification and mitigation of soil and groundwater contamination, including involvement with other local agencies in investigation, cleanup, and closure
- Development and continuation of local, state and federal agency relationships
- Groundwater management reports
- Continuation of public education and water conservation programs
- Identification and management of recharge areas and wellhead protection areas
- Identification of well construction, abandonment, and destruction policies
- Provisions to update the groundwater management plan

Work on a number of the GWMP elements had been ongoing for some time prior to the formal adoption of the GWMP, and expanded work on implementation of the GWMP continues.

3.1.1.6 Available Groundwater Supplies

The groundwater component for the East Subbasin groundwater supply in the Region derives from a groundwater operating plan for the East Subbasin developed over the last 25 years to meet water requirements (municipal, agricultural, small domestic) while maintaining the East Subbasin in a sustainable condition (i.e., no long-term depletion of groundwater or interrelated surface water). This operating plan also addresses groundwater contamination issues in the East Subbasin, all consistent with both the MOU and the GWMP described above. The groundwater operating plan is based on the concept that pumping can vary from year to year to allow increased groundwater use in dry periods and increased recharge during wet periods and to collectively ensure that the groundwater East Subbasin is adequately replenished through various wet/dry cycles. As ultimately formalized in the GWMP, the operating yield concept has been quantified as ranges of annual pumping volumes to capture year-to-year pumping fluctuations in response to both hydrologic conditions and customer demand.

Ongoing work through implementation of the GWMP has produced three detailed technical reports. The first report, dated April 2004, documents the construction and calibration of the groundwater flow model for the Valley (CH2M Hill 2004). The second report, dated August 2005, presents the modeling analysis of the purveyors' groundwater operating plan (CH2M Hill and Luhdorff & Scalmanini 2005). The most recent report, an updated analysis of the basin (Luhdorff & Scalmanini and GSI 2009) presents the modeling analysis of the current groundwater operating plan, including restoration of contaminated wells for municipal supply after treatment and also presents a range of potential impacts deriving from climate change considerations. The primary conclusion of the modeling analysis is that the groundwater operating plan will not cause detrimental short or long term effects to the groundwater and surface water resources in the Valley and is therefore, considered sustainable (CLWA, et al. 2011).

The updated groundwater operating plan, summarized in the *2010 Santa Clarita Valley UWMP* and Table 3.1-2 is as follows:

- Alluvium: Pumping from the Alluvium in a given year is governed by local hydrologic conditions in the eastern Santa Clara River watershed. Pumping ranges between 30,000 and 40,000 AFY during normal and above-normal rainfall years. However, due to hydrogeologic constraints in the eastern part of the subbasin, pumping is reduced to between 30,000 and 35,000 AFY during locally dry years.

- Saugus Formation: Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly from the SWP. During average-year conditions within the SWP system, Saugus pumping ranges between 7,500 and 15,000 AFY. Planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 AFY during a drought year and can increase to between 21,000 and 25,000 AFY if SWP deliveries are reduced for two consecutive years and between 21,000 and 35,000 AFY if SWP deliveries are reduced for three consecutive years. Such high pumping would be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 AFY, to further enhance the effectiveness of natural recharge processes that would recover water levels and groundwater storage volumes after the higher pumping during dry years.

TABLE 3.1-2
AVAILABILITY OF GROUNDWATER FOR THE REGION

	Groundwater Production (AF)			
Aquifer	**Normal Year**	**Dry Year 1**	**Dry Year 2**	**Dry Year 2**
East Subbasin				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	15,500 to 25,000	21,000 to 25,000	21,000 to 35,000
Acton Basin	34,400	14,900	14,900	14,900
Total	**71,900 to 89,400**	**60,400 to 74,900**	**65,900 to 74,900**	**65,900 to 84,900**

Source: *2010 Santa Clarita Valley UWMP* (CLWA, et al. 2011), Table 3-5, and UWCD and CLWA 1996.

Additionally, availability of groundwater from the Acton Groundwater Basin is estimated to range from 14,883 AF for a relatively dry period to 34,395 AF for a relatively wet period (UWCD and CLWA 1996).

Over time, directly related to the rate of suburban development and corresponding decrease in agricultural land use, the amount of Alluvium pumping for agricultural water supply is expected to decrease, with an equivalent increase in the amount of Alluvium pumping for municipal water supply, resulting in total pumping remaining essentially constant through 2050. In the future, Alluvium pumping is intended to remain within the sustainable ranges in the Groundwater Operating Plan. Planned Saugus Formation pumping increases are also expected to remain at levels consistent with the operating plan.

Overall, the municipal groundwater supply, distributed among the retail purveyors, recognizes the existing and projected future uses of groundwater by overlying interests in the Valley such that the combination of municipal and all other groundwater pumping remains within the groundwater operating plan, which has been analyzed for sustainability (CLWA, et al. 2011).

3.1.1.6.1 Impacted Well Capacity

As discussed in the 2008 IRWMP, certain wells in the Basin were impacted by perchlorate contamination and thus represented a temporary loss of well capacity within CLWA's service area. The remediated wells (two Saugus wells and one Alluvium well) and the replacement wells (one Saugus and one Alluvium well), collectively restore much of the temporarily lost well capacity and are now included as parts of the active municipal groundwater source capacities. More details on perchlorate contamination and remediation in the Region are provided below in Section 3.2.4.3.3.

Castaic Lake

3.1.2 Imported Water Supplies

Imported water supplies in the Region consist primarily of SWP supplies, which were first delivered to CLWA in 1980. Detail on the SWP facilities and background is also provided in Section 2.7.1. In addition to its SWP Table A Amount, CLWA has developed other imported water supplies. CLWA has purchased an imported surface supply from the Buena Vista Water Storage District

(BVWSD) and Rosedale-Rio Bravo Water Storage District (RRBWSD) in Kern County, which was first delivered to CLWA in 2007. CLWA wholesales these imported supplies to each of the local retail water purveyors. Newhall Land and Farming (Newhall Land) has acquired a water transfer supply from a source in Kern County. This supply, referred to as "Nickel water," would be made available to VWC. Additionally, a small amount of SWP water is available to a portion of the eastern part of the Region through deliveries from the Antelope Valley-East Kern Water Agency (AVEK).

3.1.2.1 SWP Water Supplies

CLWA and AVEK are two of 29 water agencies (commonly referred to as "contractors") that have an SWP Water Supply Contract with DWR. Each SWP contractor's SWP Water Supply Contract contains a "Table A," which lists the maximum amount of water an agency may request each year throughout the life of the contract. Currently, CLWA's annual Table A Amount is 95,200 AF[2]. AVEK's annual Table A Amount is 141,400 AF, but only approximately 3 percent (or 4,242 AF) of that amount is available to the eastern parts of the IRWM Region.

In addition to Table A supplies, additional types of imported water may be made available by DWR including Article 21 water, Turnback Pool water and Dry Year Water Purchase supplies. However, due to uncertainty in availability, they are not included as supplies in this IRWMP.

3.1.2.1.1 Flexible Storage Account

The Sacramento-San Joaquin Delta

As part of its water supply contract with DWR, CLWA has access to a portion of the storage capacity of Castaic Lake. This Flexible Storage Account allows CLWA to utilize up to 4,684 AF of the storage in Castaic Lake, which must be replaced by CLWA within five years of its withdrawal. In 2005, CLWA negotiated with Ventura County SWP contractor agencies to obtain the use of their Flexible Storage Account. This allows CLWA access to another 1,376 AF of storage in Castaic Lake. CLWA access to this additional storage is available on a year-to-year basis through 2015. While it is expected that CLWA and Ventura County will extend the existing flexible storage agreement beyond the 2015 term, it is not assumed to be available beyond 2015 in this Plan. AVEK does not have access to SWP flexible storage.

3.1.2.1.2 Factors Affecting SWP Table A Supplies

The amount of SWP water actually available and allocated to SWP contractors each year is dependent on a number of factors including, primarily, the availability of water at the source of supply in northern California, the ability to transport that water from the source to the primary diversion point in the southern Sacramento-San Joaquin Delta and the magnitude of total

[2] CLWA's original SWP Water Supply Contract with DWR was amended in 1966 for a maximum annual Table A Amount of 41,500 AF. In 1991, CLWA purchased 12,700 AF of annual Table A Amount from a Kern County water district, and in 1999 purchased an additional 41,000 AF of annual Table A Amount from another Kern County water district, for a current total annual Table A Amount of 95,200 AF.

contractor demand for that water. More detail on this is found in the *2010 Santa Clarita Valley UWMP*.

The "*State Water Project Delivery Reliability Report,"* prepared by DWR, assists SWP contractors and local planners in assessing the reliability of the SWP component of their overall supplies. In the *2011 Reliability Report* (DWR 2012), DWR estimates that for all contractors combined, the SWP can deliver a total Table A supply of 61 percent of total maximum Table A Amounts on a long-term average basis, under current conditions and 60 percent of total maximum Table A Amounts under future conditions. In the worst-case single critically dry year, DWR estimates the SWP can deliver 9 percent of total maximum Table A Amounts under current conditions and eleven percent under future conditions. During multiple-year dry periods, DWR estimates the SWP can deliver a total Table A supply averaging 35 to 38 percent of total maximum Table A Amounts under current conditions and 30 to 35 percent under future conditions.

Table 3.1-3 shows CLWA's and AVEK's SWP supplies projected to be available to the Region in average/normal years (based on the average delivery over the study's historic hydrologic period from 1922 through 2003). Table 3.1-3 also summarizes estimated SWP supply availability in the Region in a single dry year (based on a repeat of the worst-case historic hydrologic conditions of 1977) and over a multiple dry-year period (based on a repeat of the historic four-year drought of 1931 through 1934). Supply availability is agency-specific and may differ from combined contractor estimates described above. Table 3.1-3 does not include the 11,000 AFY available from the Buena Vista-Rosedale transfer in an average, single-dry, or multiple-dry year, as this supply is a firm amount in all year types.

3.1.2.2 Other Imported Supplies

3.1.2.2.1 Buena Vista - Rosedale

CLWA has executed a long-term transfer agreement for 11,000 AFY with the BVWSD and RRBWSD and began taking delivery of this supply in 2007. The supply is based on existing long-standing Kern River water rights, which would be delivered by exchange of SWP Table A Amount. This water supply is firm; that is, the total amount of 11,000 AFY is available in all water year types based on the Kern River water right.

3.1.2.2.2 Nickel Water – Newhall Land

Newhall Land has acquired a water transfer from Kern County sources known as Nickel water. This source of supply totals 1,607 AFY. The Nickel water comes from a firm source of supply and was acquired in anticipation of the Newhall Ranch Specific Plan development. In this IRWM Plan, it is anticipated that the Nickel water will be available to the VWC.

TABLE 3.1-3
SWP TABLE A SUPPLY RELIABILITY FOR CLWA AND AVEK (AF)[(a)(b)]

Wholesaler (Supply Source)	2011	2015	2020	2025	2030-2050
Average Water Year[(c)]					
DWR (SWP)					
Table A Supply CLWA	60,000	60,000	60,000	60,000	57,000
% of Table A Amount[(d)]	63%	63%	63%	63%	60%
Table A Supply AVEK	2,587	2,587	2,587	2,587	2,545
% of Table A Amount[(d)]	61%	61%	61%	61%	60%
Single Dry Year[(e)]					
DWR (SWP)					
Table A Supply CLWA	12,000	12,000	12,000	12,000	10,000
% of Table A Amount[(d)]	13%	13%	13%	13%	10%
Table A Supply AVEK	424	424	424	424	424
% of Table A Amount[(d)]	10%	10%	10%	10%	10%
Multi-Dry Year[(f)]					
DWR (SWP)					
Table A Supply CLWA	33,750	33,750	33,750	33,750	32,250
% of Table A Amount[(d)]	35%	35%	35%	35%	34%
Table A Supply AVEK	1,527	1,527	1,527	1,527	1,442
% of Table A Amount[(d)]	36%	36%	36%	36%	34%

Notes:
(a) Supplies to CLWA and AVEK provided by DWR from detailed delivery results from the analyses presented in DWR's"*2011 SWP Delivery Reliability Report*. As indicated in the *2011 Reliability Report*, the supplies are based on existing SWP facilities and current regulatory and operational constraints.
(b) Table A supplies include supplies allocated in one year that are carried over for delivery the following year.
(c) Based on average deliveries over the study's historic hydrologic period of 1922 through 2003.
(d) Supply as a percentage of CLWA's Table A Amount of 95,200 AF; Supply as a percentage of AVEK Table A water estimated to be available to Region (4,242 AF).
(e) Based on the worst case historic single dry year of 1977.
(f) Supplies shown are annual averages over four consecutive dry years, based on the historic four-year dry period of 1931-1934.

3.1.3 Groundwater Banking

In 2003, CLWA produced a Water Supply Reliability Plan (Reliability Plan), and updated it in 2009 (CLWA 2009). The Reliability Plan outlines primary elements that CLWA should include in its water supply mix to obtain maximum overall supply reliability enhancement. These elements include both conjunctive use and groundwater banking programs, which enhance the reliability of both the existing and future supplies, as well as water acquisitions.

Conjunctive use is the coordinated operation of multiple water supplies, generally based on storing groundwater supplies in times of surplus for use during dry periods and drought when surface water supplies would likely be reduced. During water shortages, the stored water is pumped out and conveyed to the banking partner, or used by the farmers in exchange for their surface water allocations, which are delivered to the banking partner.

CLWA is a partner in four existing groundwater banking programs, the Semitropic Water Storage District (SWSD) Banking Program, the West Kern Water Storage District Program and two RRBWSD Banking programs, discussed below in Sections 3.1.4.1 and 3.1.4.2 respectively.

Newhall Land is also a partner in the SWSD Banking Program, as discussed in Section 3.1.4.3, with its supplies assumed to be available to VWC.

3.1.3.1 Semitropic Water Banking Program

In 2002, CLWA entered into a temporary storage agreement with SWSD and stored an available portion of its Table A Amount (24,000 AF) in an account in SWSD's program. In 2004, 32,522 AF of available 2003 Table A supply was stored in a second temporary SWSD account. In accordance with the terms of CLWA's storage agreements with SWSD, 90 percent of the banked amount, or a total of 50,870 AF, will be available to CLWA to meet demands. Of this recoverable storage, 4,950 AF has been withdrawn, with 1,650 AF delivered in 2009 and 3,300 AF delivered in 2010, leaving a balance of 45,920 AF in storage available to meet future CLWA needs. CLWA executed an amendment with SWSD for a ten-year extension of each banking agreement in April 2010. Current operational planning includes use of the water stored in SWSD for dry-year supply.

3.1.3.2 Rosedale-Rio Bravo Water Storage District Water Banking Programs

CLWA has entered into a long-term agreement with RRBWSD that provides it with storage and pumpback capacity of 20,000 AFY, with up to 100,000 AF of storage capacity. CLWA began storing water in this program in 2005 and has 94,270 AF currently available for withdrawal.

CLWA also has a two-for-one banking program with the RRBWSD that has a recoverable capacity of 9,500 AF. CLWA began storing water in this program in 2011 and has 7,470 AF of recoverable water as of 2012.

These projects are water management programs to improve the reliability of CLWA's existing dry-year supplies; they are not an annual source of supply that could support growth.

3.1.3.3 Semitropic Water Banking Program – Newhall Land

One of SWSD's long-term groundwater banking partners is Newhall Land. In its agreement with SWSD, Newhall Land has available to it a pumpback capacity of 4,950 AFY and a storage capacity of 55,000 AF. Newhall Land has a current storage balance of 26,059 AF. This supply is assumed to be available to VWC and is planned to be used only in dry years.

3.1.3.4 West Kern Water District Storage Program

CLWA has entered into a two-for-one program with the West Kern Water District and has put 5,000 AF of water into the program in 2011. This results in CLWA having 2,500 AF of recoverable water in the program in 2012.

3.1.4 Recycled Water

At the current time the necessary infrastructure to produce and utilize recycled water exists within the CLWA service area only. Hence the following section on recycled water focuses on the CLWA service area, describing existing and future recycled water opportunities. Currently there are two water reclamation plants (WRPs) within the CWA service area, treating water to tertiary level. Additionally, the Newhall Ranch development is also planning to construct a

WRP, and recycled water from this source may be incorporated into the CLWA recycled water system.

By utilizing the recycled water from the WRPs for irrigation and other non-potable purposes, CLWA can more efficiently allocate its potable water and increase the reliability of water supplies in the Valley. CLWA's 2002 *Draft Recycled Water Master Plan* (Recycled Plan) and the associated 2007 *Program Environmental Impact Report* outline a multi-phase plan to supply recycled water to the CLWA service area, which is currently in its second phase (Phase 2).

The two WRPs in the CLWA service area, the Saugus WRP and the Valencia WRP, are owned and operated by the SCVSD. The Valencia WRP, located on The Old Road near Magic Mountain Amusement Park, was completed in 1967. The Valencia WRP has a current treatment capacity of 21.6 million gallons per day (MGD), equivalent to 24,192 AFY. In 2011, the Valencia WRP produced an average of 15 MGD of tertiary recycled water. Use of recycled water from the Valencia WRP is permitted under Los Angeles RWQCB Order Nos. 87-48 and 97-072. The Saugus WRP, completed in 1962, is located southeast of the intersection of Bouquet Canyon Road and Soledad Canyon Road. The Saugus WRP has a current treatment capacity of 6.5 MGD (7,280 AFY). No future expansions are possible at the plant due to space limitations at the site. In 2011, the Saugus WRP produced an average of 5 MGD of tertiary recycled water. Use of recycled water from this facility is permitted under Los Angeles RWQCB Order Nos. 87-49 and 97-072.

Phase 1 of the Recycled Plan has been constructed and begins with a 4,000 GPM pump station at the Valencia WRP that connects to a 1.5 MG reservoir in the Westridge area. It serves landscape customers along The Old Road and the Tournament Players Club (TPC) golf course, all of which are VWC customers. Phase 1 of the recycled water system can deliver up to 1,700 AFY. In 2011, CLWA reused approximately 337 AF of recycled water.

Phase 2, will provide the infrastructure to deliver another approximately 1,600 AFY recycled water to residential developments and large irrigation customers. This second phase is divided into three separate sub phases that are currently in design: Phase 2A, 2B, and 2C. Phase 2A will divert recycled water from the Saugus WRP and distribute it to identified users to the north, across the Santa Clara River and then to the west and east. Customers included in this expansion will be Santa Clarita Central Park and the Bridgeport and River Village developments. Additionally, large customers will be served with this expansion with a collective design that will increase recycled water deliveries by 500 AFY. Phase 2B includes the rehabilitation of the Honby Pump Station, the conversion of an existing pipeline from potable to recycled water use, and additional storage in the eastern portion of CLWA's service area. Phase 2B will extend recycled water distribution 9,500 feet to an industrial area north and east of the intersection of Soledad Canyon Road and Golden Valley Road.

Phase 2C further expands the recycled water program with the South End Recycled Water Project, which is a project proposed under the Proposition 84 Round 1 Implementation Grant program. VWC has initiated project design to expand the existing recycled water transmission and distribution system southerly to supply recycled water to additional customers as well as potentially supply a source of recycled water to customers of adjacent water agencies. Phase 2C will expand recycled water distribution in the City of Santa Clarita easterly along Valencia Boulevard and southerly along Rockwell Canyon Road and Orchard Village Road to Lyons

Avenue. Phase 2C will result in the use of up to 910 AFY of recycled water from the Valencia WRP.

Ultimately, the CLWA recycled water system, along with the recycled water system proposed as part of the Newhall Ranch Development, will recycle approximately 22,800 AFY for non-potable uses.

Valencia Water Reclamation Plant

3.1.4.1 New Wastewater Treatment Facilities

A third Valley reclamation plant, the Newhall Ranch WRP, is proposed as part of the Newhall Ranch project. This proposed facility would be located near the western edge of the development project along the south side of State Route 126. The plant would be constructed in stages, with an ultimate capacity of 6.8 MGD (7,616 AFY) as stated in the RWQCB's Order R4-2007-0046. According to the Newhall Ranch Resource Management and Development Plan/Spineflower Conservation Plan EIS/EIR of April 2009, approximately 5,400 AFY of the tertiary treated water from this plant is projected to be used by the Newhall Ranch Project. The WRP will serve the Newhall Ranch Specific Plan and a new County Sanitation District has been created to operate and maintain the Newhall Ranch WRP.

3.2 Water Quality

The Region's water is an important resource and its quality is of vital importance. The quality of water affects the ability to use it, affects the cost of providing treated drinking water, affects habitat conditions, and can impair or enhance recreation.

3.2.1 Surface Water Quality

This section discusses water quality as it pertains to pollution and the natural environment.

3.2.1.1 Basin Plan

The Los Angeles RWQCB Basin Plan (1994) includes water quality objectives for the entire Santa Clara River Watershed. These objectives were established to protect the various beneficial uses for that particular water body or reach. The water bodies of the Upper Santa Clara River watershed, which include streams, natural lakes and reservoirs, span a wide variety of existing, potential and/or intermittent beneficial uses. The following is a list of the beneficial uses identified in the Upper Santa Clara River Region:

- Municipal and Domestic Supply
- Industrial Service Supply
- Industrial Process Supply
- Agricultural Supply
- Groundwater Recharge

- Freshwater Replenishment
- Hydropower Generation
- Water Contact and Non-contact Water Recreation
- Warm and Cold Freshwater Habitat
- Wildlife Habitat
- Rare, Threatened, and Endangered Species
- Spawning, Reproduction, and/or Early Development

All of the water bodies in the Region support the designated beneficial uses (either existing or intermittent) of municipal and domestic supply, agricultural supply, groundwater recharge, water contact recreation, non-contact water recreation, wildlife habitat, and warm freshwater habitat. In addition, many water bodies (such as Bouquet, San Francisquito, and Soledad Canyons) support the designated beneficial uses (either existing or intermittent) of rare, threatened or endangered species; wetland habitat; and/or spawning, reproduction, and/or early development. Regional reservoirs that support hydropower generation include Elderberry Forebay, Castaic Lake, Dry Canyon Reservoir, Bouquet Reservoir, and Pyramid Lake. Local surface waters are not a direct source of drinking water supply in the Region, but they are a continual source of recharge to groundwater which is used to meet municipal water demands.

Table 3.2-1 shows Basin Plan water quality objectives of selected conventional pollutants meant to protect the beneficial uses in the Upper Santa Clara River watershed. The Basin Plan also outlines many narrative water quality objectives as well as various statewide plans and policies which contain applicable water quality objectives, some of which have been found to be causing impairment in the Upper Santa Clara River.

In addition to the aforementioned water quality objectives, since the 1994 version of the Basin Plan was adopted, several key plans and policies which affect California were developed containing water quality standards. U.S. EPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About 40 criteria in the NTR were applicable in California. On May 18, 2000, U.S. EPA adopted the California Toxics Rule (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality standards for priority pollutants. The State Water Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy or SIP) in March 2000 and amended it in February 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control.

TABLE 3.2-1
WATER QUALITY OBJECTIVES FOR WATERS IN THE UPPER SANTA CLARA RIVER WATERSHED

	TDS (mg/L)	Chloride (mg/L)[(a)]	Sulfate (mg/L)	Nitrogen (mg/L)	SAR (mg/L)[(b)]	Boron (mg/L)
Inland Surface Waters						
Above Lang gaging station (Reach 8)	500	50	100	5	5	0.5
Between Lang gaging station and Bouquest Canyon Road Bridge (Reach 7)	800	100	150	5	5	1.0
Between Bouquet Canyon Road Bridge and West Pier Highway 99 (Reach 6)	1000	100	300	10	5	1.5
Between West Pier Highway 99 and Blue Cut gaging station (Reach 5)	1000	100	400	5	10	1.5
Groundwater Basins						
Acton Valley	550	100	150	10;45;10;1[(c)]	NA	1.0
Sierra Pelona Valley (Agua Dulce)	600	100	100	10;45;10;1[(c)]	NA	0.5
Upper Mint Canyon	700	100	150	10;45;10;1[(c)]	NA	0.5
Upper Bouquet Canyon	400	30	50	10;45;10;1[(c)]	NA	0.5
Green Valley	400	25	50	10;45;10;1[(c)]	NA	-
Lake Elizabeth-Lake Hughes area	500	50	100	10;45;10;1[(c)]	NA	0.5
Santa Clara-Mint Canyon	800	150	150	10;45;10;1[(c)]	NA	1.0
South Fork	700	100	200	10;45;10;1[(c)]	NA	0.5
Placerita Canyon	700	100	150	10;45;10;1[(c)]	NA	0.5
Santa Clara-Bouquet and San Francisquito Canyons	700	100	250	10;45;10;1[(c)]	NA	1.0
Castaic Valley	1000	150	350	10;45;10;1[(c)]	NA	1.0
Saugus Formation	-	-	-		NA	-

Notes:
(a) The RWQCB has adopted revised Site-Specific Objectives (SSOs) for chloride. See RWQCB Order No. R4-2008-012.
(b) SAR = Sodium adsorption ratio.
(c) 10 mg/L nitrogen (as nitrate + nitrite); 45 mg/L nitrate (as NO_3); 10 mg/L nitrate-nitrogen; 1 mg/L nitrite-nitrogen.

3.2.1.2 Water Quality Management Tools

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. SDWA applies to every public water system in the United States. SDWA authorizes the US EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. Originally, SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. Amendments in 1996 greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of

safe drinking water. Under the SDWA, technical and financial aid is available for certain source water protection activities.

The Federal Clean Water Act (CWA) contains two strategies for managing water quality including, (1) a technology-based approach that envisions requirements to maintain a minimum level of pollutant management using the best available technology; and (2) a water quality-based approach that relies on evaluating the condition of surface waters and setting limitations on the amount of pollution that the water can be exposed to without adversely affecting the beneficial uses of those waters. Section 303(d) of the CWA bridges these two (2) strategies. Section 303(d) requires that the States make a list of waters that are not attaining standards after the technology-based limits are put into place. For waters on this list (and where the US EPA administrator deems they are appropriate), the States are required to develop a numeric Total Maximum Daily Load (TMDL). A TMDL must account for all sources of the pollutants that caused the water to be listed. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (Federally permitted discharges) and contributions from nonpoint sources.

A TMDL is a number that represents the assimilative capacity of receiving water to absorb a pollutant. A TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, an allotment for natural background loading, as well as a margin of safety and additional accounting for seasonal variation. TMDLs can be expressed in terms of mass per time (the traditional approach) or in other ways such as toxicity or a percentage reduction or other appropriate measure relating to a state water quality objective. A TMDL is implemented by reallocating the total allowable pollution among the different pollutant sources (through the permitting process or other regulatory means) to ensure that the water quality objectives are achieved.

3.2.1.3 Section 303(D) List of Water Quality Limited Segments

The 2010 Section 303(d) Impaired Waterbodies List for the Upper Santa Clara River Watershed was approved by the SWRCB on September 21, 2009 and was approved by the US EPA on October 11, 2011. There are a number of constituents that are on the 2010 303(d) list for Reaches 5, 6 and 7 of the Santa Clara River, and for Lake Hughes, Lake Elizabeth and Munz Lake, which are also within the Region. Figure 2.1-1 shows the various reaches of the Santa Clara River. Table 3.2-2 provides a summary of the current listings of impaired water bodies of the Upper Santa Clara River Watershed.

3.2.1.4 TMDLs

The Santa Clara River currently has three adopted TMDLs due to non-attainment of water quality objectives, one pertaining to chloride, another pertaining to nitrogen compounds, and a third pertaining to bacteria. Another TMDL is in place for three lakes within the Region that are impaired with trash.

TABLE 3.2-2
2010 303(D) LIST OF IMPAIRED WATER BODIES –
UPPER SANTA CLARA RIVER WATERSHED

Name	Pollutant/ Stressor	Potential Sources	Typical Data Range	Basin Plan Objective	Est. Size Affected (acres)	Proposed/ Approved TMDL Completion
Elizabeth Lake	Eutrophication	Nonpoint	NA	NA	123	2019
	Organic Enrichment/ Low Dissolved Oxygen	Nonpoint	0.8 – 11.0 mg/L	Annual mean > 7.0 mg/L; No sample < 5.0 mg/L	123	2019
	pH	Nonpoint	7.3 - 9.6	6.5 – 8.5	123	2019
	Trash	Nonpoint	NA	NA	123	2008
Lake Hughes	Algae	Nonpoint	NA	NA	21	2019
	Eutrophication	Nonpoint	NA	NA	21	2019
	Fish Kills	Nonpoint	NA	NA	21	2019
	Odor	Nonpoint	NA	NA	21	2019
	Trash	Nonpoint	NA	NA	21	2008
Munz Lake	Eutrophication	Nonpoint	NA	NA	7	2019
	Trash	Nonpoint	NA	NA	7	2008
Santa Clara River, Reach 5 (Blue Cut to West Pier Hwy 99)	Chloride	Nonpoint/ Point	10 – 138 mg/L	80 – 100 mg/L	9	2005
	Coliform	Nonpoint/ Point	20 -24,000 MPN[(a)]/ 100 mL	30-day log mean < 200 MPN[(a)]/100 mL; no more than 10% of samples > 400 MPN[(a)]/100 mL	9	2019
	Iron	Nonpoint	NA	NA	9	2021
Santa Clara River, Reach 6 (West Pier Hwy 99 to Bouquet Cyn Rd)	Chloride	Nonpoint/ Point	10 – 138 mg/L	80 – 100 mg/L	5	2005
	Chlorpyrifos	Unknown	NA	NA	5	2019
	Coliform	Nonpoint/ Point	20 -24,000 MPN[(a)]/100 mL	30-day log mean < 200 MPN[(a)]/100 mL; no more than 10 % of samples > 400 MPN[(a)]/100mL	5	2019
	Copper	Nonpoint	NA	NA	5	2021
	Diazinon	Unknown	NA	NA	5	2019
	Iron	Unknown	NA	NA	5	2021
	Toxicity	Unknown	NA	NA	5	2019
Santa Clara River, Reach 7 (Bouquet Cyn Rd to Lang Gaging)	Coliform	Nonpoint	NA	NA	21	2019

Source: SWRCB 2010.
Note: (a) MPN = Most Probable Number.

3.2.1.4.1 Nitrogen Compounds

The nitrogen compounds TMDL for Reaches 5 and 6 (previously Reaches 7 and 8) of the Santa Clara River went into effect on March 23, 2004. Nitrogen compounds can cause or contribute to eutrophic effects such as low dissolved oxygen, algae growth and reduced benthic macro invertebrates. The identified source of nitrogen compounds in the Santa Clara River are wastewater discharges, with possible other sources being agricultural runoff, stormwater runoff, groundwater discharge and atmospheric deposition. Given these sources, wasteload allocations for nitrogen compounds were assigned to the various sources (LARWQCB 2011).

In 2003 the SCVSD upgraded the treatment processes at the Valencia and Saugus WRPs to include nitrification/denitrification to address nutrients. The 2011 average ammonia levels in the Valencia and Saugus WRP recycled water were 1.02 and 1.32 mg/L, respectively. The 2011 average nitrate plus nitrite levels in Valencia and Saugus WRP recycled water were 2.60 and 4.36 mg/L, respectively (CLWA, et al. 2011).

The numerical TMDL targets established for ammonia and for nitrate plus nitrite are shown in Table 3.2-3 and Table 3.2-4, respectively. (As referred to in Tables 3.2-3 and 3.2-4, Reaches 7 ad 8 are the same as Reaches 5 and 6 referred to in Table 7.3-3 and elsewhere in this document).

The Santa Clara River is not longer considered to have impairments related to nitrate; the river no longer appears on the 303(d) list for nitrate.

TABLE 3.2-3
TMDL FOR AMMONIA ON THE UPPER SANTA CLARA RIVER

Reach	One-hour average NT[(a)] (mg-N/L)	Thirty-day average NT (mg-N/L)
Reach 8	14.8	3.2
Reach 7 above Valencia	4.8	2.0
Reach 7 below Valencia	5.5	2.0
Reach 7 at County Line	3.4	1.2

Source: *2010 Santa Clarita Valley* UWMP (CLWA, et al. 2011), based on LARWQCB Santa Clara River TMDL for Nitrogen Compounds Staff Report, June 2003.
Note: (a) NT = Numeric Target.

TABLE 3.2-4
TMDL FOR NITRATE PLUS NITRITE ON THE SANTA CLARA RIVER

Reach	Thirty-day Average (mg-N/L)
Reach 8	9.0
Reach 7	4.5

Source: *2010 Santa Clarita Valley* UWMP (CLWA, et al. 2011), based on LARWQCB Santa Clara River TMDL for Nitrogen Compounds.

3.2.1.4.2 Chloride

The Chloride TMDL was established due to the original listing of Reaches 5 and 6 of the Upper Santa Clara River for chloride on the 1998 303(d) list of impaired water bodies. Originally adopted in 2002, the most recent Basin Plan Amendment for this TMDL was unanimously adopted by the RWQCB in on December 11, 2008 with final approval by the US EPA on April 6, 2010. Beneficial uses currently impacted include salt-sensitive agriculture. Irrigation of salt sensitive crops such as avocados, strawberries, and nursery crops, with water containing high chloride levels allegedly results in reduced yields of such high value crops. Sources of chloride include self-regenerating water softeners, drinking water, and other additives that contribute to chloride in wastewater effluent. Wastewater discharges from the Saugus and Valencia WRPs were determined to be the principal source, making up an estimated 70 percent of the chloride load into Reaches 5 and 6 (LARWQB 2011).

The TMDL implementation schedule allows for several special studies to determine whether existing water quality objectives and waste-load allocations for chloride can be revised. The TMDL established final waste load allocations of 100 mg/L and higher conditional waste load allocations for the Saugus and Valencia WRPs, and provides for a 10-year schedule to attain compliance with the conditional water quality objectives and waste-load allocations for chloride. On October 28, 2013, the Santa Clarita Valley Sanitation District certified the Final Chloride Compliance Facilities Plan and associated Environmental Impact Report and approved a project consisting of ultraviolet disinfection, advanced treatment using reverse osmosis, and deep well injection for brine disposal, that complies with the final wasteload allocations of the chloride TMDL.

3.2.1.4.3 Bacteria

The upper Santa Clara River has been listed as impaired by elevated levels of indicator bacteria, starting in 1996 at Reach 6. During the 1998 Water Quality Assessment, Reaches 5 and 7 were also found to be impaired by high coliform counts and were added to the 303(d) List. Elevated bacterial indicator densities have shown to be closely related to adverse health effects and impair water quality for water contact recreation. As a result of this impairment to beneficial uses, the Indicator Bacteria TMDL was adopted by the RWQCB for all three reaches on July 8, 2010 and went into effect on March 21, 2012 (DOT 2011). Major contributors of bacteria to the Upper Santa Clara River are discharges from the stormwater conveyance system that drains urban areas. In contrast, runoff from natural landscapes has not been found to be a significant source of bacteria.

Numeric TMDL targets, expressed as allowable exceedance days, are used to calculate waste load and load allocations for non-point and point sources. They are based on an acceptable health risk for recreational waters as recommended by the US EPA and take into consideration that natural sources of bacteria exist that may cause or contribute to exceedances of objectives. Regulatory mechanisms that will be used to implement the adopted TMDL include the general NPDES permits, individual NPDES permits, MS4 Permits covering jurisdictions within the Upper Santa Clara River watershed, the Statewide Industrial Stormwater General Permit, the Statewide Stormwater Permit for Caltrans Activities, the Conditional Waiver for Irrigated Lands, Waste Discharge Regulations, and waivers thereof, as well as additional applicable California Water Code Sections and other appropriate mechanisms (LARWQCB 2010).

3.2.1.4.4 Trash

On March 6, 2008, a trash TMDL became effective for Lake Elizabeth, Munz Lake, and Lake Hughes. Sources of trash have been identified as litter from adjacent lands, roadways, and direct dumping, as well as storm drains. By 2011, targeted efforts in the vicinity of Munz Lake resulted in the finding that the lake was no longer impaired; however levels of trash discharges to Lake Elizabeth and Lake Hughes are still resulting in water quality objective violations. The beneficial uses being impacted are water contact and non-water contact recreation, warm freshwater and wildlife habitat, and rare and threatened species. Structural and non-structural best management practices have been identified as a means of addressing this TMDL (LARWQCB 2011). LA County completed the installation of the required five full-capture trash devices in September of 2012 and is thereby in full compliance of this TMDL.

3.2.2 Potable Water Quality

The previous section discussed water quality as it pertained to pollution and the natural environment. This section identifies water quality regulations related to potable water delivered to customers.

The quality of water received by individual customers will vary depending on whether they receive imported water, groundwater, or a blend. Some will receive only imported water at all times, while others will receive only groundwater. Others may receive water from one well at one time, water from another well at a different time, different blends of well and imported water at other times, and only imported water at yet other times. These times may vary over the course of a day, a week, or a year.

The following sections provide a general description of the water quality of both imported water and groundwater supplies as well as a discussion of potential water quality impacts on the reliability of these supplies.

3.2.2.1 Water Quality Constituents of Interest

Some contaminants are naturally-occurring minerals and radioactive material. In some cases the presence of animals or human activity can contribute to the presence of certain constituents in the source waters. The Santa Clarita Valley's water suppliers are committed to providing their customers with high quality water that meets all federal and state primary drinking water standards (CLWA, et al. 2011). Common water constituents that are regularly tested for, include metals and salts, disinfection by-products, microbial contaminants, radioactive compounds, organic compounds, and hardness. General findings are listed below and more details on these constituents can be found in the *2010 Santa Clarita Valley UWMP* and the *Santa Clarita Water Quality Report* (CLWA 2012). Perchlorate is an additional constituent that has been a water quality concern in the Region and is discussed in detail below.

- **Metals and Salts.** Metals and salts are tested in groundwater once every three years and in Castaic Lake water every month. Small quantities of naturally occurring arsenic are present in Castaic Lake and in groundwater wells; however arsenic levels are below the allowable drinking water maximum contaminant level (MCL). Maximum tested levels of chloride in water throughout the Santa Clarita Valley are all well below the minimum

MCL set for chlorides and nitrate levels in drinking water also meet federal and state MCL standards (CLWA 2012).

- **Disinfection By-Products.** CLWA uses ozone and chloramines to disinfect its water. Disinfection By-Products (DBPs), such as Trihalomethanes and Haloacetic Acids, are generated by the interaction between naturally occurring organic matter and disinfectants such as chlorine and ozone. Ozone is a very powerful disinfectant that can also interact with bromide, a naturally occurring salt, to produce bromate. The potable water systems are tested regularly for these constituents and levels are within drinking water standards (CLWA 2012).

- **Microbial Contaminants.** Microbiological drinking water tests are conducted weekly for total coliform bacteria. No *E. coli* was detected in any drinking waters in 2011. Additional microbiological tests for the water-borne parasites *Cryptosporidium parvum* and *Giardia lamblia* are performed on water from Castaic Lake and have been negative (CLWA 2012).

- **Radioactive Compounds.** Testing is conducted for alpha and beta radioactivitiy. If concentrations are measured above a given threshold, uranium and radium tests are also required. Current levels of radioactive compounds meet federal and state MCL standards (CLWA 2012).

- **Organic Compounds.** Castaic Lake and local wells are tested at least annually for volatile organic compounds and periodically for non-volatile synthetic organic compounds. Trichloroethylene and tetrachloroethylene have been found in trace levels in groundwater in the Valley, but test levels are below the MCL and generally below the detection limit for reporting (CLWA 2012).

- **Hardness.** Hard water is the primary complaint from Valley customers and despite the ban on automatic water softeners in the Valley, some households still use these units to remove hardness. In addition to having high operating costs, many of these units are designed to discharge a brine (salt) solution to the sanitary sewer system that is eventually discharged to the Santa Clara River (CLWA, et al. 2011).

- **Perchlorate.** Perchlorate, a chemical used in making rocket and ammunition propellants, has been a water quality concern in the Santa Clarita Valley since 1997 when it was originally detected in four Saugus Formation groundwater wells. To date, perchlorate has been detected in a total of 8 wells, in both the Saugus Formation and the Alluvium, including most recently in VWC's Saugus Well 201, in August 2010. Six wells were ultimately taken out of service upon the detection of perchlorate. All wells have either been (1) abandoned and replaced, (2) returned to service with the addition of treatment facilities that allow the wells to be used for municipal water supply as part of the overall water supply systems permitted by the California Department of Public Health (DPH) or (3) are targeted for treatment or replacement.

  Returning impacted wells to municipal water supply service by installing treatment requires DPH approval before the water can be considered potable and safe for delivery to customers. Before issuing a permit to a water utility for use of an impaired source, DPH requires that studies and engineering work be performed to demonstrate that

pumping the well and treating the water will be protective of public health for users of the water. Ultimately, VWC's plan, as described below, and DPH requirements are intended to ensure that the water introduced to the potable water distribution system has no detectable concentration of perchlorate (CLWA, et al. 2011). A more detailed discussion on the perchlorate contamination and remediation efforts can be found below in Section 3.2.4.3.3.

- **Other.** Other water quality parameters that may pose more aesthetic concerns, such as the odor threshold, color and turbidity have also tested below drinking water MCLs (CLWA 2012).

3.2.3 Imported Water Quality

CLWA provides SWP water and other imported water to the Valley. The source of SWP water is rain and snow of the Sierra Nevada, Cascade, and Coastal mountain ranges. This water travels to the Delta through a series of rivers and various SWP structures. From there it is pumped into a series of canals and reservoirs, which provide water to urban and agricultural users throughout the San Francisco Bay Area and central and southern California. The southernmost reservoir on the West Branch of the SWP California Aqueduct is Castaic Lake. CLWA receives water from Castaic Lake and distributes it to the retail water purveyors following treatment.

Rio Vista Water Treatment Plant

As surface water is exposed to a variety of microbial contaminants, there are considerably more water quality regulations for surface water providers than apply to groundwater. CLWA has two surface water treatment plants, the Rio Vista Water Treatment Plant located in Saugus and the Earl Schmidt Water Filtration Plant located near Castaic Lake. Both of these plants have a multi-barrier strategy. The first barrier is the application of ozone, a powerful disinfectant, which has the ability to kill a broad range of microbes. The second barrier is the addition of chemicals to remove particles from the water, which can hide and protect microbes. Removing particles improves the anti-microbial action of the disinfectants. The water is then passed through two sets of filters, and chloramines are then added to the water. Chloramines contain chlorine and ammonia and prevent the growth of bacteria in the distribution system, which delivers water from the treatment plants to the retail water purveyors.

An important property of SWP water is the chemical make-up, which may fluctuate and is influenced by its passage through the Delta. The Delta is basically a very large marsh (or estuary) with large masses of plants and peat soils. These contribute organic materials to the water. Salt water can also move into the Delta from San Francisco Bay and the Pacific Ocean. This brings in salts, notably bromide and chloride. Chloride levels from the Delta may elevate local chloride levels. Additionally, disinfectant by-products (DBPs) are generated when bromide and organic materials react with disinfectants such as ozone and chlorine.

SWP water is generally low in dissolved minerals, such as calcium, magnesium, sodium, potassium, manganese, and nitrate. Dissolved mineral concentrations (total dissolved solids [TDS]) range between approximately 250 to 360 mg/L and hardness ranges between about 105 to 135 mg/L (as calcium carbonate). Historically, the chloride content of SWP water has varied widely from over 100 mg/L to below 40 mg/L, depending on Delta conditions. However, resulting from increased demand and dry period projections, a greater portion of water in the SWP has been pumped in from water banking programs, which can reduce peak chloride concentrations in SWP water (CLWA, et al. 2011).

As reported in the Water Quality Report (CLWA 2012), all constituents meet the federal and state drinking water standards, but management remains a concern in order to continue to provide highest quality water.

3.2.4 Groundwater Quality

Groundwater quality in the Region is generally good. Local groundwater generally does not have microbial water quality problems and has generally very little organic matter. The mineral content is fairly high, resulting in very "hard" groundwater, which although is not a health issue, is a water quality concern for this water resource. Presence of nitrate is an ongoing issue in the Agua Dulce groundwater basin where nitrate has been detected at levels exceeding drinking water standards. In the Acton Valley groundwater basin, elevated chloride, TDS, and sulfate levels have been detected and pose an ongoing water quality issue. In the Santa Clara River Valley East groundwater subbasin, the primary water quality concern has been perchlorate contamination.

3.2.4.1 Agua Dulce Groundwater Basin

The water quality in the Agua Dulce groundwater basin is generally calcium bicarbonate in character with a mixed calcium magnesium bicarbonate character deeper down. TDS ranges from 330 to 520 mg/L and total hardness ranges from 230 to 330 mg/L (Slade 2004). Although some random inorganic compounds have been detected, all levels have been well below the allowed MCLs. The major water quality issue for the basin is the presence of nitrate. Nitrate has been detected as high as 69.1 mg/L in one well in the basin, which exceeds the MCL of 45 mg/L for this constituent. More typical ranges for nitrate in the basin are between 20 and 40 mg/L (Slade 2004).

3.2.4.2 Acton Valley Groundwater Basin

Groundwater in this basin is generally classified as calcium-bicarbonate (DWR 2002a), although groundwater in the broad valley north of Acton exhibited calcium-magnesium bicarbonate to calcium-magnesium-sulfate character (Slade 1990). Based on sampling of 5 public water-supply wells, DWR reported TDS concentrations ranging from 424 to 712 mg/L, with an average concentration of 579 mg/L (DWR 2002a). During June 1988 to June 1989, the concentrations of TDS ranged from 279 to 480 mg/L, total hardness (TH) ranged from 172 to 271 mg/L, and nitrate concentrations ranged from 3.9 to 24.7 mg/L (Slade 1990, UWCD and CLWA 1996). The TDS content is greatly influenced by deep percolation of the rainfall runoff; it increases as rainfall declines and vice versa (UWCD and CLWA 1996).

DWR evaluation (DWR 2002a) indicated high concentrations of TDS, sulfate and chloride in 75 wells in the northern part of the basin, with some concentrations exceeding drinking water standards (Slade 1990; DWR 1993). Nitrate concentrations in two wells were above drinking water standards as well (DWR 1968).

3.2.4.3 Santa Clara River Valley East Groundwater Subbasin

As previously mentioned, this subbasin has two sources of groundwater. Most local wells draw water from the Alluvium whose quality is primarily influenced by precipitation and stream flow. A smaller portion of the Valley's water supply is drawn from the Saugus Formation, a much deeper aquifer than the Alluvium, which is recharged primarily by a combination of rainfall, where exposed, and deep percolation. The two aquifers' water quality changes at different rates and much more slowly than surface water.

Local groundwater generally does not have microbial water quality problems. Parasites, bacteria, and viruses are filtered out as the water percolates through the soil, sand, and rock on its way to the aquifer. Even so, disinfectants are added to local groundwater when it is pumped by wells to protect public health. Local groundwater has very little organic material and generally has very low concentrations of bromide, minimizing potential for DBP formation. Taste and odor problems from algae are not an issue with groundwater.

The mineral content of local groundwater is very different from SWP water. The groundwater is very "hard," in that it has high concentrations of calcium and magnesium (approximately 250 to 500 mg/L total hardness as CaCO3) (CLWA, et al. 2011). Groundwater may also contain higher concentrations of nitrates and chlorides when compared to SWP water. However, all groundwater meets or exceeds drinking water standards.

3.2.4.3.1 Groundwater Quality – Alluvium

Water quality in the Alluvium generally exhibits a "gradient" from east to west, with lowest dissolved mineral content to the east, and an inverse correlation with precipitation and streamflow, with a stronger correlation in the easternmost portion of the subbasin, where groundwater levels fluctuate the most. Wet periods have produced substantial recharge of higher quality (low TDS) water, and dry periods have resulted in declines in groundwater levels, with a corresponding increase in TDS (and individual contributing constituents) in the deeper parts of the Alluvium. The aquifer varies from calcium bicarbonate character in the east to calcium sulfate character in the west. Nitrate levels decline in the west and TDS levels increase (DWR 2002b).

The presence of long-term consistent water quality patterns, although intermittently affected by wet and dry cycles, supports the conclusion that the Alluvium is a viable ongoing water supply source in terms of groundwater quality. The most notable groundwater quality concern in the Alluvium is perchlorate, detailed in Section 3.2.4.3.3.

3.2.4.3.2 Groundwater Quality – Saugus Formation

Water quality in the Saugus Formation has not historically exhibited the precipitation-related fluctuations seen in the Alluvium. Based on available data over the last fifty years, groundwater quality in the Saugus had exhibited a slight overall increase in dissolved mineral content. More

recently, several wells within the Saugus Formation exhibited an additional increase in dissolved mineral content, similar to short term changes in the Alluvium, possibly as a result of recharge to the Saugus Formation from the Alluvium. Since 2005, however, these levels have been steadily dropping or remained constant (CLWA, et al. 2011).

Dissolved mineral concentrations in the Saugus Formation remain below the Secondary (aesthetic) MCL. Groundwater quality within the Saugus will continue to be monitored to ensure that degradation does not threaten the long-term viability of the Saugus as an agricultural or municipal water supply. An ongoing water quality issue in the Saugus Formation is perchlorate contamination, detailed in Section 3.2.4.3.3.

3.2.4.3.3 Groundwater Contamination (Perchlorate) and Well Restoration

Perchlorate has been the most notable groundwater quality concern in the Santa Clarita Valley. To date, perchlorate has been detected in a total of 8 wells, in both the Saugus Formation and the Alluvium, including most recently in VWC's Saugus Well 201 in August 2010.

Table 3.2-5 summarizes the current remediation status of all wells where perchlorate has been detected.

TABLE 3.2-5
STATUS OF IMPACTED WELLS

Year Perchlorate Detected	Purveyor Well	Groundwater Aquifer	Status
1997	SCWD Saugus 1	Saugus	DPH approved returning the well to service in January 2011; well in active service utilizing approved perchlorate treatment.
1997	SCWD Saugus 2	Saugus	DPH approved wells return to service in January 2011; well in active service utilizing approved perchlorate treatment.
1997	VWC Well 157	Saugus	Sealed and capacity replaced by new well.
1997	NCWD Well 11	Saugus	Out of service.
2002	SCWD Stadium Well	Alluvium	Destroyed and capacity replaced by new well.
2005	VWC Well Q2	Alluvium	DPH approved perchlorate treatment removal in 2007; treatment was installed in 2005 and relocated for potential future use; well remains in service.
2006	NCWD Well N-13	Saugus	DPH approved quarterly monitoring, results have always been below the detection limit for reporting; well remains in service.
2010	VWC Well 201	Saugus	Out of service pending additional monitoring and evaluation of remediation alternatives.

Source: *2010 Santa Clarita Valley* UWMP (CLWA, et al. 2011).

Perchlorate was initially detected in 1997, in four wells operated by the purveyors in the eastern part of the Saugus Formation, near the former Whittaker-Bermite facility. In late 2002, the contaminant was detected in a fifth well, an Alluvium well (SCWD's Stadium Well) also located near the former Whittaker-Bermite site, which was immediately taken out of service and subsequently destroyed. Perchlorate was detected again in early 2005 in a second Alluvium well (VWC's Well Q2) near the former Whittaker-Bermite site, and in 2006 in very low concentrations (below the detection limit for reporting) in a Saugus well (NCWD's N-13) near one of the originally impacted wells.

In 2002 CLWA and the U.S. Army Corps of Engineers (ACOE) signed a cost-sharing agreement for a feasibility study of the area. Under federal and state law, the owners of the Whittaker-Bermite property have the responsibility for the groundwater cleanup. In February 2003, the California Department of Toxic Substances Control (DTSC) and the impacted purveyors entered into a voluntary cleanup agreement entitled *Environmental Oversight Agreement*. Under the Agreement, DTSC is providing review and oversight of the response activities being undertaken by CLWA and the purveyors related to the detection of perchlorate in the impacted wells. Under the Agreement's Scope of Work, CLWA and impacted purveyors prepared a Work Plan for sampling the production wells, a report on the results and findings of the production well sampling, a draft Human Health Risk Assessment, a draft Remedial Action Work Plan, an evaluation of treatment technologies and an analysis showing the integrated effectiveness of a project to restore impacted pumping capacity, extract perchlorate-impacted groundwater from two Saugus wells for treatment, and control the migration of perchlorate in the Saugus Formation. Based on treatment method pilot studies, selected ion exchange was determined to be the preferred treatment method for removing perchlorate. Environmental review of that project was completed in 2005 with adoption of a mitigated Negative Declaration. The Final Interim Remedial Action Plan for containment and extraction of perchlorate was completed and approved by DTSC in January 2006. Design and construction of the treatment facilities and related pipelines to implement the pump and treat program and to also restore inactivated municipal well capacity was completed in 2007. Treatment of the water began in 2010 and since 2011, the restored wells are now returned to service as part of the operational Saugus groundwater supply. In 2012, the Environmental Oversight Agreement was amended to include VWC Well 201.

In 2007, a final settlement was completed and executed to fund, remediate and treat the contaminated water from the impacted wells. The "Rapid Response Fund" established under this litigation settlement will be used if the remedy to contain perchlorate contamination in the Alluvium and portions of the Saugus Formation does not prevent migration of the perchlorate plume towards downgradient threatened wells (VWC Wells N, N-7, N-8, S6, S7, S8, 201 and 205 and NCWD Wells N-10, N-12 and N-13). The Rapid Response Fund provides up to $10 million for any additional costs of providing replacement water, associated operations and maintenance costs of treatment equipment and resin under the terms of the Agreement.

Most recently, in August 2010, perchlorate was detected in VWC's Saugus Well 201. Sampling in the months that followed confirmed the detection of perchlorate at concentrations that ranged from 5.7 to 16 micrograms per liter (µg/L). VWC removed Well 201 from service when perchlorate was first detected and is currently evaluating remediation alternatives, including wellhead treatment, in order to return the well to service and restore impacted well capacity.

Additional information on the perchlorate contamination and remediation efforts can be found in the *2010 Santa Clarita Valley UWMP* and through a DTSC information repository.

3.2.5 Water Quality Considerations for Recycled Water Use

The SWRCB adopted a statewide Recycled Water Policy (Policy) on February 3, 2009 to establish uniform requirements for the use of recycled water. The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources in a manner that implements state and federal water quality laws. The Policy states that salts and nutrients from all sources, including recycled water, should be managed on a basin wide or watershed wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses.

The Policy finds that the appropriate way to address salt and nutrient issues is through the development of regional or sub-regional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects. Salt and nutrient plans must include a basin/sub basin wide monitoring plan that specifies an appropriate network of monitoring locations. The monitoring plan should be site specific and must be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives.

A salt and nutrient management plan is being prepared concurrently with this IRWMP Update. After appropriate public review, the salt and nutrient management plan and associated data will be finalized, made available to IRWMP Stakeholders and submitted to the LARWQCB.

3.2.6 Water Quality Impacts on Reliability

Since 1997, when perchlorate was originally detected in Valley groundwater supplies, the presence of this constituent has raised water quality concerns as well as concerns over the reliability of those supplies. The protection of groundwater sources (wells) from known contamination or provisions for treatment in the event of contamination is crucial to the availability and reliability of this water supply source. However, monitoring well installation has been completed; and a focused study of the Saugus Formation has ultimately been incorporated into the overall groundwater remediation and perchlorate containment efforts, which will enhance the reliability of groundwater in this region. All remedial action has now been reviewed by the DTSC.

Overall, the plans developed for groundwater operation will allow CLWA and the retail purveyors to meet near term and long term demand within the CLWA service area. No anticipated change in reliability or supply due to water quality is anticipated based on the present data.

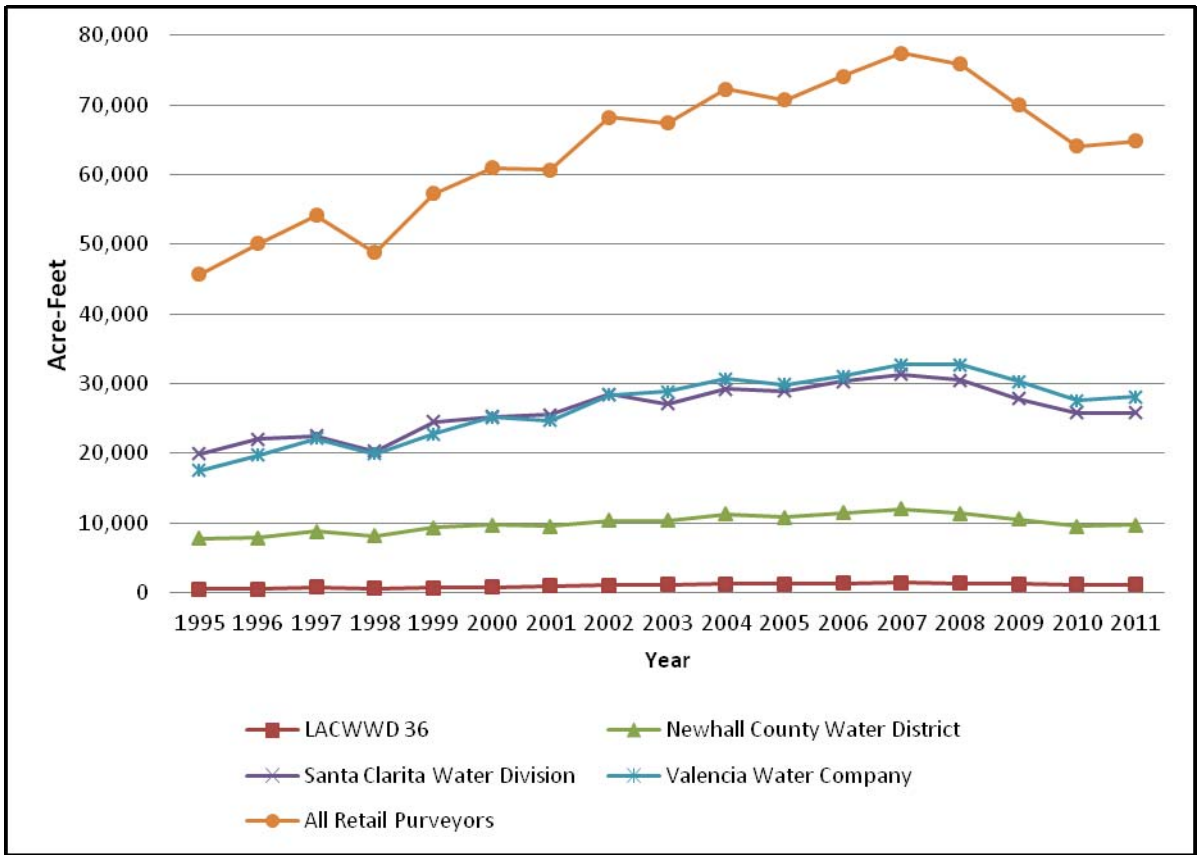
3.3 Water Demand

A summary of the Region's historical water demand is provided below.

Figure 3.3-1 shows the historical use of all water supplies for municipal water uses, including local groundwater, imported water supplies and recycled water. As seen in the figure, this use

shows an increasing trend in water demand since 1995 with a downturn in recent years likely due to response by customers to conservation efforts and economic conditions.

FIGURE 3.3-1
HISTORICAL WATER USE



Source: CLWA, et al. 2012.

3.3.1 Projected Demand

The *2010 Santa Clarita Valley UWMP* utilized existing land use data and new housing construction information to project water demands in the CLWA service area. Table 3.3-1 summarizes the current and projected water demands for the CLWA service area through 2050, based on individual purveyor projections of single family homes, multi-family homes, commercial, industrial, institutional/government, and landscape accounts. It is anticipated that these projected demands can be met using the water supplies described above.

TABLE 3.3-1
SUMMARY OF PROJECTED WATER DEMANDS

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Purveyors[a]									
LACWWD 36[b]	1,243	1,583	1,801	2,145	2,489	2,833	3,177	3,520	3,864
NCWD[b]	10,560	11,406	11,764	13,440	15,115	16,791	18,466	20,142	21,818
SCWD[b]	27,816	28,209	27,757	30,938	34,119	37,300	40,481	43,662	46,843
VWC[b]	30,354	31,145	30,586	33,714	36,841	39,969	43,097	46,224	49,352
LACWWD 37[c]	2,300	2,700	3,100	3,500	3,900	4,400	4,400	4,400	4,400
SPVMWC[d]	50	50	50	50	50	50	50	50	50
Total Purveyor Demand	72,323	75,093	75,058	83,787	92,514	101,343	109,671	117,998	126,327
Non-Purveyors[e]									
Acton Private Users[c]	1,500	1,900	2,300	2,700	3,100	3,500	3,500	3,500	3,500
Agua Dulce Private Users[c]	1,800	2,100	2,400	2,700	3,000	3,300	3,300	3,300	3,300
Agua Dulce Winery and Vineyard[c]	60	60	60	60	60	60	60	60	60
Agricultural and Other[f]	16,099[g]	15,400	14,400	13,400	11,000	10,000	9,000	8,000	7,500
Total Water Demands	91,782	94,553	94,218	102,647	109,674	118,203	125,531	132,858	140,687

Notes:

(a) Reflects existing and projected demands in CLWA service area only. CLWA's Annexation Policy requires annexing parties to provide additional fully reliable supplies. Purveyor demands reflect demands with conservation.

(b) Source: *2010 Santa Clarita Valley* UWMP (CLWA, et al. 2011), Table 2-2 (for 2010 demands) and Table 2-22 (for 2015-2050 demands).

(c) Source: Acton-*Aqua Dulce Conceptual Master Plan for Water Facilities* 2004. Assumes build-out would occur in 2030 with an even growth rate throughout the planning period. Water demands after 2030 kept constant based on build-out demands.

(d) Estimate from Slade 2004.

(e) Non-purveyor demands do not include conservation.

(f) Source: *2010 Santa Clarita Valley* UWMP (CLWA, et al. 2011), Table 3-7.

(g) 2010 demand for agricultural and other taken from CLWA, et al. 2012, Table 2-2.

Projected demands reflect conservation activities planned by agencies in the IRWMP Region to comply with Senate Bill 7 of Special Extended Session 7 (SBX7-7). As described in SBX7-7, it is the intent of the California legislature to increase water use efficiency and the legislature has set a goal of a twenty percent per capita reduction in urban water use statewide by 2020. As SBX7-7 applies to retail water suppliers, NCWD, SCWD and VWC must comport with its requirements. For more detail, see the *2010 Santa Clarita Valley UWMP* (www.clwa.org/publications/2010-urban-water-management-plan).

3.3.2 Other Factors Affecting Water Demands

Besides population, the major factors that affect water usage are weather and water conservation.

Generally, when the weather is hot and dry, water usage increases. In the Santa Clarita Valley, the largest amount of water use occurs during the end of summer and in the beginning of fall months, whereas water is used least in the cooler months leading into spring. In addition, past studies have indicated that during dry years, demands within the Santa Clarita Valley can increase from between five to ten percent. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping.

The extent to which water demand changes is also dependent on the conservation activities imposed. Residential, commercial, and industrial usage can be expected to decrease as a result of the implementation of more aggressive water conservation practices and stricter building codes. The greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation as it typically represent as much as 70 percent of the water demand for residential customers depending on lot size and amount of irrigated turf and plants. Details on planned conservation activities can be found in the *2010 Santa Clarita Valley UWMP*.

California, as a whole, faces the prospect of significant water management challenges due to a variety of issues including population growth, regulatory restrictions and climate change. Climate change is of special concern because of the range of possibilities and their potential impacts on essential operations, particularly operations of the SWP. The most likely scenarios involve increased temperatures, which will reduce the Sierra Nevada snowpack and shift more runoff to winter months, and accelerated sea level rise. These changes can cause major problems for the maintenance of the present water export system since water supplies are conveyed through the fragile levee system of the Sacramento-San Joaquin Delta. The other much-discussed climate scenario or impact is an increase in precipitation variability, with more extreme drought and flood events posing additional challenges to water managers[3]. Climate change vulnerabilities in the IRWM Region are discussed in detail in the following Sections.

3.4 Summary of Major Water Issues and Problems

Over the course of the series of Stakeholder meetings, many issues and topics were discussed. However, many of the issues raised can be summarized into these themes:

[3] Final California Water Plan Update 2009 Integrated Water Management: Bulletin 160.

- Continued growth in water demand while imported water supplies become less reliable. As described earlier in this section, the long-term estimated delivery of SWP water is 60 percent; in a dry year SWP supply may be as low as seven percent. In addition, reliability of SWP could be affected by climate changes (see Section 5). In the meantime population in the Region is anticipated to nearly double by year 2050.

- Difficulty in maintaining open space, habitat areas, and groundwater infiltration areas given population growth and increased urbanization. Planning agencies in the area have plans and policies to increase urban density to minimize "sprawl" and to maintain open space and habitat (which also function as groundwater recharge areas) but it is expected that there will be some land use conversion.

- High cost of supplying recycled water. Recycled water is one of the Region's options to enhance local water supplies in order to meet growing water demands. However, it requires costly new infrastructure to distribute water to its users. These are major considerations when promoting and expanding its use within the Region.

- Controlling the introduction, spread, and habitat degradation, related to invasive species. Invasive species can irrevocably modify and disrupt the ecological systems in which they spread, causing harm to native species through sudden increased competition for the same resources. The resulting reduction in ecological diversity makes the native ecosystems more susceptible to further disturbances and reduces their ability to provide valuable ecological services. Considering the high diversity of the Upper Santa Clara River Watershed and numerous special status species in the Region, the control of invasive species is considered important to sustain and enhance the existing natural systems and ecological processes in the Region. Invasive species are particularly an issue in floodplain areas.

- Variety of water quality issues, including volatile organic compounds (VOCs), chloride and bacteria, as well as the ongoing cost of monitoring and treating perchlorate contamination. Maintaining high levels of water quality is a crucial component of water resources management in the Region, affecting the availability and reliability of local water supplies. Various factors contribute to continued need for rigorous monitoring and protection of water supply sources. As discussed above, recycled water discharges have been identified as major sources of chlorides to water resources in the Region. In addition, with increased recycled water use in the Region, additional water quality considerations must be taken into account that will require effective salt and nutrient management in order to continue to meet water quality objectives. Perchlorate contamination has raised water quality concerns since 1997 when it was first detected in drinking water wells and requires continued monitoring and treatment at considerable financial costs.

- Runoff and drainage issues in the more rural areas that result in negative effects to the rural areas and areas downstream. Need to enhance flood management in rural communities with expanded flood and drainage infrastructure.

- Runoff and drainage issues related to urbanizing areas in the floodplain. It is difficult to manage stormwater given the variability of quality and quantity of stormflow. There is an

increasing regulatory emphasis on limiting pollution in stormwater runoff. Ongoing urbanization adds impervious surfaces and introduces more pollutants.

- Habitat degradation due to lack of flows. The diverse natural systems in the Upper Santa Clara River Region are highly dependent on the health of the riparian systems throughout the Region, which includes the mainstem of the Santa Clara River, one of the last free-flowing river systems in Southern California. Maintaining minimum in-stream flows to sustain riparian system functions, including species habitat, remains a challenge and may become increasingly challenging with predicted climate change impacts.

These identified issues were important in establishing the Plan objectives as described in Section 6.

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Section 4: Watershed Flood Management

4.1 Santa Clara River Hydrology

The following detailed narrative is modified in large part from the 1996 *Water Resources Report* (UWCD and CLWA 1996). The Upper Santa Clara River is a large ephemeral stream that comprises the headwaters for the Santa Clara River system. The intermittent flows of the Santa Clara River are fed by tributary inflow as well as treated wastewater discharge from the Saugus and Valencia WRPs.

The river originates as a typical mountain stream with a relatively narrow channel incised into hard bedrock that formed the local mountains. It has a straight to meandering channel pattern, and characteristic channel bedforms represented by a sequence of bars, riffles and pools. The bars are accumulations of the bed material positioned successfully downriver on the opposite sides of the channel. The pools are deep zones located directly opposite the bars, and the riffles are the shallow zones between the pools. The coarsest material is deposited in the bars. In alluvial channels, often a coarse-grained lag is left on the riffle, and fine-grained material is deposited in the pool.

As the river exits the confinement of the mountains, it has a typical braided stream geomorphology characterized by the frequently shifting network of channels and the intervening bars, the broad floodplain area, and typical braided stream deposits composed of coarse sediment ranging in size from coarse sand to boulder. In arid and semiarid climates, the morphology of such streams is controlled by stormwater flows originating in highland areas and storms of short duration and great intensity can result in flash floods in this area (UWCD and CLWA 1996). Such braided rivers typically transport large volumes of bedload. It is believed by fluvial geomorphologists that bank erosion is the most necessary factor in creating braided stream systems.

As the Upper Santa Clara River enters the mountains, it narrows down into a single channel, and as it exits, it becomes distinctly braided. In the area where the river system exits Aliso Canyon and Soledad Pass, the morphology of the river is broad and flat. In Aliso Canyon the width of the 500-year floodplain ranges from 400 to 600 feet and drains to the north. As the river exits Aliso Canyon, it abruptly turns to the west and the floodplain widens to a width of approximately 2,000 feet near Acton. At Acton, the river channel abruptly turns south, and the floodplain narrows down to a width ranging between 600 and 800 feet across as it enters Soledad Canyon near Ravenna. Leaving the canyon just east of State Highway 14 at Soledad, the river traverses the Santa Clara River Valley East Subbasin. There, it becomes broad and shallow, and displays typical braided stream geomorphological features, such as point bar deposits, gravelly stream bottoms, and broad wide washes that contain an abundant coarse-size material (sand, gravel, cobble and boulder). The 500-year floodplain formed along this reach of the river contains mostly fine sediment (silt and clay) and varies from about 1,000 to 2,000 feet wide. As the river enters the main Santa Clarita Valley, it is joined by Bouquet Creek and further down by the tributary in San Francisquito Canyon that display similar morphology. As the river passes through the west-northwest trending valley, the width of the floodplain abruptly narrows to about 500 feet before reaching Interstate-5. Castaic Creek enters the Santa Clara River from the north at the Castaic Junction area, and the river course continues in the

southwestern direction. The width of the floodplain ranges between about 800 feet and 3,000 feet along this reach to the Los Angeles-Ventura County Line (VCWPD and LACDPW 2005).

4.2 Drainage Infrastructure

There are many flood improvements in the Region, major drainage infrastructure is shown in Figure 4.2-1. Table 4.2-1 below documents drainage facilities for the Santa Clara River and the major tributaries.

TABLE 4.2-1
DRAINAGE FACILITIES FOR THE SANTA CLARA RIVER AND MAJOR TRIBUTARIES

Main River /Tributary	Current Improvement	Compatible Future Channel Improvement
Santa Clara River	Soft bottom with protective levee	Soft bottom with stabilizers where necessary
Tick Canyon	Lower reach-concrete channel	Upper reach-concrete channel with debris control
Mint Canyon	Lower reach-concrete channel	Middle reach-concrete channel Upper reach-soft bottom with stabilizers
Bouquet Canyon	Middle reach-soft bottom with stabilizers	Lower and Upper reaches-soft bottom with stabilizers
Dry Canyon	Lower reach-concrete channel	Upper reach-concrete channel
Haskell Canyon	Lower reach-concrete channel	Upper reach-soft bottom with stabilizers
Plum Canyon	Lower reach-concrete channel	Upper reach-concrete channel with debris control or soft bottom with stabilizers
South Fork – Santa Clara	Lower reach-soft bottom with stabilizers Middle reach-concrete channel	Lower reach-soft bottom with stabilizers Upper reach-concrete channel with debris control
Pico Canyon	Lower reach partly soft bottom with stabilizers partly concrete channel	Upper reach-soft bottom with stabilizers
San Francisquito	Lower reach-soft bottom with stabilizers	Upper reach-soft bottom with stabilizers
Violin Canyon	Lower reach-concrete channel	Upper reach-soft bottom with debris control
Castaic Creek	Below I-5 Freeway-soft bottom with protective levee	Above I-5 Freeway-soft bottom with stabilizers or concrete channel

Source: LACDPW 2006, Table 2.2.1

INDEX

KERN COUNTY

LOS ANGELES COUNTY

VENTURA COUNTY

CALIFORNIA AQUEDUCT

Los Angeles County Flood Control District Boundary

Santa Clara River

- Debris Basin
- Reclamation Plants
- Water Treatment Plants
- Dams
- Storm Drains and Channels
- Lakes and Reservoirs
- Upper Santa Clara River Watershed
- Upper Santa Clara River 100-year Floodplain
- Cities

PAGE 1

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Data contained in this map is produced in whole or part from the Los Angeles County Department of Public Work's precise database.

Figure 4.2-1
Major Drainage Infrastructure
Upper Santa Clara River Watershed

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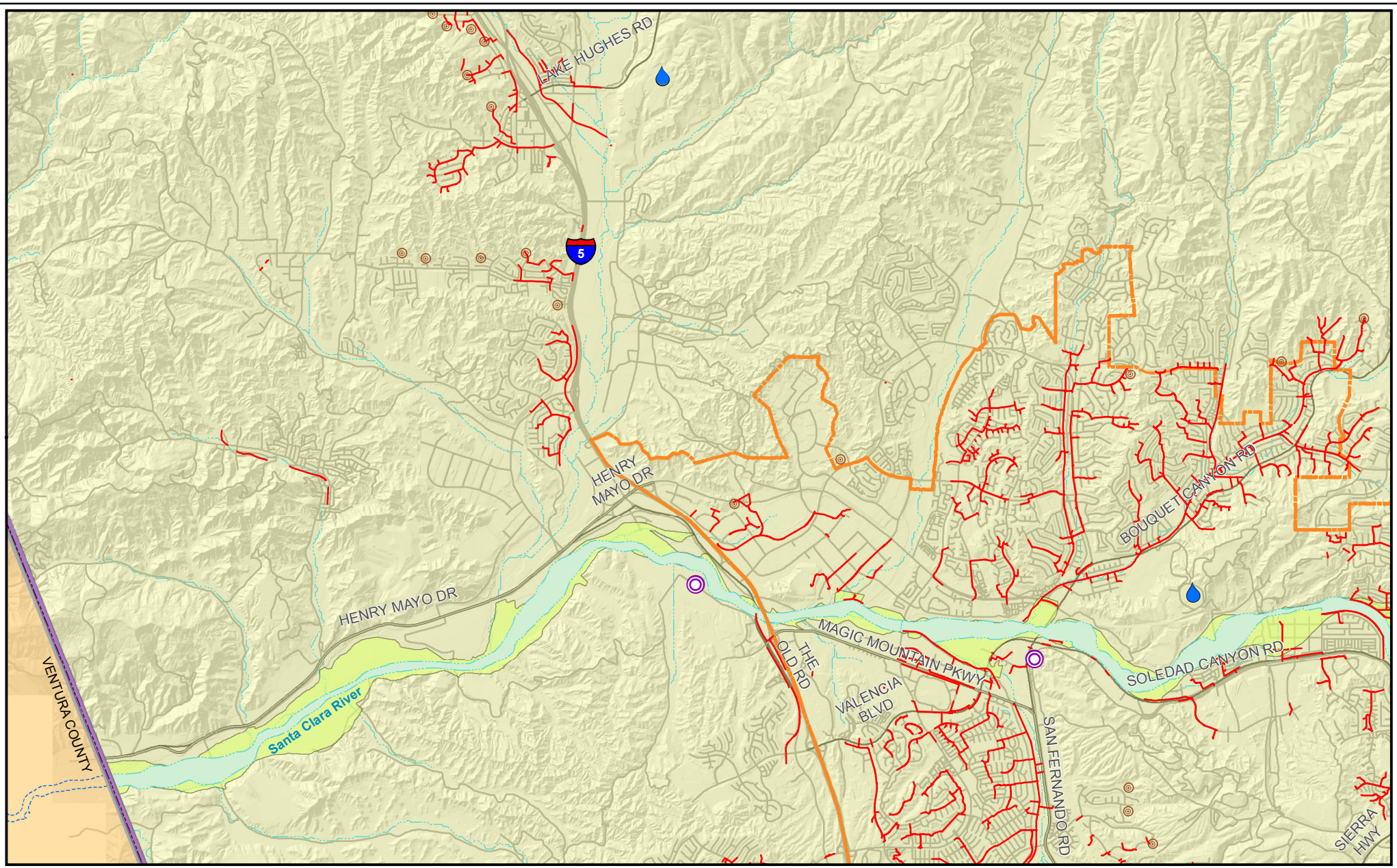
PAGE 1



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Lakes and Reservoirs
Debris Basin
Reclamation Plants
Water Treatment Plants
Dams
Storm Drains and Channels
River, Streams and Creeks
Upper Santa Clara River Watershed
Upper Santa Clara River 100-year Floodplain
Cities

1 Miles

Figure 4.2-1
Major Drainage Infrastructure
Upper Santa Clara River Watershed

PAGE 2

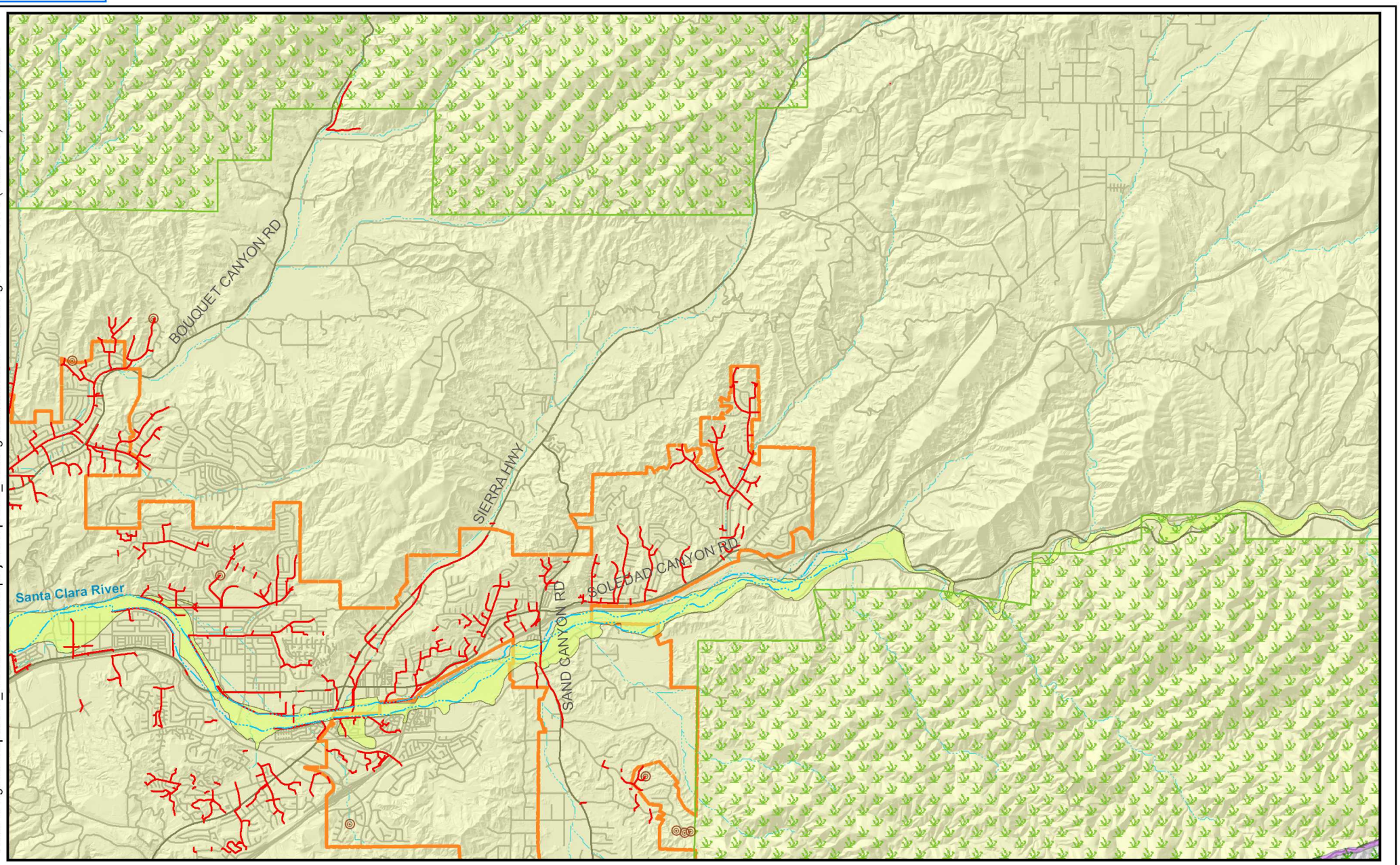

Figure 4.2-1
Major Drainage Infrastructure
Upper Santa Clara River Watershed

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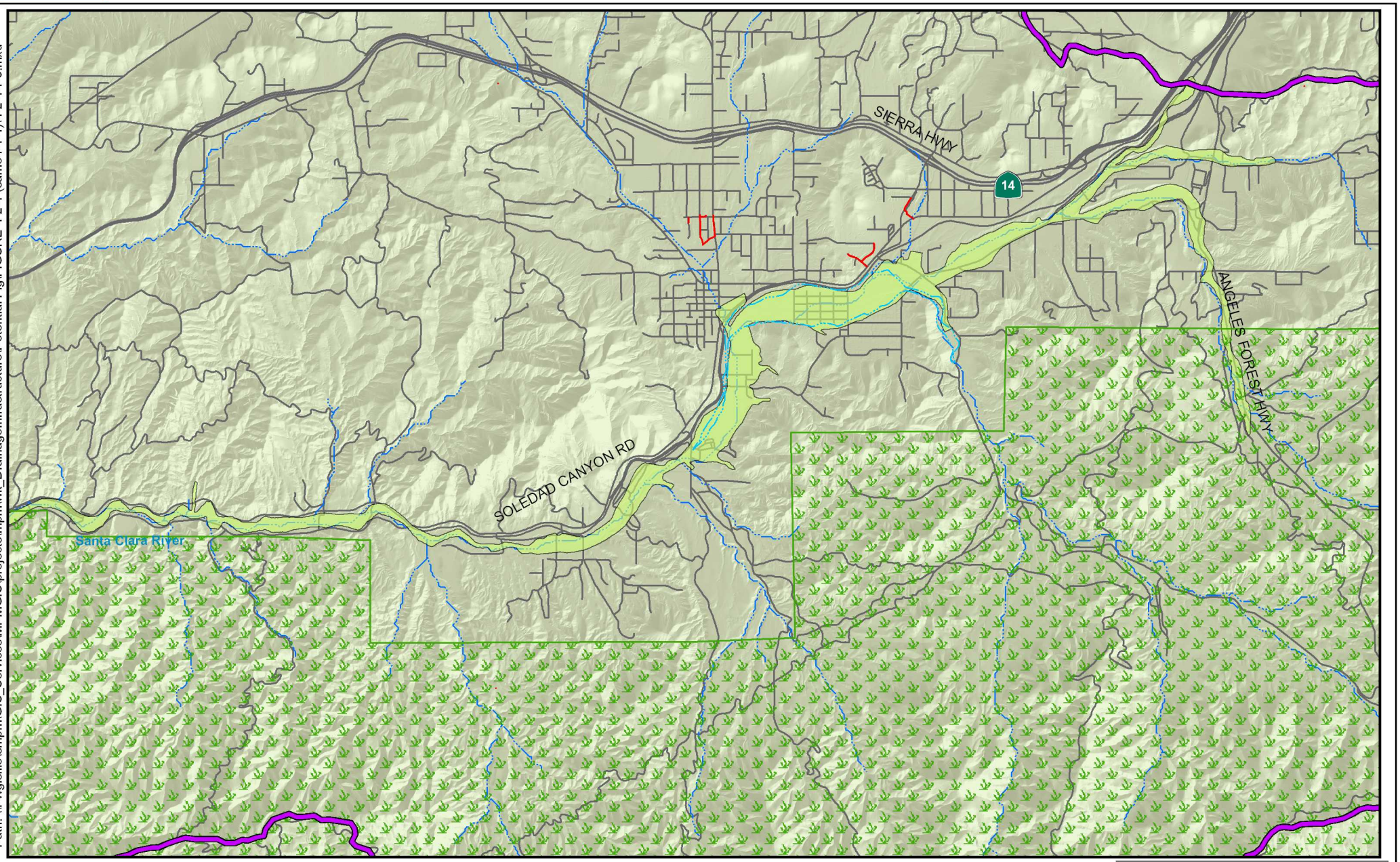

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- Dams
- Debris Basin
- Reclamation Plants
- Lakes and Reservoirs
- Storm Drains and Channels
- River, Streams and Creeks
- Upper Santa Clara River Watershed
- Upper Santa Clara River 100-year Floodplain
- Cities
- U S Forest Boundary

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Figure 4.2-1
Major Drainage Infrastructure
Upper Santa Clara River Watershed

PAGE 4

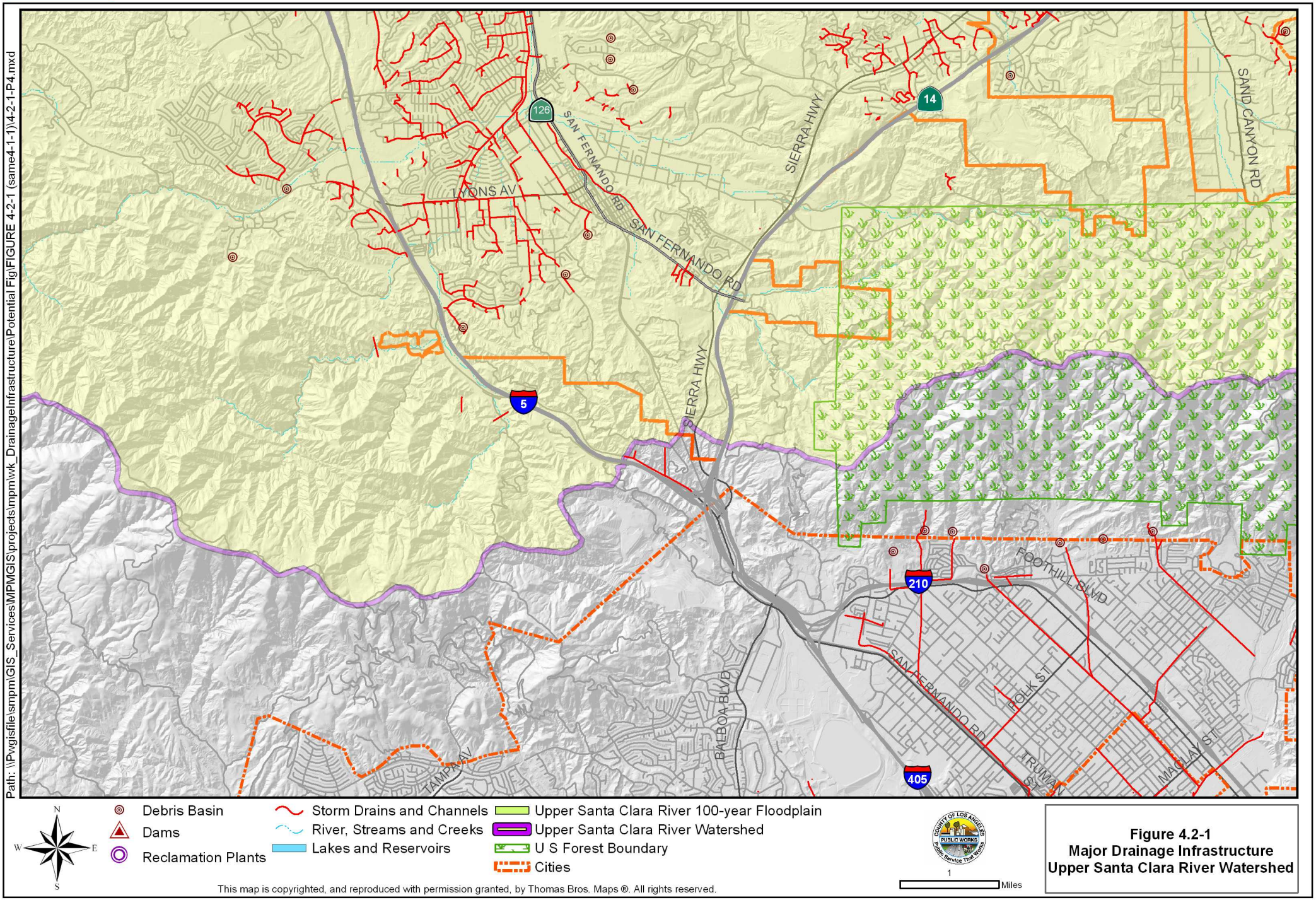
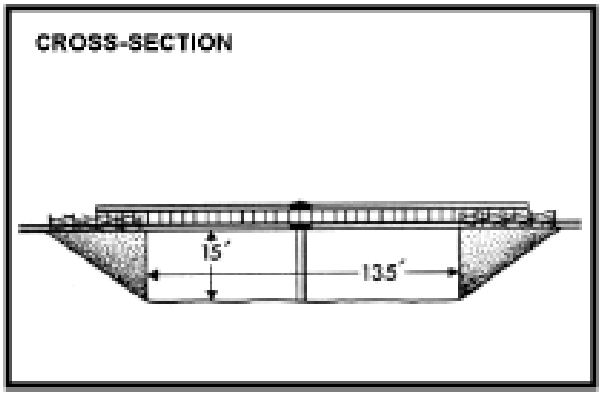


Figure 4.2-1
Major Drainage Infrastructure
Upper Santa Clara River Watershed

4.3 Runoff and Flood Events

Typical to watersheds in arid to semi-arid climates, annual rainfall and resulting peak flows are highly variable. Flood flows in the Upper Santa Clara River increase, peak, and subside rapidly in response to high-intensity rainfall. The “flashy” hydrograph produced by these conditions shows a rapid increase in discharge over a short time period with a quickly developed peak discharge compared to normal baseflow. The active river channel has adjusted in response to large flood events.

Several major natural flood events have occurred in the Region, including during the winters of 1969, 1978, 1983, and 2004/2005. Two storm events occurred in January and February 1969 and produced the worst floods in the area in recorded history (VCWPD and LACDPW 2005, Stillwater Sciences 2011). During January 18 through January 26 there was a two-phase storm event, with a peak flow of 14,800 cubic feet per second (cfs) recorded on the Santa Clara River at the Old Highway Bridge/Interstate 5. The other storm occurred from February 23 through 25 with the Santa Clara River flows at the Old Highway Bridge peaking at 31,800 cfs, exceeding all previous records.



Cross-Section of the Bouquet Canyon Road Stream Gaging Station

Problems encountered in the Valley were much greater during the February storm event than the January event, and the damage was caused mostly by erosion rather than debris deposition. In this area, high flows caused severe erosion of watercourses and the destruction of many bridges and improvements along these watercourses. Serious erosion at the south abutment of the Interstate-5 Bridge forced the closure of the freeway. Significant among these damages was also the destruction of the Africa-USA zoological compound located in the Santa Clara River floodplain near the eastern end of the Valley. Considerable damage was caused in the Iron Canyon and Sand Canyon drainages as debris deposition blocked roads, plugged culverts, and damaged bridges. Throughout the rest of the Valley, miscellaneous flooding and erosion caused minor damage, including the destruction of 2,000 feet of waterline which served as the sole source of domestic water for the community of Val Verde.

Storms during the months of February and March, in1978, led to major flooding and related damages along the Sespe Creek. Significant sediment transport and deposition occurred, which resulted in its overflow of the creek and damage of over 370 homes from tons of silt and debris. A large contributor to the sedimentation and degree of damage experienced was the Mill fire, which burned 70.3 square miles in 1975. Losses of this flood event included one fatality and over $6 million in damage in the Los Serenos area of Fillmore. This flood event eventually led to the construction of the Fillmore levee and installation of the first real-time flood warning system (Automated Local Evacuation in Real Time [ALERT]) in Ventura County (Brooks 1982, County of Ventura 2013).

The major storm event of 1983 took place from February 26 to March 6 (Los Angeles County Flood Control District 1983). Los Angeles County was hit by a series of storms which brought approximately 26 inches of rain to the San Gabriel Mountains. While extensive flooding did not occur, several new records for rainfall and runoff were produced. Mountainous areas of the Region experienced landslides and debris runoff. The damages occurred along natural watercourses, in canyons where no flood protection existed, to waterfronts, and to existing flood control facilities. Areas protected by the flood control system received insignificant damage. Damage to facilities along the Santa Clara River included: erosion of a reach of gunite lining in the vicinity of Lang Station Road adjacent to the Southern Pacific Railroad tracks which prevented use of the tracks; street and trunk sanitary sewer in Lost Canyon Road were severely damaged by meandering flows upstream of Sand Canyon Road; south approach to the Sand Canyon Road Bridge above the Santa Clara River was completely washed out, and flows destroyed underground and overhead utilities; the south approach to the Sierra Highway Bridge and some utilities were damaged; a carport and the utilities in a trailer park located on the north side of the river west of Sierra Highway were destroyed; Soledad Canyon Road and Southern California Edison Company's main power lines (upstream of Bouquet Canyon Road) were damaged; the large structural steel power transmission tower west of the Golden State Freeway on Magic Mountain Parkway was toppled over by flows; the east approach to the Magic Mountain Parkway Bridge west of San Fernando Road was completely washed out; and a portion of the Bouquet Canyon concrete channel wall in the vicinity of Alamogordo Road and Bouquet Canyon Road was washed away, requiring emergency restoration work.

In the winter of 2004 to 2005 the City of Santa Clarita declared a state of emergency when the Region experienced severe rains with reports of about 37 inches falling in the Newhall area. The intense precipitation resulted in record discharge levels in the Santa Clara River and major floods and mud slides. Massive amounts of mud and debris transported by the floods jammed and collapsed the Newhall Creek drainage system and damage to a total of 64 homes and buildings was recorded in the area. In total, flood damages to private and public property amounted to over $5.8 million (PCA 2006, City of Santa Clarita 2010, HK&C 2010).

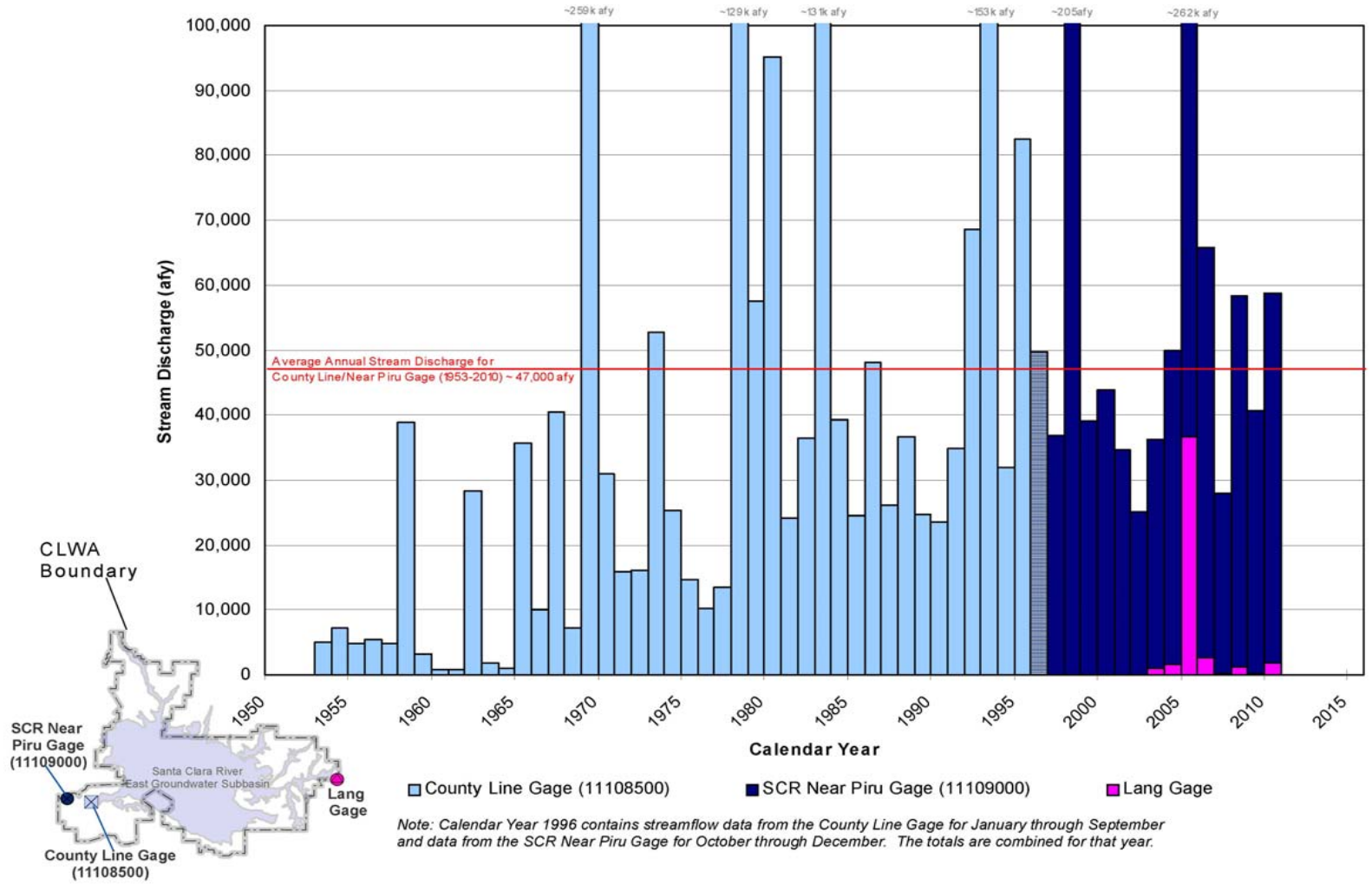
Figure 4.3-1 provides a summary of historic runoff for the Santa Clara River at three locations: the Lang Gage, which is at the eastern edge of the CLWA service area; the County Line Gage near the Ventura/Los Angeles county line; and the Piru gage near the Ventura County community of Piru.

4.4 Factors Affecting Flooding and Geomorphic Processes

Flood hazards in the Upper Santa Clara River watershed are often associated with episodic occurrences of high-intensity storms with debris-laden flash floods. Given the highly dynamic morphology and periodically intense delivery of water and sediment, the Upper Santa Clara River is subject to significant adjustments within its bed and movement into adjacent floodplain areas.

Beginning in the 1960s when rapid urbanization occurred in the Region, natural runoff and sediment transport patterns were modified by construction of impervious surfaces, such as paved streets and building rooftops. During the growth period in the 1980s the Upper Santa Clara River floodplain and channel were increasingly modified to provide for urban development, as well as associated flood control and debris flow protection infrastructure.

FIGURE 4.3-1
HISTORICAL RUNOFF FOR THE SANTA CLARA RIVER



Source: CLWA, et al. 2011 (SCV *Water Report)*

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Common consequences of urban development are increased peak discharge and frequency of floods. Hydromodification activities, such as increased paved surfaces for urban development, impact the watershed's ability to capture rainfall and convey flows. With a reduction in permeable surfaces, a smaller proportion of rainfall infiltrates in the ground, thereby increasing the amount, velocity, flow rate, and often the timing, of surface runoff. Resulting increased stream discharge rates can increase stream channel instability and streambank erosion (SWRCB 2009). In addition, the conversion of native shrublands to non-native grasslands have shown to contribute to higher sediment yields and can lead to an increase in landslide frequency (Stillwater Sciences 2011).

With development in the floodplain, a river loses its natural outlet and ability to migrate into adjacent areas. The mainstem of the Upper Santa Clara River retains much of its natural attributes, including a sand-bedded, braided channel and broad floodplain terraces. However, throughout much of the Region, particularly in the more urbanized areas of Santa Clarita, including the South Fork Santa Clara River, Bouquet and Mint Canyons, active channel widths have been reduced by floodplain encroachment and river channel encroachment over the past several decades. Encroachment has constricted flows and reduced sediment storage and has created unstable conditions in the river's morphology. Results include accelerated changes to channel bed levels, bank failure and increased hazards to people and infrastructure. Levee construction, bank stabilization, channelization, and flow and sediment routing structures, such as stormdrains and debris basins,could result in unpredictable river responses during large flood events and increase risk to public safety and damage to ecological functions (Stillwater Sciences 2011).

Watershed hydrology and geomorphic dynamics are also affected by wildfires, which accelerate erosion and sedimentation. Following fires, rain infiltration rates are significantly reduced, thereby increasing overland flows, peak flows and sediment yield in the watershed. Post fire periods in arid to semi-arid regions, such as the Upper Santa Clara River Region, are typically characterized by a so-called "fire-flood" sequence as increased runoff and accelerated erosion on hillsides result in debris flows, landslides and floods (Stillwater Sciences 2011).

While, big fires are natural events, urban expansion has placed people in fire-susceptible landscapes and this encroachment has been found to increase overall fire frequency in southern California wilderness areas. With large areas in the Region dominated by fire-dependent vegetation and hilly terrain in addition to dry weather conditions, wildfires in the Upper Santa Clara River watershed will continue to affect watershed hydrology and geomorphic dynamics at varying scales (Stillwater Sciences 2011).

4.5 Flood Management

Various programs and policies guide flood management in the Region and promote flood protection to the community, including ordinances adopted by the City and County, as well as federal requirements. Generally, development in the Region is required to be protected from flood hazards through avoidance of flood-prone areas or through elevation of building pads in certain areas prone to flooding (County of Los Angeles 2011).

The City of Santa Clarita participates in the National Flood Insurance Program (NFIP), which is intended to lessen financial devastation by allowing City residents to obtain direct federal relief

following declared flood disasters. The major elements of this program include flood hazard mapping, flood insurance, and floodplain management. The NFIP requires the City to adopt a local floodplain ordinance and to regulate development in floodplains. In exchange, FEMA provides the community with flood maps that show risk of flooding, offers federally backed flood insurance and provides assistance in flooding events.

The original flood maps for the City were produced over 30 years ago. FEMA embarked on a national Map Modernization Program in 2005 to update the country's aging flood maps. The flood maps for the Santa Clara River and eight major tributaries in the Santa Clarita Valley have been restudied and are in draft form. After a quality assurance review and public notification process, the City expects to have the new food map data adopted by year 2018.

The City Floodplain Management Ordinance, adopted in 2008, is based on the California Model Floodplain Management Ordinance. The ordinance consists of regulations that control alterations to natural floodplains, stream channels, and natural protective barriers, and includes requirements that control activities in special flood hazard areas. The City of Santa Clarita uses these maps and the ordinance to regulate development in floodplains. All development goes through a review process across several divisions to insure proper elevation, required flood-proofing and proper drainage control.

The City also participates in the Community Rating System (CRS) program which is a voluntary program administered by FEMA that encourages development standards that exceed the minimum NFIP requirements. As a result, flood insurance premiums within the community are reduced based on the level of reduced flood risk. The City's current rating in the CRS program is a Class 8 which offers a 10% discount to the flood insurance premiums. This equates to a savings on average of $154/policy per year (City of Santa Clarita 2012, C. Monde 2012).

The County has also adopted a Floodplain Management Ordinance consistent with the NFIP, which establishes floodway maps and governs land uses and construction of structures within floodplains. Additionally, drainage requirements are outlined in other portions of both the County Code and City Municipal Code, in order to prevent flooding and ensure that stormwater flows are properly diverted from away buildings and into drainage devices (County of Los Angeles 2011).

4.6 Stormwater Management

Stormwater and non-stormwater discharges in the Region are currently regulated under the countywide discharge requirements of the Los Angeles County Municipal Stormwater National Pollutant Discharge Elimination System Permit, Order No. 01-182. This Municipal Separate Storm Sewer System (MS4) permit, originally adopted in 2001, was recently revised and newly adopted on November 8, 2012 by the LARWQCB after circulation of a draft tentative order and solicitation of public comments.

The MS4 permit regulates discharge across the jurisdictional boundaries of the unincorporated areas of Los Angeles County and 84 cities within the LACFCD. The main purpose is to implement effective pollution prevention programs that will reduce the discharge of pollutants from the storm drain system in order to protect receiving waters and their beneficial uses. The MS4 permit requirements primarily focus on the following areas:

- Non-stormwater discharge prohibitions
- TMDL water quality based effluent limitations
- Receiving water limitations
- Watershed management program provisions
- Minimum control measures

Standard provisions of the MS4 permit that constitute minimum control measures to be implemented include the following categories:

- Public Information and Participation Program, to increase public knowledge of stormwater issues, improve stormwater-related behavior and engage diverse socio-economic and ethnic groups.

- Industrial/Commercial Facilities Program, designed to prevent illicit discharges and reduce discharges into the MS4 and receiving waters through monitoring and education.

- Planning and Land Development, applicable to new development and redevelopment, requirements under this provision include implementing smart growth and low impact development strategies, minimizing impervious surfaces, implementing hydromodification control BMPs and increasing the control and beneficial use of stormwater runoff.

- Development Construction Program, requiring each permittee to establish an erosion and sediment control ordinance for soil-disturbing construction projects and to implement a program to prevent construction-related pollution discharges.

- Public Agency Activities Program, to control stormwater pollution impacts from permittee-owned and operated facilities and activities.

- Illicit Connections and Illicit Discharges Elimination Program, to detect, investigate, and eliminate illicit connections and discharges to the MS4.

These programs may be implemented in accordance with the requirements listed in the MS4 permit or addressed within an approved watershed management program. The watershed management program provisions in the MS4 permit allow flexibility to develop watershed-wide programs in order to address the highest watershed priorities and achieve compliance with permit requirements, including TMDLs, receiving water limitations, and non-storm water action levels. These programs focus on designated watershed management areas, such as the Santa Clara River Watershed Management Area. An integrated monitoring and assessment program is required in order to assess progress towards meeting applicable limitations. Starting in 2015, an adaptive management process will be required annually in order to enhance effectiveness of the watershed management program.

The 2012 permit primarily differs from the previous order in that it will incorporate additional provisions consistent with 33 TMDLs, new requirements for hydromodification and low impact development, and new requirements for monitoring (SWRCB 2012).

In compliance with the county-wide MS4 permit, the City of Santa Clarita is conducting individual efforts to manage stormwater quality and discharge. The City has adopted a Stormwater and Urban Runoff Pollution Control ordinance that prohibits discharge of any pollutant into the storm drain system, as well as the Standard Urban Stormwater Mitigation Plan Implementation ordinance, that outlines stormwater-related requirements for new development and redevelopment. Regular maintenance of the storm drain system and catch basins is conducted by the City and is in part financed through the Stormwater Pollution Prevention Fee paid by all Santa Clarita property owners. In addition, efforts to manage stormwater quality include providing information and education to residents to improve awareness of stormwater pollution issues, and providing the City's Stormwater Hotline to report illicit dumping to the storm drain system (City of Santa Clarita 2012).

In addition to floodplain management ordinances and stormwater permitting programs, policies applicable to the Region include requirements for Low Impact Development (LID) techniques for development projects, in order to manage stormwater and reduce runoff volumes. Whereas constructed impervious surfaces alter regular drainage patterns and watershed hydrology, in part by increasing runoff volume and stream sedimentation, LID is a land-use planning approach that incorporates measures that protect natural, pre-development water flow and drainage characteristics in order to minimize urbanization impacts. Stormwater is thereby managed by creating permeable surfaces, such as through zero runoff and biofiltration measures, where runoff can infiltrate/be retained and stormwater can be treated (County of Los Angeles 2011).

The Conservation and Open Space elements of the City of Santa Clarita General Plan and the OVOV Area Plan, include policies to require LID techniques in the design of private development and capital projects. In 2008, the County adopted an LID ordinance as part of the County Green Building Program (County of Los Angeles 2011).

Section 5: Climate Change

Climate change refers to significant changes in temperature, precipitation, wind patterns and other weather that occur over several decades and beyond. Climatic changes observed in recent decades are occurring due to rising average global temperatures that are the result of elevated levels of gases released primarily by human activities, which trap heat in the atmosphere in a process known as the greenhouse effect. These so-called greenhouse gases include, among others, water vapor, carbon dioxide (CO_2) and methane (CH_4).

Climate change is impacting California water resources in many ways, including through rising sea levels, reduced snowpack, and more frequent and severe droughts. Impacts and vulnerabilities vary by region resulting in the need for tailored actions to ensure the viability of regional watersheds, including the Upper Santa Clara River Watershed. These actions focus on reducing the intensity of climate change through mitigation measures and adapting to climate change effects.

5.1 Climate Change

This climate change section was developed to be consistent with the following Proposition 84 IRWMP Guidelines (October 2012):

- Describe, consider, and address the effects of climate change on the region and disclose, consider, and reduce where possible greenhouse gas (GHG) emissions when developing and implementing projects
- Identify climate change impacts and address adapting to changes in the amount, intensity, duration, timing, and quality of runoff and recharge
- Consider the effects of sea level rise on water supply conditions and identify suitable adaptation measures
- Describe policies and procedures that promote adaptive management

This section is intended to focus on climate change adaptation and instill climate change adaptation as an overarching theme throughout the Plan. Climate change mitigation measures are included in future actions discussed in this section, are integrated in IRWMP objectives, and are an important consideration when prioritizing projects to implement this IRWMP. The recently issued *Climate Change Handbook for Regional Water Planning* dated November 2011 (Schwarz et al 2011) was used for guidance in developing this Plan section.

5.1.1 Legislative and Policy Context

5.1.1.1 Current Regulatory Constraints

5.1.1.1.1 US EPA Mandatory Reporting of Greenhouse Gases Rule

The US EPA Reporting Rule, which started in 2011, requires reporting for 2010 emissions for sources or single facilities with more than 25,000 metric tons carbon dioxide equivalent

($MTCO_2e$) annually. The rule can be found at: http://www.epa.gov/climatechange/emissions/ghgrulemaking.html.

5.1.1.1.2 Title V of the Clean Air Act

Title V of the federal Clean Air Act reauthorization (1990) requires each state to develop a permit-to-operate system and emission fee program for major sources of air pollution. Title V only applies to "major sources." US EPA defines a major source as a facility that emits, or has the potential to emit (PTE) any criteria pollutant or hazardous air pollutant (HAP) at levels equal to or greater than the Major Source Thresholds (MST). The MST for criteria pollutants may vary depending on the attainment status (e.g., marginal, serious, extreme) of the geographic area and the criteria pollutant or HAP in which the facility is located.

Title V permit holders must incorporate GHG requirements when renewing or revising a permit. EPA has continued to pursue regulations to address issues related to climate change. The EPA already requires large emissions sources (greater than 25,000 MTCO2e) to annually report their emissions. As well, the EPA has published rules to start directly regulating GHG emissions under the Clean Air Act. Under the EPA's Tailoring Rule, facilities responsible for nearly 70 percent of the nation's GHG emissions will be subject to GHG emissions permits.

None of the water utilities in the Region are currently subject to these federal regulations because none own or operate a single facility that meets the current emissions threshold of 25,000 $MTCO_2e$ per year.

5.1.1.1.3 AB 32 Global Warming Solutions Act and Executive Order S-3-05

California continues to lead the nation in developing public policy responses to address issues related to climate change and GHG emissions — most notably through the implementation of Assembly Bill 32 (AB 32). AB 32 established GHG reduction targets for California and put the California Air Resources Board (ARB) in charge of implementation and rulemaking through the development of the "Scoping Plan." AB 32 aims to reduce statewide GHG emissions to 1990 levels (427 million $MTCO_2e$) by 2020. California is currently at about 469 million $MTCO_2e$, and under the business-as-usual case, most recently updated in 2010, 2020 emissions are expected to be about 507 million $MTCO_2e$. In order to meet the 2020 target, California will need to reduce GHG emissions by about 80 million $MTCO_2e$, an approximate 16 percent reduction from the state's projected 2020 emissions, by 2020. To meet these targets a two percent reduction is needed each year for the next ten years. To accomplish the goal the state is pursuing a number of direct regulations and market-based mechanisms that have been laid out in a Scoping Plan. The core measures of the Scoping Plan are tailpipe standards, transportation and land-use changes, low carbon fuel standard, enhanced energy efficiency, a Renewables Portfolio Standard (RPS) of 20 percent by 2010 and 33 percent by 2020, and a Cap & Trade program. More information about the Scoping Plan can be found at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.

5.1.1.1.4 California ARB's Mandatory Greenhouse Gas Reporting Regulation

ARB's Mandatory Reporting Rule requires the state's largest emitters (single sources with GHG emissions greater than 25,000 $MTCO_2e$ per year) to annually report and verify their GHG emissions. The rules were revised to harmonize the state's reporting rules with the US EPA's

Mandatory Reporting Rule and streamline the reporting and verification process for sources with GHG emissions between 10,000 and 25,000 $MTCO_2e$. ARB finalized the proposed changes in 2011. The rule can be found at: http://www.arb.ca.gov/cc/ccei.htm.

5.1.1.1.5 Cap-and-Trade Rule and Compliance Offsets

The most far-reaching regulatory action to emerge from AB 32 is the development of rules implementing a cap-and-trade program for California. Under cap-and-trade, an overall limit on GHG emissions from capped sectors will be established and lowered every year until 2020. Facilities subject to the cap will be able to trade permits to emit GHGs or acquire offsets from uncapped sectors. Starting in 2012, entities with GHG emissions greater than 25,000 $MTCO_2e$ in process and combustion emissions (not indirect electricity emissions) will be subject to cap. Water utility facilities in the Upper SCR are below this threshold for their facilities and will not be included in the Cap and Trade regulation. More information about the Cap and Trade regulation can be found at: http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

The cap-and-trade program will effectively put a price on GHG emissions and implicitly on energy (transportation fuel and electricity) prices. While water utilities in the Region may not be directly subject to a cap on emissions they may be subject to higher prices for fossil fuels and electricity. Water utilities may also see carbon prices manifested in its supply chain as suppliers pass their compliance and higher energy costs onto their customers.

"The regulation will cover 360 businesses representing 600 facilities and is divided into two broad phases: an initial phase beginning in 2012 that will include all major industrial sources along with utilities; and, a second phase that starts in 2015 and brings in distributors of transportation fuels, natural gas and other fuels.

Companies are not given a specific limit on their greenhouse gas emissions but must supply a sufficient number of allowances (each covering the equivalent of one ton of carbon dioxide) to cover their annual emissions. Each year, the total number of allowances issued in the state drops, requiring companies to find the most cost-effective and efficient approaches to reducing their emissions. By the end of the program in 2020 there will be a 15 percent reduction in greenhouse gas emissions compared to today, reaching the same level of emissions as the state experienced in 1990, as required under AB 32.

To ensure a gradual transition, ARB will provide significant free allowances to all industrial sources during the initial period (2012-2014). Companies that need additional allowances to cover their emissions can purchase them at regular quarterly ARB auctions, or buy them on the market. Electric utilities will also be given allowances and they will be required to sell those allowances and dedicate the revenue generated for the benefit of their ratepayers and to help achieve AB 32 goals.

Eight percent of a company's emissions can be covered using credits from compliance-grade offset projects, promoting the development of beneficial environmental projects in the forestry and agriculture sectors. Included in the regulation are four protocols, or systems of rules, covering carbon accounting rules for offset credits in forestry management, urban forestry, dairy

methane digesters, and the destruction of existing banks of ozone-depleting substances in the U.S. (mostly in the form of refrigerants in older refrigeration and air-conditioning equipment)."[4]

California is coordinating the development of its program with the Western Climate Initiative (WCI). WCI is a multi-jurisdictional initiative to develop regional market-based mechanisms (i.e., cap-and-trade program) to reduce GHGs. The rationale for a broader regional approach is that it could provide greater flexibility for emitters in how, when and where to achieve emissions reductions; and create a more fluid and robust marketplace for trading.

5.1.1.1.6 South Coast Air Quality Management District (SCAQMD) Guidance for CEQA Greenhouse Gas Significance Thresholds

Consistent with Senate Bill (SB) 97, projects subject to CEQA review must estimate GHG emissions and consider potential impacts, and projects with potential significant impacts must consider mitigating project related emissions.

In 2007, the California Legislature directed the Natural Resources Agency to develop specific guidelines for lead agencies on how to quantify, evaluate and mitigate a project's potential GHG emissions and climate change impacts. Under the guidelines, finalized in February 2010, a lead agency must calculate GHG emissions from a project, assess the impacts of these emissions, make a significance determination, and if necessary consider mitigation measures. The definitions of significant impacts and determination of significance thresholds are subject to interpretation of pre-existing CEQA guidelines and jurisprudence.

SCAQMD has developed interim draft guidance establishing a process for evaluating whether or not GHG emissions from an industrial project (i.e., stationary source) are significant where SCAQMD is the lead agency. SCAQMD is currently considering expanding its guidelines for use by other local lead agencies. The proposal includes a significance threshold for commercial and institutional land use projects (e.g., new construction).

SCAQMD draft interim guidance significance thresholds are: 10,000 $MTCO_2e$/year for industrial projects (SCAQMD lead agency), and 3,000 $MTCO_2e$/year (proposed) for commercial/institutional projects. SCAQMD guidance does not distinguish between biogenic (naturally occurring) and anthropogenic (human caused) emissions. Wastewater plant emissions are considered biogenic. More information about the Guidance can be found at: http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html, http://www.water.ca.gov/climatechange/docs/CEQA_GHG_Guidance.pdf and http://www.ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf.

5.1.1.1.7 Executive Order S-13-08

By Executive Order S-13-08, the California Governor directed the California Natural Resources Agency, DWR, the Office of Planning and Research, the California Energy Commission, State Water Resources Control Board, and other State agencies to research and advance California's ability to adapt to the impacts of climate change. Results of this work include the California Sea Level Rise Assessment and the California Climate Change Adaptation Strategy.

[4] ARB press release dated December 16, 2010. The full press release can be found at: http://www.arb.ca.gov/newsrel/newsrelease.php?id=170.

5.1.1.1.8 California Ocean Protection Council Resolution

The California Ocean Protection Council Resolution adopted March 11, 2011 requires that projects or programs funded by the State of California consider sea level rise.

5.1.1.2 Future Regulatory Constraints

5.1.1.2.1 US EPA Greenhouse Gas Tailoring Rule

US EPA is considering rules targeting sources below 50,000 short tons CO_2e (about 45,000 $MTCO_2e$) by 2016. The current rule applies to sources greater than 75,000 short tons CO_2e (about 68,000 $MTCO_2e$). US EPA is also reviewing an accounting approach for biogenic emissions sources.

In its final Tailoring Rule, US EPA committed to exclude sources with GHG emissions below 50,000 short tons CO_2e (about 45,000 $MTCO_2e$) per year from new permitting requirements through at least 2016. During this period, US EPA plans to conduct a study of the permitting burdens that would exist if the Tailoring Rule were to be applied to smaller sources. Based on the outcome of the study US EPA may expand the tailoring rule to include additional small sources or permanently exclude them from a GHG permitting system. Given the political constraints facing the agency, including efforts in the U.S. Congress to repeal or delay US EPA's authority to enact the rules, it is unlikely that the agency will pursue aggressive regulation of small sources such as those operated by CLWA.

As currently adopted, the Tailoring Rule does not distinguish between GHG emissions from fossil and biologically derived fuels. US EPA concluded a public comment period in September 2010 seeking information on approaches to account for GHG emissions from bioenergy and other biogenic sources. US EPA is under considerable political pressure to revisit the decision to treat emissions from biomass the same as emissions from fossil fuels. No decision has yet been made on this issue.

5.1.1.2.2 Federal Cap-and-Trade Program or other Market-Based Mechanism to Create a Price for GHGs or Carbon

While the Clean Air Act allows US EPA to use economic incentives, including emissions trading programs, to control emissions; the prospects for legislation establishing a national economy wide cap-and–trade program, or alternative carbon pricing policies such as a carbon tax, are highly unlikely in the near-term. Congress may act to increase incentives for energy efficiency and renewable energy production. The most likely mechanism for renewable resources incentives is through a federal clean energy standard that would include nuclear energy resources. Enactment of a federal clean energy standard is unlikely to impact the Region as none of the current federal policy proposals would preempt California's far more ambitious renewable energy portfolio standard.

5.1.1.2.3 AB 32 Scoping Plan Water Sector Recommendations

In addition to regulatory approaches to meet the state GHG emissions reduction goals; the ARB Scoping Plan calls for the "water sector" to implement six voluntary measures to achieve 4.8 million $MTCO_2e$ in emissions reductions by the year 2020. The measures include: increased

water use efficiency, broader implementation of water recycling, improvements to the energy efficiency of the state's water and wastewater infrastructure, low impact development techniques, development of in-conduit hydroelectric and wastewater treatment renewable energy resources, and instituting a public goods charge to finance investments in water conservation and water sector energy efficiency. More information about these measures can be found at: http://www.arb.ca.gov/cc/scopingplan/document/appendices_volume1.pdf.

Both the Association of California Water Agencies and the California Association of Sanitation Agencies have active programs to track and monitor the development of any legislation or regulatory initiatives to mandate these measures.

The ARB Scoping Plan will be updated in 2013, which will allow past performance to be evaluated and policies to be re-assessed.

5.1.1.2.4 City of Santa Clarita Climate Action Plan

Consistent with requirements by the State of California, the City of Santa Clarita completed a CAP, outlining how emissions reduction goals required under AB 32 will be achieved (see also Section 2.3.1.1). The CAP will serve as a component of the general plan document for the City to address GHG Emissions. Based on the goals, objectives, and policies of the recently adopted General Plan, the CAP identified measurable mitigation strategies that will enable the City of Santa Clarita to meet and even exceed the 2020 GHG emissions targets. Mitigation measures included in the CAP focus actions in four categories.

- Energy
    - Installation of higher efficiency public street and area lighting
    - Replacement of traffic lights with LED traffic lights
    - Establishment of onsite renewable energy systems – Solar Power
- Transportation
    - Overall land use/locations measures, which include reducing total vehicle miles travelled and improving traffic flow by increasing density of in-City development and diversity of mixed use developments, increasing location efficiency, destination and transit accessibility, integrating affordable and below market rate housing, improving the transit system, and improving the pedestrian network.
- Water
    - Use of reclaimed water
    - Installation of low-flow water fixtures
    - Use of water-efficient landscape irrigation systems
- Vegetation
    - Urban tree planting
    - Creation of new vegetated open space

Implementation of these CAP measures is anticipated to reduce GHG emissions in the City of Santa Clarita by 193,000 $MTCO_2e$ per year.

5.1.2 Vulnerability to Climate Change

This section identifies the potential climate change vulnerabilities of the Region's water resources. The climate change assessment presented in this section is at least equivalent to the checklist assessment in DWR's *Climate Change Handbook for Regional Water Planning* and consistent with climate change requirements in the Proposition 84 IRWMP Guidelines (October 2012).

5.1.2.1 Climate Change Scenarios

Climate change assessment is performed using the output of computer models that project future conditions from inputs on GHG emissions. These models are not predictive, but provide projections of potential future climate scenarios that can be used for planning purposes.

The primary climate variables projected by global climate models (GCMs) that are important for water resources planning in California are changes in air temperature, changes in precipitation patterns, and sea level rise. The State of California 2009 Climate Change Impacts Assessment (California Climate Change Center 2009) provides the scientific basis for developing statewide climate change impact projections. The 2009 assessment provided future climate projections to support water resources decision making in California. A set of six GCMs were run for two GHG emissions scenarios, A2 and B1, selected from the Intergovernmental Panel on Climate Change (IPCC) Special Report on Emissions Scenarios (SRES). The IPCC report provides a family of common scenarios that cover a range of plausible trends in GHG emissions over the 21st century as a result of economic, technological, and population change (IPCC 2007). Scenario A2 assumes higher GHG emissions and high growth in population and represents a more competitive world that lacks cooperation in development (similar to business as usual), while B1 is a lower GHG emission scenario that represents social consensus for sustainable development. Each GCM was used to simulate a historical period from 1950-1999 and a future projection period from 2000 to 2100. The 1950-1999 period serves as a baseline or "present condition" for the models so that future conditions can be projected. Table 5.1-1 lists the six GCM models and their sponsoring organization.

TABLE 5.1-1
SUMMARY OF GLOBAL CLIMATE MODELS

GCM	Sponsoring Organization and Model Name
NCAR-PCM1[(a)]	National Center for Atmospheric Research (NCAR) Parallel Climate Model (PCM)
GFDL-CM21[(a)]	National Oceanic and Atmospheric Administration (NOAA) Geophysical Fluids Dynamics Laboratory (GFDL) model, version 2.1
NCAR-CCSM3[(a)]	NCAR Community Climate System Model (CCSM)
MPI-ECHAM5	Max Plank Institute ECHAM5/MPI-OM Used by DWR for its climate change analysis for the 2009 Reliability Report and 2011 update.

MIROC32	MIROC 3.2 medium-resolution model from the Center for Climate System Research of the University of Tokyo and collaborators
CNRM-CM3[(a)]	French Centre National de Recherches Météorologiques (CNRM) models
Four Model Average[(a)]	Cal-Adapt website. Average of the following four GCMs: NCAR-PCM1, GFDL-CM21, NCAR-CCSM3, and CNRM-CM3. Used in this analysis for Upper Santa Clara River Region

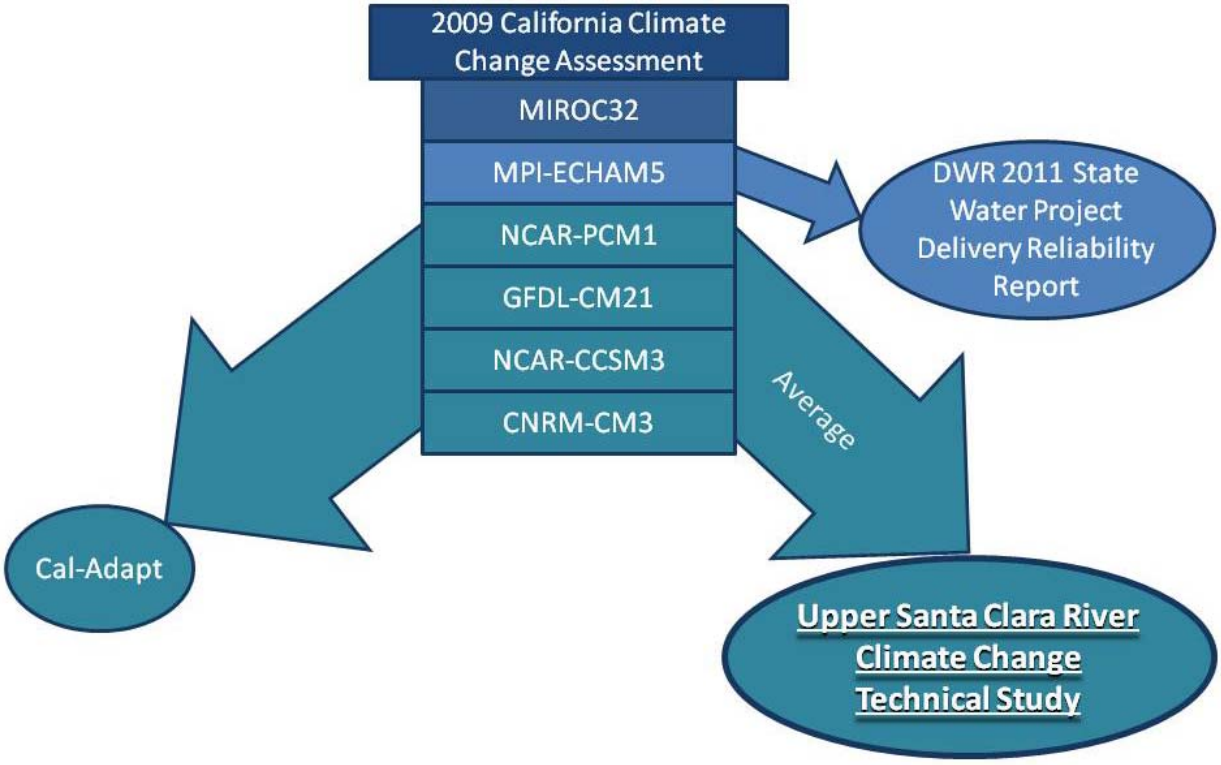
Note: (a) Model used by Cal-Adapt.

DWR used the MPI-ECHAM5 model with the A2 emissions scenario when preparing the 2011 *State Water Project Delivery Reliability Report*. MPI-ECHAM5 represents the median of the six GCMs listed in Table 5.1-1.

The California Energy Commission's Public Interest Energy Research Program (PIER) recently established the Cal-Adapt website (http://cal-adapt.org/), whose purpose is to explore California's climate change research. In part, the website provides output from four climate models (NCAR-PCM1, GFDL-CM21, NCAR-CCSM3, and CNRM-CM3) and two GHG emission scenarios (A2 and B1) downscaled to any location in California. The four GCMs are a subset of the six GCMs used in DWR's climate change assessments. Because the MPI-ECHAMP5 GCM is not included in Cal-Adapt, an average of the four GCMs (also provided by Cal-Adapt) with the A2 emission scenario was used in this analysis for Upper Santa Clara River Region to be consistent with the DWR analysis.

Figure 5.1-1 provides a visualization of which global climate change models were used in the above-mentioned climate change assessments and assessment tools.

FIGURE 5.1-1
GLOBAL CLIMATE CHANGE MODELS USED IN ASSESSMENT OF WATER RESOURCES



5.1.2.1.1 Statewide Climate Change Projections

Statewide climate change projections, based on the 2009 Scenarios Project assessment, were used to assess Regional vulnerabilities described in Table 5.1-2. All of the models show increased warming throughout the 21st century, with average annual air temperature increasing about 2°F to 5°F by 2050. The Mediterranean seasonal precipitation pattern is expected to continue during the 21st century, with most of the precipitation occurring during winter from North Pacific storms. The hydro-climate is expected to be influenced by the El Niño-Southern Oscillation (ENSO) with alternating periods of wet and dry water years. In the Sierra Nevada Mountains, there will be some shift to more winter precipitation occurring as rain instead of snow, with a reduction in snowpack accumulation and shifts in runoff patterns, especially during the summer and fall.

5.1.2.1.2 USCR Region Climate Change Projections

Locally, overall air temperatures are expected to rise from 1°F to 2.3°F over the next few decades. The historical average annual temperature in the Upper Santa Clara River region is 61.9°F; the A2 and B1 scenarios project increases of 6.9°F and 4.3°F by the end of the 21st

century. Figure 5.1-2 shows the projected air temperature change for the four GCMs averaged from 2000 through 2100, compared with the historical baseline from 1950-2000 used for the initial conditions for the models (see Section 5.1.2.1) The temperature projections begin to deviate between the A2 and B1 scenarios around mid-century, with the A2 scenario increase about twice the B1 scenario by 2100. For purposes of this analysis, an air temperature increase of 4°F has been assumed.

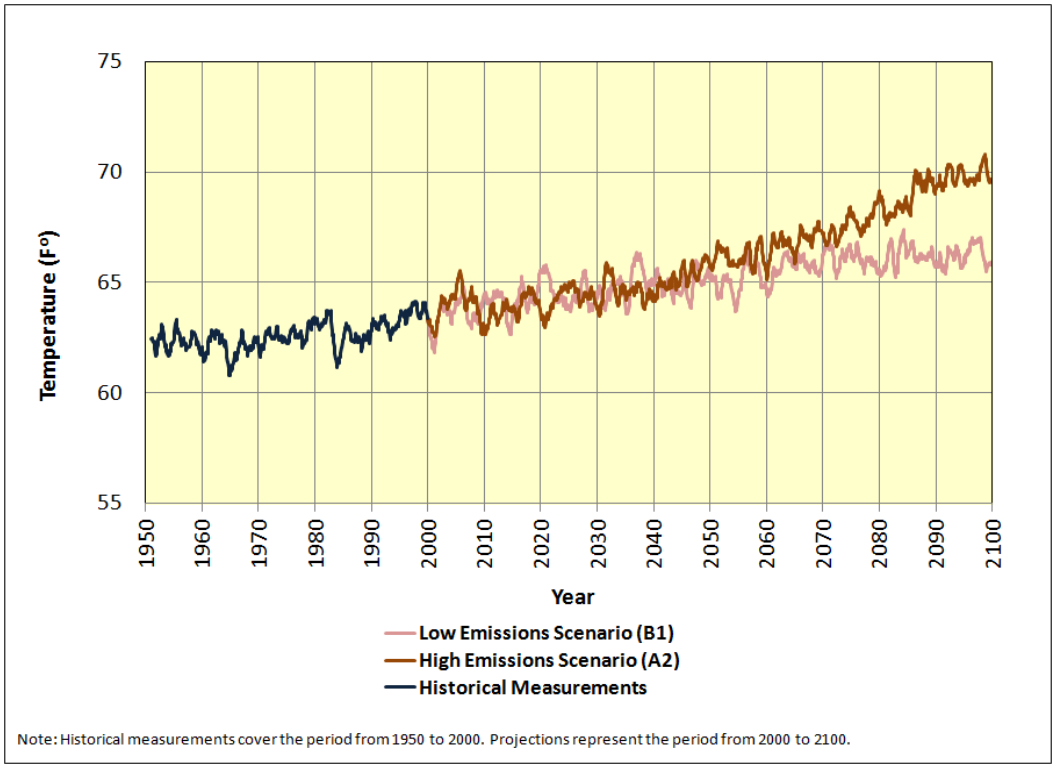
Precipitation in the Region is essentially all due to rain, and significant shifts in the timing of precipitation are not expected to occur. One of the four climate models projects slightly wetter winters, and others project slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. The drier conditions projected may result in a higher wildfire risk in the Region. Figure 5.1-3 shows the decadal precipitation projections from 1960 through 2100. There appears to be continued variable precipitation over the next century, with overall decrease. For purposes of this analysis, a 10 percent decrease in annual precipitation has been assumed.

5.1.2.2 Vulnerable Watershed Characteristics

Identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing the climate change vulnerabilities in the Region. In the context of this analysis, vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with and adapt to, the adverse effects of climate change, consistent with the definition in the recently issued *Climate Change Handbook for Regional Water Planning*.

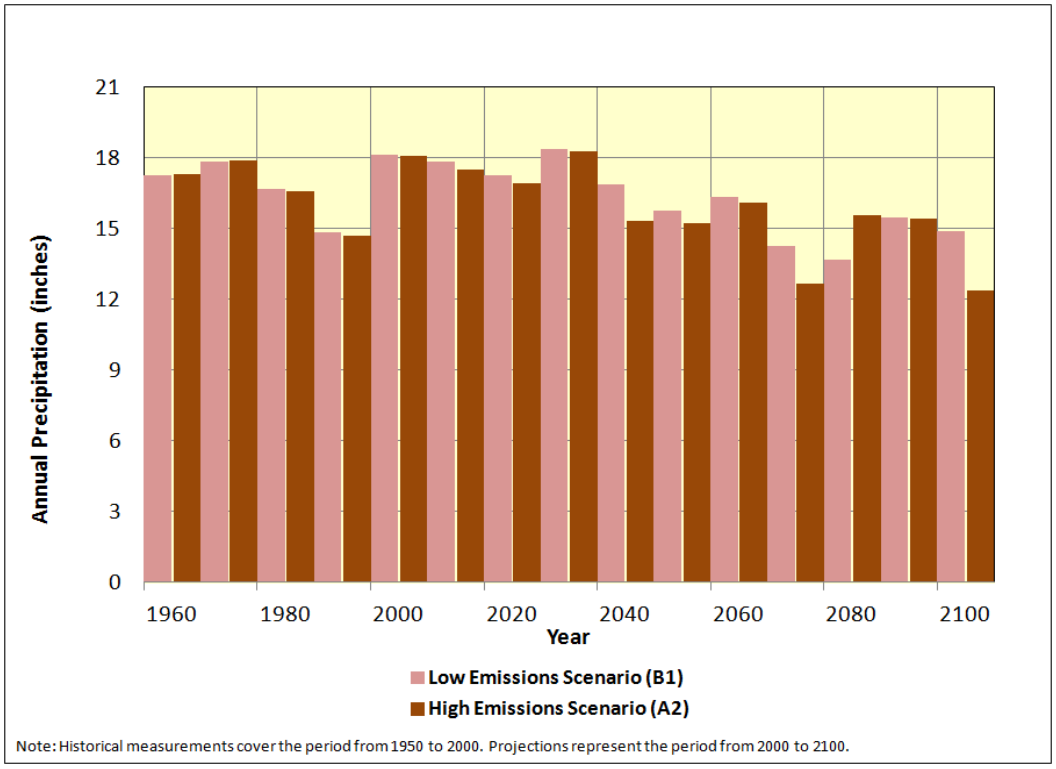
Table 5.1-2 provides a summary list of water-related resources that are considered important in the Region and potentially sensitive to future climate change. The summary table provides the main categories applicable to water planning in the Region with a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts. The main categories follow the climate change vulnerability checklist assessment as defined in the *Climate Change Handbook for Regional Water Planning*. These categories also reflect a combination of the IRWMP requirements and are consistent with Proposition 84 requirements.

FIGURE 5.1-2
HISTORICAL AND PROJECTED ANNUAL AVERAGE AIR TEMPERATURE FOR THE USCR REGION: AVERAGE OF FOUR GCMS FOR TWO EMISSIONS SCENARIOS



Source: Source data are based on Cal-Adapt website for the Santa Clarita area.

FIGURE 5.1-3
PROJECTED ANNUAL PRECIPITATION FOR USCR REGION:
AVERAGE OF FOUR GCMS FOR TWO EMISSIONS SCENARIOS



(a) Source: Source data are based on Cal-Adapt website for the Santa Clarita area.

Table 5.1-2 identifies the anticipated climate change impacts on these identified resources only qualitatively. It should be noted that resources that are likely to be vulnerable to climate change are considered for further analysis in the following subsections. Table 5.1-2 also highlights those resources in the Region that are unlikely to be affected by climate change and therefore they do not warrant further analysis and consideration at this time.

5.1.2.3 Vulnerability Sector Assessment

Climate change processes are supported by extensive scientific research and are based on a vast number of peer-reviewed and published technical literature. Much of the available literature presents general information, but there is relatively little information that presents specific tools on how to apply impacts in the context of addressing climate change impacts on water resources. In addition, far less information is available on smaller geographic areas and the spatial resolution of the existing climate change models is still quite low. One additional challenge is that precipitation projections cannot be easily converted directly into surface runoff and groundwater recharge to connect with the local water resources planning activities.

TABLE 5.1-2
CLIMATE CHANGE VULNERABILITY ASSESSMENT OVERVIEW

Watershed Characteristics	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes of hydrology in the Region as a result of climate change could lead to changes in water demand, both in quantities and patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporation losses with warmer temperature, and longer growing season.
Water Supply	**SWP Imported Water** – SWP water is an important portion of the water resources available to the Region. Potential impacts on SWP water availability resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term. Decreased inflow from runoff, increased evaporative losses, warmer and shorter winter seasons can alter natural recharge of groundwater. In addition, additional reductions in the SWP imported water imposed by climate change would lead to more reliance on local groundwater.
Water Quality	**SWP Imported Water** – Sea level rise could result in increases in chloride and bromide (a disinfection by product precursor), potentially requiring changes in drinking water treatment. Increased temperature could result in increase in algal blooms and taste and odor events. **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts. Increased wildfire risk and flashier storms could increase turbidity loads for water treatment.
Sea Level Rise	The Region is not directly subject to sea level rise. However, potential effects of sea level rise would affect SWP water supply conditions. As discussed above, the principal concern is the potential for sea water intrusion to increase Delta salinity. As sea level rise is not a direct regional concern, it is not discussed further in this vulnerability assessment.
Flooding	Local surface flows could change as a result of more frequent and intense storm events, leading to more areas susceptible to flooding, and increasing risk of direct flood damage in the Region.
Ecosystem and Habitat	Increased temperature and potential decreases in annual precipitation could put stress on sensitive ecosystems and alter habitats. Water-dependent recreation could also be affected by water quality impacts. In addition, the Region may be subject to increased wildfire risk, which could alter habitat.

Watershed Characteristics	General Overview of Vulnerabilities
Hydropower	Currently, the Region produces only minimal hydropower; thus, climate change effects on hydropower are not likely to be considerable and were not considered further in the analysis at the time of this IRWMP update.

This section presents the vulnerability of each sector identified in Table 5.1-2 with respect to climate change projections given the existing tools and available data. This is an initial attempt using projections specific to the Region for the vulnerability assessment in support of the IRWMP. The outcome of this initial assessment is intended to help understand the potential impacts, to integrate climate change into long-term planning, and to improve understanding of the uncertainties associated with climate change effects. Consistent with the water resources planning horizon in the Region through 2050, the vulnerability analysis considers projections for mid-21st century (2050), consistent with DWR's modeling approach to climate change.

5.1.2.3.1 Water Demand

Demand management is an important adaptation given decreased water supply as a result of climate change. A simple methodology was used to relate historical water demand with temperature. Reasonable projections were made for potential variations in water demand, based on anticipated temperature increase as a result of climate change.

The Cal-Adapt A2 emissions scenario used to project temperature and precipitation with climate change and the MPI-ECHAM5-MPI model used by DWR for SWP reliability analysis are similar with respect to the level of future projected emissions. The Cal-Adapt A2 emissions scenario projects a temperature increase for the Region of about 4°F by the mid-century (2050) and increase of about 7°F by the end of century. The projected average annual air temperature rise of 4°F by 2050 appears small against the background historical annual variability and characterizing the impacts of temperature rise on water demand is a difficult task and discussed on a qualitative basis. While water use varies considerably depending on other factors such as regional economy, population, and land use, a qualitative assessment of water demand increase can be noted based on the projected temperature increase from the Cal-Adapt A2 emission scenario.

Limited historical temperature data are available for the Region from the Castaic Dam Evaporation Station (Site 252CE), provided by the LADPW. Based on 20 years of limited data between 1991 and 2011, the average of the maximum temperature varied from 62.9°F in February to 95.1°F in August, with the highest temperature of 98.4°F measured in August 1998. The average of the minimum temperature over the same historical period varied from 43.8°F in February to 62.6°F in August, with the lowest temperature of 39.1°F measured in March 2006. Although data records are limited covering a relatively short period of time, significant seasonal and annual variations are noted.

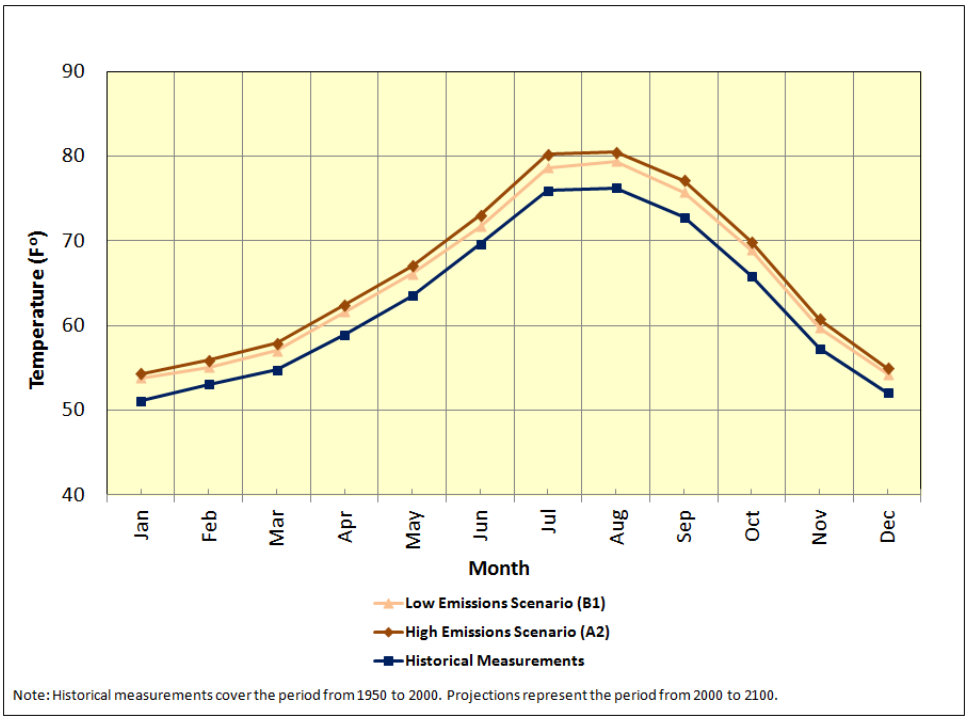
Historical water demand shows an increasing trend since 1995 with a downturn in recent years, likely due to response by customers to conservation efforts and the economic downturn. Water use to meet municipal water needs increased from approximately 45,700 AF in 1995 to nearly 77,500 AF in 2007, and was about 70,000 AF in 2009. Water demand is projected to gradually

increase from almost 95,000 AF in 2015 to nearly 141,000 AF in 2050 (Section 3.3.1). This projection accounts for projected land use changes and conservation to comply with SBX7-7.

Weather affects water demand in the Region. The largest water use occurs during the end of summer and the beginning of fall months (July, August, and September) and water is used least in cooler months leading into spring (February and March). Total water use can vary more than 50 percent seasonally, indicating a significant monthly and seasonal variation in water use with weather conditions.

Higher temperature is likely to increase water demands. While the ten percent increase of water demand per capita has been assumed to account for dry years in the *2010 Santa Clarita Valley UWMP*, there are not sufficient data available to quantify the effect from increasing temperature resulting from climate change. For a qualitative discussion, the projected increases in temperature and evapotranspiration (ET) have been evaluated to show seasonal changes in projections with climate changes compared with historical trends. Figure 5.1-4 shows the projected average monthly air temperature change for the four GCMs averaged from the present (1950-2000) through 2100 for the Region. The temperature projections are higher for the A2 and B1 emissions scenarios than the historical observed data and the A2 scenario projections are consistently higher than the B1 scenario projections. Based on the monthly average temperature, the projections with climate change show increase in temperature throughout the year with higher temperature increase in dry or summer months than wet or winter months. Under the A2 scenario, the projected temperature increase would be about 4°F during summer months compared with about 3°F during winter months. Qualitatively, these projections suggest water demand in the Region is likely to increase as a result of the projected higher temperature with a higher temperature increase anticipated during dry months compared to wet months.

FIGURE 5.1-4
PROJECTED AVERAGE MONTHLY TEMPERATURE FOR USCR REGION: AVERAGE OF FOUR GCMS FOR TWO EMISSIONS SCENARIOS



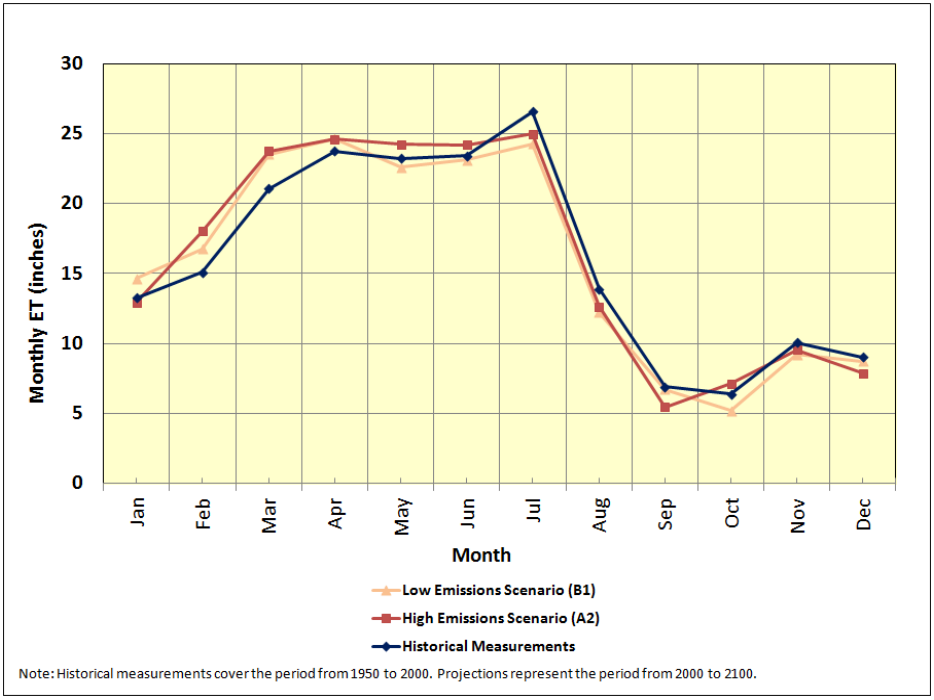
Source: Source data are based on Cal-Adapt website for the Santa Clarita area.

The most important effect of changing weather conditions is likely to be on agricultural demand. Higher temperature generally increases ET rates, but some research studies also suggest higher CO_2 levels and higher temperature increase rates of plant growth and can shorten the time to plant maturity (Hanak and Lund, 2008). This would reduce the overall plant water uptake, partially compensating for potential reductions in agricultural water supply. Thus, the net effect on agricultural crops is still uncertain (Kiparsky and Gleick, 2005) and remains an important area of ongoing research. Figure 5.1-5 shows the projected average monthly ET change for the four GCMs averaged from the present (1950-2000) through 2100 for the Region. In general, both the background historical and projections with climate change show higher ET during dry months (March through July) with a sharp decline in ET during August and September. The ET projections are generally higher for the A2 and B1 emissions scenarios than the historical observed data during months of the year where ET tends to be higher (January through June months). For months where ET is generally lower, a shift is anticipated between the background historical data and projections, where the historical data become slightly higher than the A2 and B2 scenario projections.

Qualitatively, the ET projections with climate change suggest water demand for agriculture in the Region is anticipated to increase during months where ET is high and decrease in months where ET is low. As a result of increased ET, urban water demand is anticipated to increase with greater outdoor water use for landscape irrigation. The temperature and ET projections with climate change as shown in Figures 5.1-4 and 5.1-5 demonstrate the effects of climate change on the future water demand based on seasonal variations; however, the projected water

demand increase with population growth and land use changes is large in the Region and these factors are likely to be more significant drivers of outdoor water use than the effect of climate change alone.

FIGURE 5.1-5
PROJECTED AVERAGE MONTHLY EVAPOTRANSPIRATION FOR USCR REGION: AVERAGE OF FOUR GCMS FOR TWO EMISSIONS SCENARIOS



Source: Source data are based on Cal-Adapt website for the Santa Clarita area.

5.1.2.3.2 Water Supply

For long-term water supply planning, coping with variability is a challenge. With potential additional changes imposed by climate change, there will be a heightened need to evaluate and respond to increased water supply variability.

A broad range of impacts could be produced by climate change in the Region, yet some of the most significant impacts of climate change are anticipated to occur on water resources. An analytical approach was used to identify and describe water supply availability under climate change, and includes DWR's modeling analysis of SWP imported water reliability.

SWP delivery to the Region comprises about 54 percent of total existing water supplies projected through 2050 in the Region in normal/average years (Table 3.1-1). Groundwater pumping from local aquifers and additional sources from groundwater banking activities make up the remaining major water sources used to meet the Region's municipal and agricultural water demand. The Region relies on imported SWP supplies and any reduction or change in the timing or availability of those supplies could have negative impacts on the Region. Reductions in the SWP imported water would lead to increased reliance on local groundwater or

other sources of supplies. Changes in local hydrology could affect natural recharge to the local groundwater and the quantity of groundwater that could be pumped in a sustainable manner. Reductions in SWP imported water as a result of climate change could lead to increased groundwater production.

Although SWP supply is mainly controlled by hydrologic conditions in the northern part of the state, the groundwater resources would be affected by local conditions, whereby climate change effects on these resources could occur at the same time. Therefore, the combined effects on SWP imported water and groundwater resources can exert more magnified stress on the Region's water supply planning than the effects on individual resources.

The following is an assessment of climate change on SWP imported water and groundwater resources. The SWP imported water assessment is presented first to identify potential reductions in SWP deliveries. The outcome of the SWP assessment is tied to the groundwater assessment as SWP reductions may lead to increased reliance on local groundwater.

5.1.2.3.2.1 SWP Imported Water

Availability of future SWP imported water supplies to the Region was assessed within the context of climate change impacts. The methodology used for the vulnerability assessment includes a comparison of estimated future SWP deliveries with and without climate change to evaluate the potential vulnerability of the SWP imported water. Future projections of SWP deliveries are based on the modeling analysis performed by DWR, as reported in the recently issued *2011 Reliability Report* (DWR 2012). DWR conducted an assessment of the impacts of climate change on the state's water supply using MPI-ECHAMPS Global Climate Model. As described earlier, the model output is based on the A2 emission scenario with mid-century (2050) projections. The assumption used for the emissions level in the DWR modeling analysis is consistent with the Cal-Adapt A2 emissions scenario used for forecasting temperature, precipitation, ET, and runoff projections with climate change.

DWR's modeling analysis is based on the 82 years of hydrologic data (water years 1922-2003) and uses projected levels of climate change through year 2050, with 2020 land use levels. The analysis accounts for potential hydrologic changes that could result from climate change and the effects of sea level rise on water quality, but does not incorporate the probability of catastrophic levee failure (DWR 2012).

On a qualitative basis, DWR's climate change modeling analysis indicates increased temperature, decreased water availability with reduced Sierra Nevada snowpack, early snow melt, and a rise in sea level (DWR 2012). DWR's *2011 Reliability Report* provides SWP system-wide deliveries expressed as a percentage of total maximum Table A amounts for future conditions with climate change. These percentages do not reflect the differing allocations to individual contractors. In the absence of detailed results for each contractor, this vulnerability assessment assumed that changes in total SWP Table A deliveries resulting from climate change are a reasonable representation of future SWP imported water supply to the Region. The underlying assumption is that future reductions in SWP imported water to the Region would be proportional to projected reductions in total SWP deliveries.

DWR's modeling analysis provides future projections of SWP deliveries both with and without climate change, each using the 82 years of hydrologic data. Using DWR's modeling analysis for

the assessment of climate change is consistent with the ongoing long-term water planning in the Region. In addition, results from DWR's climate change analysis allows for a direct comparison of SWP supply vulnerability of future conditions with and without climate change on a quantitative basis.

As described above, the climate change model MPI-ECHAMPS with the A2 emission scenario was used by DWR in the *2011 Reliability Report* for the future SWP delivery projections with climate change. The maximum SWP Table A demands for deliveries to SWP contractors from the Delta is 4,133 thousand acre feet (TAF) based on the current demands developed by DWR. In the *2011 Reliability Report*, the maximum SWP Table A demands for deliveries from the Delta are assumed to be the same as 4,133 TAF under future conditions, both with and without climate change effects. In other words, the maximum annual SWP Table A demand of 4,133 TAF is assumed in all 82 years of the simulation (note there is no variation in demand due to different annual hydrologic conditions). In the context of evaluating the climate change effects in this study, reductions in SWP deliveries with and without climate change are presented as percentages of the maximum SWP Table A delivery amount of 4,133 TAF annually.

It should be noted that SWP supplies to CLWA, as reported in the *2010 Santa Clarita Valley UWMP*, are based on DWR's more detailed, contractor-specific delivery data from its analyses for the *2009 Reliability Report*. In the *2010 UWMP*, DWR's analysis of current (2009) conditions was used to estimate 2010 SWP supplies and its analysis of future (2029) conditions was used to estimate 2030-2050 SWP supplies. SWP supply to CLWA by 2050 is projected to be at 57,400 AFY (60 percent of CLWA's 95,200 AFY Table A amount) in average/normal years, 9,100 AFY (10 percent of Table A amount) in a single dry year and 33,000 AFY over a multi-year dry period.

Average, Maximum, and Minimum Annual SWP Table A Deliveries

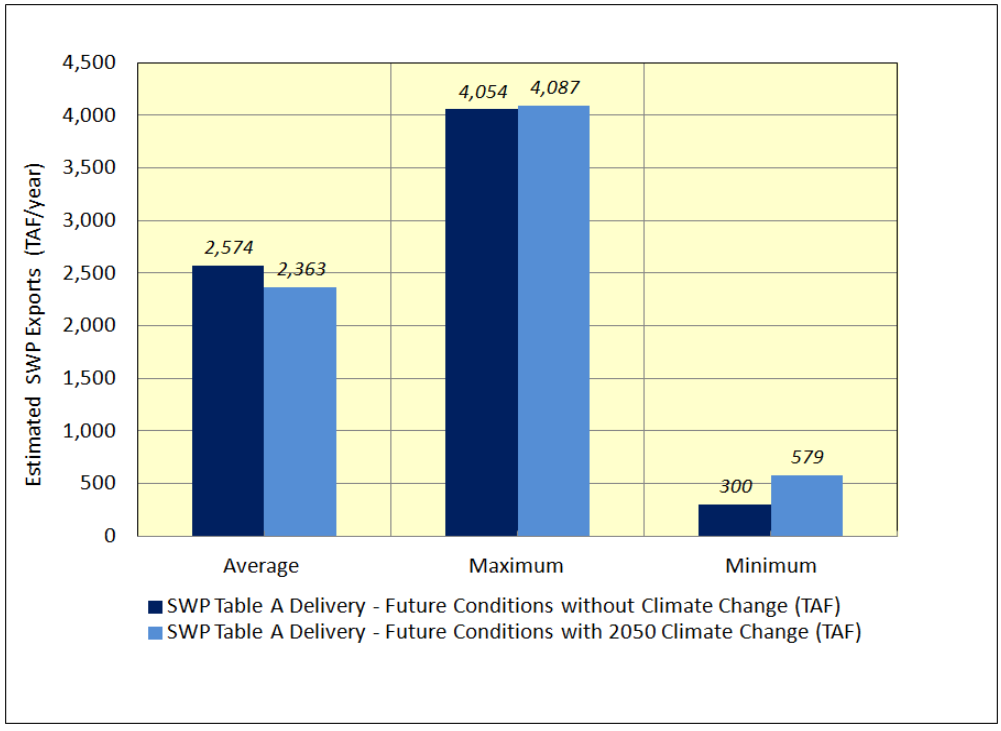
Figure 5.1-6 presents the estimated long-term average, maximum, and minimum annual SWP Table A deliveries for the future conditions with and without climate change. The long-term average is based on the projections for the 82 years of hydrologic period (1922 to 2003) modified to reflect climate change. Based on the future conditions with climate change, SWP Table A deliveries range from an annual minimum of 579 TAF to a maximum of 4,087 TAF, with the long-term average of 2,363 TAF. These estimates show that the maximum annual delivery increases by 33 TAF per year (1 percent) under the future conditions with 2050 climate change, relative to the future conditions with no climate change effects.

Estimated minimum annual delivery is 279 TAF (48%) higher with climate change than without climate change. However, the average annual deliveries decrease from 2,574 TAF under the future conditions without climate change to 2,363 TAF under the future conditions with climate change. This is a reduction of 211 TAF annually at the system-wide level.

In assessing the future SWP delivery reliability, the long-term average SWP delivery from the *2011 Reliability Report* is directly applicable to individual contractors. The long-term average of future SWP deliveries with climate change is lower than the long-term average without climate change, as depicted in Figure 5.1-6. The average value represents the long-term trend over the entire 82 years of the hydrologic data. This decreasing trend in the average SWP delivery projections with climate change is consistent with the expected reduction in the reliability of the

SWP water supply system due to climate change impact (DWR 2009). SWP future projections associated with any particular year (i.e., the minimum and maximum values) or over a short period of time (i.e., a single dry period or single wet period) should be viewed carefully because these results are dependent upon the rainfall that has occurred in previous years. In addition, reservoir storage for the beginning of any year varies depending upon the weather conditions in the previous year. Therefore, the results for any single year, such as the minimum and maximum values as shown in Figure 5.1-6, should be interpreted with caution as they may be affected by the amount of water assumed to be available from the previous year. While the long-term SWP future projections with climate change indicate reduction in deliveries, SWP projections for a single year (or over a short period of time) does not follow the decreasing trend. As described above and shown in Figure 5.1-6, the minimum and maximum values are projected to be higher with climate change. Since they represent projected deliveries in a single year, the increasing trend with climate change could be attributed to the factors that occur in the previous years, such as weather and or reservoir storage conditions, that affect deliveries.

FIGURE 5.1-6
ESTIMATED AVERAGE, MAXIMUM, AND MINIMUM ANNUAL SWP EXPORTS – FUTURE CONDITIONS WITH AND WITHOUT CLIMATE CHANGE



Source: Figure based on Draft Technical Addendum to the State Water Project Delivery Reliability Report 2011, Table 12.

Long-term average SWP Table A deliveries are estimated to be 57 percent of Table A amount for the future conditions with climate change; without climate change long-term deliveries are expected to be 62 percent of Table A amounts. Assuming available SWP supply to the Region would be proportional to the SWP system-wide supply conditions, projected SWP imported

water delivery to CLWA with climate change corresponds to about 54,500 AF (or 57 percent of Table A amount based on CLWA's annual contract amount of 95,200 AF of SWP water) and 59,300 AF (or 62 percent of Table A amount) without climate change.

The *2010 Santa Clarita Valley UWMP,* based on the *2009 Reliability Report,* assumed SWP supply of 57,400 AFY. The new modeling in the *2011 Reliability Report* suggests that CLWA SWP average supply could be 2,900 AFY less (about 3%) than assumed in the *2010 Santa Clarita Valley UWMP*. For the purpose of this analysis, results from the *2011 Reliability Report* were used consistently for future projections with and without climate change. In light of the long-term water supply availability, this reduction appears small and comprises a relatively small portion of the Region's total water supply.

It should also be noted that the current assumptions used in DWR's *2009* and *2011 Reliability Report* present a conservative projection of SWP delivery reliability. Several emerging factors related to the biological opinions on the Delta operations, issued by US FWS and the National Marine Fishery Service (NMFS), have the potential to affect the availability of SWP supplies. Therefore, the projections presented herein also present conservative estimates concerning the long-term delivery reliability of SWP supplies. These projections should be revisited during future IRWMP updates.

SWP Table A Deliveries by Water Year Types

Figure 5.1-7 and Table 5.1-3 show estimated SWP Table A deliveries by water year type under future conditions with and without climate change. In Figure 5.1-7 and Table 5.1-3, estimated SWP exports reported by DWR for the 82 years of hydrologic data (water years 1922 to 2003) were averaged according to water year type. This representation shows how the estimated SWP exports would vary by hydrologic year types over the entire 82 years of the modeling analysis. Overall, the future conditions with climate change forecast lower deliveries under all water year types, with the largest difference for dry years. Deliveries decrease by as little as 51 TAF (5%) during critical years to as much as 371 TAF (20%) during dry years under the future conditions with climate change relative to no climate change.

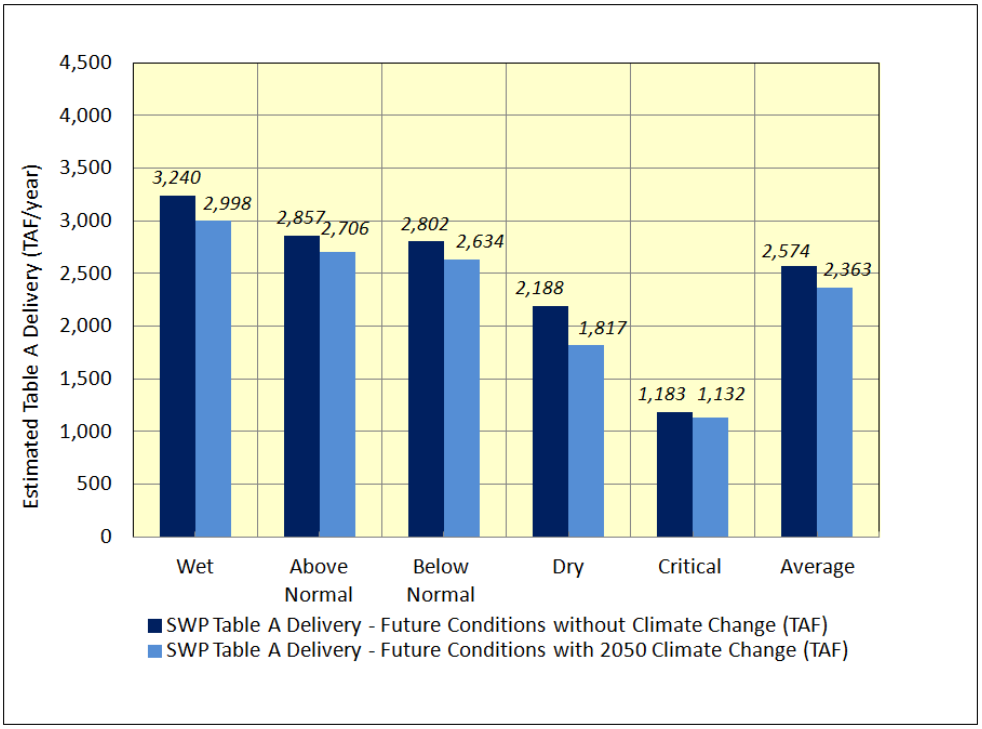
TABLE 5.1-3
ESTIMATED SWP EXPORTS BY WATER YEAR TYPE – FUTURE CONDITIONS WITH AND WITHOUT CLIMATE CHANGE

Water Year Type	Future Conditions (2050) with Climate Change (TAF)	Future Conditions (2050) without Climate Change (TAF)	Difference, Future with and without Climate Change	
			TAF	%
Wet	2,998	3,240	-242	-8
Above Normal	2,706	2,857	-152	-6
Below Normal	2,634	2,802	-168	-6
Dry	1,817	2,188	-371	-20
Critical	1,132	1,183	-51	-5
Average	2,363	2,574	-211	-9

Source: Estimated SWP exports are based on the 82 years of hydrologic data (water years 1922-2003) from Draft Technical Addendum to the State Water Project Delivery Reliability Report 2011, Table 12 SWP Table A Deliveries

for Future Conditions. Hydrologic data were averaged according to water year types based on DWR's Sacramento Valley water year index (http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST).

FIGURE 5.1-7
ESTIMATED SWP TABLE A DELIVERY BY WATER YEAR TYPE – FUTURE CONDITIONS WITH AND WITHOUT CLIMATE CHANGE



Source: Estimated SWP exports are based on the 82 years of hydrologic data (water years 1922-2003) from Draft Technical Addendum to the State Water Project Delivery Reliability Report 2011, Table 12 SWP Table A Deliveries for Future Conditions. Hydrologic data were averaged according to water year types based on DWR's Sacramento Valley water year index (http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST).

Dry-Year SWP Table A Deliveries

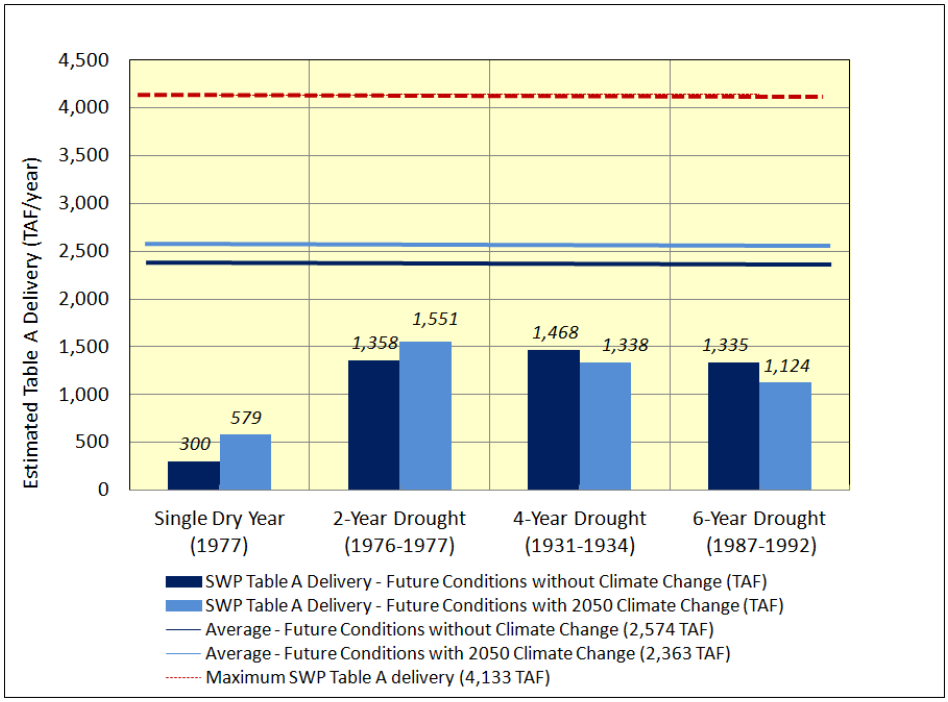
Figure 5.1-8 shows a comparison of estimated SWP Table A deliveries under future conditions with and without climate change during possible drought conditions. Unlike Figure 5.1-7 that shows the average of dry and critical years over the entire 82 years of hydrologic period, Figure 5.1-8 shows estimates of SWP exports for a single dry year, or the average of the consecutive dry years. Droughts are analyzed using historical drought-period precipitation and runoff patterns from 1922 through 2003. Future conditions with land use and climate change are also accounted for. As shown in Figure 5.1-8, estimated annual SWP deliveries can be expected to range from 579 TAF to 1,551 TAF under the future conditions with climate change, relative to 300 TAF to 1,468 TAF without climate change effects. This indicates a 12% to 48% increase for the single dry year and 2-year drought, respectively, with climate change. Under both future

conditions, the single year drought (1977) is the most intense dry period, with the lowest delivery. As shown in Figure 5.1-8, the increasing trend for the single dry and 2-year drought with climate change is different than the overall decreasing trend seen in SWP projections with climate change. As discussed above, the long-term average SWP delivery is projected to be lower with climate change (Figure 5.1-6). Similarly, a decreasing trend is seen for the average deliveries by water year types where the future conditions with climate change forecast lower deliveries under all water year types (Figure 5.1-7). However, as discussed above, the minimum and maximum values are projected to be higher with climate change (Figure 5.1-6), similar to the increasing trend seen for the single-dry year and 2-year drought projections with climate change (Figure 5.1-8). As discussed earlier, the projections over a single year (i.e., minimum, maximum, or a single dry period) or over a short period of time (i.e., 2-year drought) should be interpreted carefully because the results for the beginning of any year are dependent upon the rainfall and reservoir storage conditions in the previous year. While the increasing trend with climate change does not follow the overall expected trend for decreasing SWP deliveries with climate change, it could be attributed to the factors that occur in the previous years, such as weather and or reservoir storage conditions that affect deliveries.

While SWP supplies are anticipated to increase during short period drought conditions, as depicted in Figure 5.1-8 for the single dry year and 2-year drought, during the multi-year (4-year and 6-year) drought projections under future conditions are lower with climate change than without climate change. This is consistent with the decreasing trend seen with climate change for the long-term average and the average deliveries during different water year types. For the 4-year and 6-year drought, SWP Table A deliveries with climate change decrease by 10% to 19%, respectively, compared with future conditions without climate change. For the 6-year drought, SWP supply to the Region is anticipated to be reduced by 4,900 AF per year, as a result of decrease in SWP Table A delivery from 36% of Table A amount without climate change to 32% of Table A amount with climate change.

Assuming that the Region's SWP supply reliability would be proportional to SWP system-wide supply reliability, there is potential for slightly increased SWP supply to the Region during a single year and 2-year drought with climate change assumptions compared with no climate change effects. In the worst-case single critically dry year (1977), estimated SWP Table A delivery increases from 7% of total maximum Table A amount without climate change to 14% of Table A amount with climate change. This represents a 7% increase and corresponds to about 6,500 AF additional SWP supply to the Region (based on the annual contract amount of 95,200 AF of SWP water). During the 2-year drought, the projected increase in SWP supply is about 5% of total Table A amount or 4,500 AF more of SWP supply.

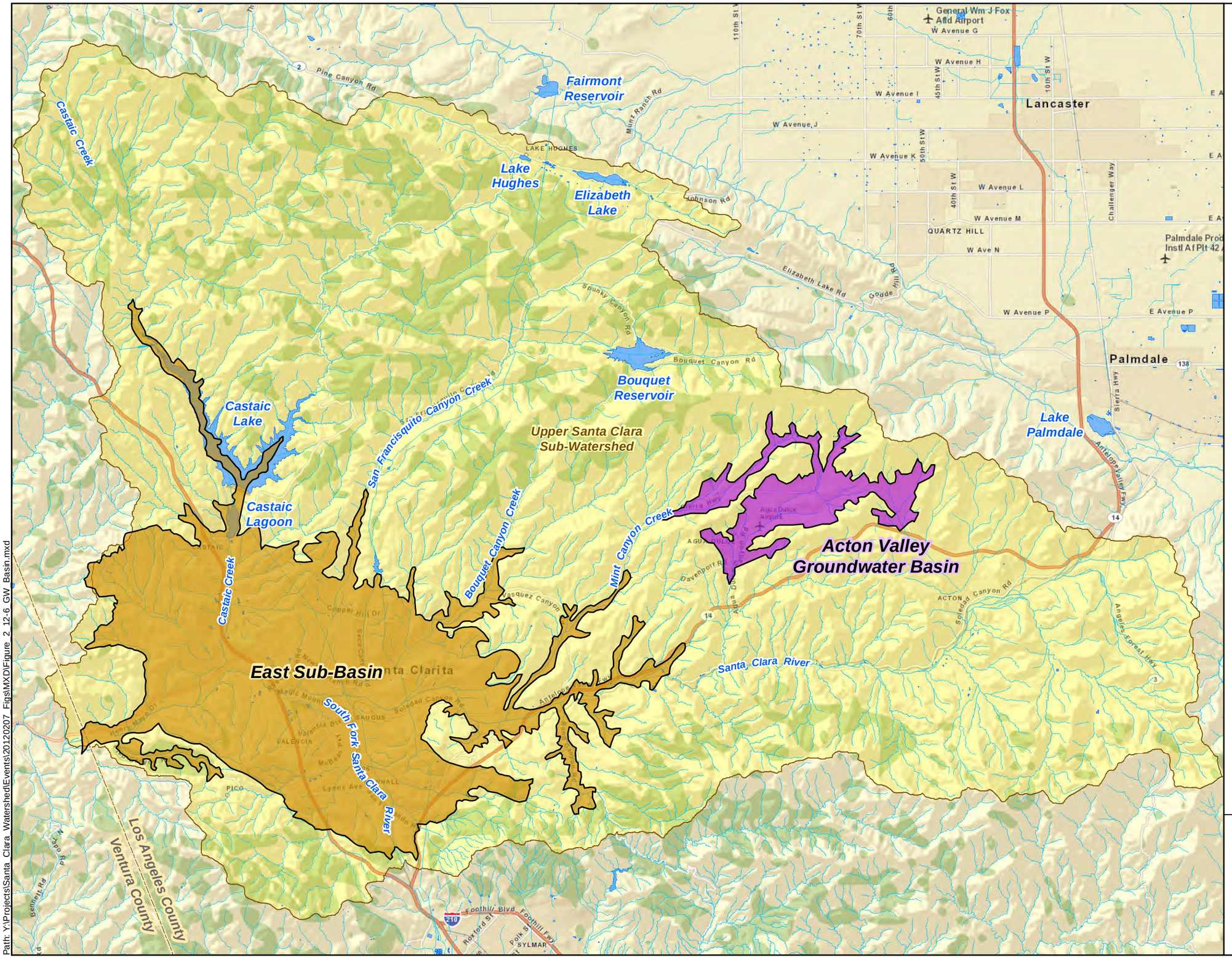
FIGURE 5.1-8
ESTIMATED SWP TABLE A DELIVERY DURING DRY PERIODS – FUTURE CONDITIONS WITH AND WITHOUT CLIMATE CHANGE



Source: Figure based on Draft Technical Addendum to the State Water Project Delivery Reliability Report 2011, Table 12 SWP Table A Deliveries for Future Conditions.

5.1.2.3.2.2 Groundwater

As discussed in the Water Supplies and Water Demand Section (see Section 3.1-1 and Table 3.1-1), the Region relies on groundwater mainly in two groundwater basins: Acton Valley Basin and Santa Clara River Valley Basin, East Subbasin. The boundaries of the basins are shown in Figure 5.1-9, as defined by DWR Bulletin 118 (DWR, 2003). There are also groundwater areas that are recognized locally (Agua Dulce Basin and Soledad Canyon Alluvial Channel) and used for pumping, but they are not designated as a groundwater basin by DWR. Groundwater extraction data, groundwater storage, and yield data for these locally recognized basins are not currently available. A detailed description of the hydrogeologic characteristics of the basins, groundwater flow and water quality conditions, and storage capacity of the aquifers is presented in the previous sections and additional details can be found in other existing reports (CH2MHill 2005; LSCE 2011).



Path: Y:\Projects\Santa_Clara_WatershedEvents\20120207_Figs\MXD\Figure_2_12-6_GW_Basin.mxd

Kennedy/Jenks Consultants

CLWA IRWMP Grant Application
Los Angeles County, California

Groundwater Basin Boundaries in the Region

1189057*00
February 2012

Figure 5.1-9

Groundwater basins in the Region are recharged largely by infiltration of surface water flows in the Santa Clara River channel and deep percolation of precipitation and runoff in its tributaries. Surface water flows percolate through the alluvial deposits along the stream channels, recharging the Alluvium, and the underlying Saugus Formation. Groundwater in the Santa Clara River Valley Basin is produced from the Alluvium and Saugus Formation.

Based on the groundwater operating plan for the Santa Clara River Valley East Subbasin, total groundwater production in a given year varies depending on the hydrologic conditions. Based on the existing and planned pumping, groundwater is anticipated to provide about 43,600 AF through year 2050 (35,225 AF existing and 8,375 AF planned) (see Table 3.1-1). In some years groundwater supplies could be supplemented with banked groundwater. With the existing (24,950 AF) and planned (20,000 AF) banking programs, total (maximum) capacity of the banking program withdrawals would reach 44,950 AF annually through 2050, but this banking water is typically used only in dry years. The projections of pumping are well within the available groundwater supply for the Region. Total combined groundwater available from the Alluvium, Saugus Formation, and Acton Basin ranges from 71,900 AFY to 89,000 AFY during normal and above normal years and reduces to 60,400 AFY to 74,900 AFY during dry years (see Table 3.1-2).

While the basins have supply exceeding the future projected pumping levels, in light of the basin characteristics and natural recharge processes in the basins, changes in local hydrology and natural recharge are anticipated to have a direct impact on available groundwater storage. Warmer winters would increase the amount of runoff available for groundwater recharge, but reductions in inflow from runoff and increased evaporative losses could reduce the amount of natural recharge. While the extent to which climate change will change the natural recharge processes and the impact of that change are not exactly known and are difficult to quantify, simplifying assumptions were applied to provide initial estimates.

For this analysis, precipitation reduction of 10 percent was assumed to occur in the Region on a long-term basis. Assessment of climate change impacts on groundwater resources is presented in two parts. The first part of the analysis uses a “what if” scenario to evaluate if groundwater aquifers could make up for SWP supplies impacted by climate change while staying within a safe operating range. The underlying assumption was that reduced SWP supplies would be solely made up by groundwater pumping and that future pumping levels could be potentially higher than the future pumping projections reported in the *2010 Santa Clarita Valley UWMP*. The second part of the analysis is based on a “what if” scenario to evaluate the combined effects of climate change on SWP supplies, in conjunction with potential climate change effects on groundwater resources. In this scenario, it was assumed that 10 percent precipitation reduction would result in 10 percent reduction in the current safe groundwater pumping operational range. This is considered as an initial assessment of climate change effect on groundwater resources and further analysis may be warranted.

Following is a brief discussion of historical and operational range of pumping from the Alluvium, Saugus Formation, and Acton Basin, as this information is pertinent to the assessment of future pumping projections with climate change effects.

Santa Clara River Valley East Subbasin – Alluvium

Pumping from the Alluvium in a given year is governed by local hydrologic conditions in the eastern Santa Clara River watershed. Therefore, changes in local hydrologic conditions resulting from climate change are anticipated to directly affect the available supply in the Alluvium.

Groundwater production from the Alluvium is projected to range from 38,100 AFY to 38,600 AFY through year 2050 under normal years (CLWA, et al. 2011). Future projections of pumping account for land-use changes including a decrease in agricultural land use and decrease in agricultural pumping and the equivalent amount of increased pumping for municipal water supply. Future pumping projections are consistent with the long-term sustainable pumping operations and are within pumping capacity and historical ranges of pumping in the Alluvium. The Alluvium can supply groundwater on a long-term sustainable basis in the overall range of 30,000 to 40,000 AFY during normal and above-normal years, with a probable reduction in dry years to 30,000 to 35,000 AFY. In terms of pumping capacity, the combined maximum pumping capacity of the three retail water purveyors with Alluvium wells (NCWD, SCWD, and VWC) is approximately 67,000 AFY (CLWA, et al. 2011), which is more than sufficient to meet the potential future groundwater supply from the Alluvium. However, as a result of the groundwater operating plan, pumping to full capacity is not permitted. Historical pumping data show that since the beginning of SWP deliveries to the Region in 1980, total pumping from the Alluvium ranged from 20,000 AFY (in 1983) to slightly more than 43,000 AFY (in 1999). During recent years between 2005 and 2009, pumping from the Alluvium was at the upper end of the operating plan range, from nearly 38,700 AF (in 2005) to slightly over 43,000 AF (in 2006).

The groundwater modeling analysis, prepared by CH2M Hill and LSCE (2005), was used to examine the yield and sustainability of the Alluvium in response to pumping in the 30,000 to 40,000 AFY range under average/normal and wet conditions, and in the 30,000 to 35,000 AFY range under locally dry conditions. The model was based on a 78-year hydrologic period from historical precipitation and considered a number of hydrologic conditions expected to affect groundwater pumping and recharge. The modeling analysis showed no evidence of long-term decline in groundwater levels or storage. The updated basin yield analysis (LSCE & GSI 2009) resulted in similar findings as the original modeling analysis, providing further evidence that the operating plan reflects the ongoing sustainable groundwater supply rates. On an overall basis, projected groundwater production from the Alluvium is intended to remain within the sustainable ranges in the groundwater operating plan (CLWA, et al. 2011).

Santa Clara River Valley Basin - Saugus Formation

Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly from SWP. Therefore, reductions in the SWP imported water from climate change impacts would lead to more reliance on the Saugus Formation.

Based on the future projections of groundwater pumping through year 2050, the Saugus Formation would supply water from 11,500 AFY to 12,500 AFY in normal years (CLWA, et al. 2011). On an overall basis, projected groundwater production from the Saugus Formation remains well within the sustainable ranges defined in the groundwater operating plan (CLWA, et al. 2011). Based on the historical operating ranges and recent modeling analyses (2005 and 2009), the Saugus Formation can supply groundwater on a long-term sustainable basis in the

overall range of 7,500 to 15,000 AFY during normal years, but has the capacity to produce more in dry years. As presented earlier in Table 3.1-2, planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 AFY during a drought year and can increase to between 21,000 and 25,000 AFY if SWP deliveries are reduced for two consecutive years and between 21,000 and 35,000 AFY if SWP deliveries are reduced for three consecutive years.

Based on a combination of historical operating experience and recent groundwater modeling analysis in 2005 and 2009, the Saugus Aquifer can be considered a sustainable water supply source to meet the Saugus portion of the operating plan for the groundwater subbasin. The operating plan for the Saugus, with fairly low pumping in wet/normal years and increased pumping through dry periods, reflects sustainable groundwater supply rates. Limited data exists regarding groundwater levels in the Saugus Formation; however, the existing data indicate no trend toward a sustained decline in water levels or storage indicative of overdraft.

Acton Groundwater Basin

The Acton Basin consists of alluvial and stream terrace deposits and is under unconfined conditions. The basin is drained by the Santa Clara River and recharged largely by deep percolation of direct rainfall runoff captured in the valley floor, and Santa Clara River and tributaries. As seen in Table 3.1-2, availability of groundwater from the Acton Basin is estimated to range from 14,900 AF for a relatively dry period to 34,400 AF for a relatively wet period. Based on the historical data, groundwater levels declined during the 1950s through the mid-1970s, rose during the late 1970s to the mid-1980s, and continued to decline after the 1980s (Slade 1990).

"What If" Scenario 1: Projected Future Groundwater Pumping with Reduced SWP Supplies

This scenario assumes (1) SWP supplies with climate change as reported in the 2011 Reliability Report and (2) groundwater supplies consistent with the 2010 Santa Clarita Valley UWMP.

This section presents the first part of the analysis where future groundwater pumping volumes are projected to accommodate the reduced SWP supplies as a result of climate change effects on SWP supplies. The future projections of pumping from the Alluvium, Saugus Formation, and Acton Basin, as reported in the *2010 Santa Clarita Valley UWMP*, were evaluated in light of the operating plan pumping range and reduced SWP supplies resulting from climate change based on the vulnerability assessment of SWP supplies presented above. This is a qualitative analysis to evaluate if the basins have the potential to make up for reduced SWP supplies resulting from climate change without long-term effects on groundwater levels and storage. The current analysis is mainly based on the long-term average trends to capture the long-term response from climate change. Conditions during a multi-year (6-year) drought were also assessed as a conservative approach.

Based on DWR's modeling analysis of climate change effects on SWP supplies, CLWA's SWP imported water supply is estimated to decrease by 4,900 AFY both on the long-term average basis and during the multi-year (6-year) drought, relative to future projections without climate change. In average/normal years, the future pumping projections of 38,100 AFY to 38,600 AFY in the Alluvium, as described in the *2010 Santa Clarita Valley UWMP* (CLWA, et al. 2011), would be in the upper range of the operating plan (up to 40,000 AFY, Table 3.1-2). Additional pumping from the Alluvium to accommodate the reduced SWP delivery of 4,900 AFY would

exceed the sustainable yield. In addition, pumping higher than the estimated sustainable Alluvium yield at 38,600 AFY could potentially result in both short-term and long-term groundwater levels and storage depletion in this basin. For the purpose of this assessment, it was assumed that the Alluvium could potentially produce 38,600 AFY on the long-term average. During a multi-year drought, the potential for the basin to support additional pumping of 4,900 AFY is low, given that the basin operating yield decreases to 34,850 AFY (CLWA, et al. 2011).

Historical pumping in the Saugus Formation, on the other hand, has been fairly low and increased pumping up to about 15,000 AFY over a four-year period showed short-term water level impacts but produced no long-term depletion of the substantial groundwater storage. While the future projection of pumping from the Saugus Formation ranges from 11,500 AFY to 12,500 AFY, the basin has the potential to pump additional amounts in the short-term, as high as 35,000 AFY during a single dry year and up to 32,550 AFY during a multi-year drought in the case of reduced SWP deliveries. For the purposes of this assessment, it was assumed that, both on the long-term basis, and multi-year drought conditions, the entire amount of reduced SWP supplies could be potentially made up by pumping in the Saugus Formation. If the reduced SWP supply was made up solely by groundwater pumping in the Saugus Formation, pumping would increase by an equivalent amount of reduced SWP delivery, or 4,900 AFY. This would result in pumping in the range of 16,400 AFY to 17,400 AFY on the long-term average. This range is slightly higher than the upper end of the planned use of the aquifer in normal years, but lower than the upper range of pumping in dry years when reduced SWP deliveries occur during consecutive years (up to 35,000 AFY). As discussed earlier, the full Saugus Formation supply of 35,000 AFY in certain dry years would require restoration of perchlorate impacted wells with additional wells, but pumping in the range of 16,400 AFY to 17,400 AFY is not anticipated to be affected by well capacity. Overall, additional pumping from the Saugus to make up for reduced SWP supplies is within the range of pumping identified in the recent basin analysis found to protect long-term groundwater sustainability. Groundwater levels could potentially go below historical levels in response to greater long-term use of the aquifer, but the basin is anticipated to show recovery of groundwater levels and storage after cessation of higher pumping.

Given that the Acton Basin is under unconfined conditions and shows historical groundwater level declines, the basin is anticipated to be most vulnerable to local changes in hydrology and reduced natural recharge. For the purpose of this assessment, no additional pumping from the Action Basin was assumed to occur to respond to reduced SWP deliveries resulting from climate change.

<u>“What If” Scenario 2: Projected Future Groundwater Pumping with Reduced SWP Supplies and Reduced Precipitation</u>

This scenario assumes (1) SWP supplies with climate change as reported in the 2011 Reliability Report and (2) groundwater supplies reduced to reflect anticipated reductions in recharge with climate change.

For the purpose of this part of the analysis, SWP projections with climate change remain the same as discussed in the “What If” Scenario 1. However, the groundwater operating range was modified based on the simplifying assumption that a 10 percent reduction in precipitation would lead to a 10 percent reduction in the operational range. This is done on a long-term basis and does not account for year-to-year variations in precipitation change or any resulting annual

changes in groundwater resources. The intent is to evaluate if the basins can still support the additional pumping in the long-term without adverse long-term effects in groundwater storage and levels when SWP deliveries are reduced because of climate change effects on SWP supplies.

Given a 10 percent reduction in the operational yield, available pumping from the Alluvium is assumed to decline to 27,000 AFY to 36,000 AFY, less than the current operating range of 30,000 AFY to 40,000 AFY. Future projected groundwater production from the Alluvium (without climate change) ranges from 38,100 AFY to 38,600 AFY, which exceeds the modified operational yield. While the 10 percent reduction assumption is very broad and conservative, this suggests that, the Alluvium may not have the capacity to support future projections of pumping in the long-term, and may not support additional pumping that may be required when SWP supplies are reduced. In addition, future pumping of 38,100 AFY to 38,600 AFY may require further analysis of the operational range to maintain the long-term sustainability of the basin.

Assuming a 10 percent reduction in the operational yield, the Saugus Formation could potentially range from 6,750 to 31,500 AFY, compared with the current range of 7,500 AFY to 35,000 AFY. If the reduced SWP supply of 4,900 AFY was made up solely by groundwater from the Saugus Formation, pumping would range from 16,400 AFY to 17,400 AFY on the long-term average, compared with future pumping projection of 11,500 AFY to 12,500 AFY without climate change. This increased pumping is higher than the upper end of the modified operating range in normal years (13,500 AFY), but still lower than the upper range of the modified operating use in consecutive dry years (22,500 AFY for a dry year 2 and 31,500 AFY for dry year 3). With the modified (reduced) operating range, it appears that the Saugus Formation could potentially support pumping up to 13,500 AFY in the long-term without affecting the long-term stability of the basin. Therefore, the Saugus Formation has the potential to make up for a portion of the additional pumping when SWP deliveries are reduced with climate change, but a combination of other sources should be considered to make up the difference and meet the water demand in the Region.

5.1.2.3.3 Water Quality

Improving water quality is a Plan objective that may be impacted by climate change. Studies of potential climate change impacts on water quality exist, but few trends in relationships between hydroclimate (hydrology and weather variables) have been identified. Key climate vulnerabilities potentially important to the Region include increasing temperature and changes in precipitation patterns. Increased wildfire risk is another potential factor that could affect water quality in the Region. Outside the Region, sea level rise in the Sacramento-San Joaquin Delta is expected to impact water quality of imported SWP water.

Surface waters in the Region are expected to be more directly vulnerable to water quality impacts of climate change, while water quality impacts to groundwater sources would be indirect. Key surface water sources include imported SWP water stored in Castaic Lake and flowing water in the Upper Santa Clara River and its tributaries such as Bouquet Creek.

SWP Imported Water

SWP water is vulnerable to potential effects of climate change at the source in the Delta and in storage in Castaic Lake. The effect in the Delta would be due to sea level rise which increases the intrusion of salinity into the exported SWP water. This will increase chloride and bromide (a disinfection byproduct precursor that is also a component of sea water) concentrations in the SWP imported water. In addition, decreased freshwater flows into the Delta could increase organic matter, which contribute to disinfection byproduct formation, in the SWP water. Water stored in Castaic Lake will also be vulnerable to climate change. A prior study of potential climate change impacts on the water quality of Lake Cachuma near Santa Barbara found that water quality parameters related to rainfall-runoff (turbidity and apparent color) during the wet season, winter, and/or spring could be evaluated by looking at total precipitation while water parameters related to taste and odor (increasing water temperature, dissolved oxygen (DO), threshold odor number (TON), pH, and percent DO saturation) during the dry season, spring, and summer could be evaluated by looking at air temperature parameters and/or evaporation (Drago and Brekke 2005).

Extreme storm events, although rare, may be more intense under climate change and may present treatment challenges for source water with increased turbidity. In the past, high turbidity events in Castaic Lake during 1998 and 2005 required modification of the drinking water treatment processes (primarily additional chemical usage) for extended periods. In 2005, an intense winter rainfall event after a wildfire in the watershed the prior year resulted in extremely high turbidities (peak over 80 NTU) in the lake. Although the treatment plants were able to treat the water, the additional sludge production overwhelmed the solids handling equipment and the plants had to be shut down for a brief time. This combination of more intense rainfall events and increased wildfire risk is more likely under projected climate change conditions.

The warmer temperatures could lead to increased taste and odor events triggered by algal blooms, which are characterized by water quality changes such as increases in DO and DO saturation, pH, and TON, during the spring and summer. CLWA's two surface water treatment plants are designed to address taste and odor events through preozonation, although use of higher ozone dosages to control taste and odor events must also consider the need to control bromate formation (from the oxidation of bromide), which could increase due to greater bromide levels in the imported SWP water affected by climate change.

Regional Surface Waters

The primary Regional surface water is the Upper Santa Clara River and its tributaries, including Bouquet Creek. The Upper Santa Clara River is largely defined as ephemeral with highly variable flows, depending on precipitation levels. Water quality impacts to rivers due to climate change include increased temperature, more frequent heavy rainfall events, and longer periods of low natural stream flow due to decreased annual precipitation. A prior study of 43 rivers found that surface water temperatures increased 0.4 to 0.6°F for each 1°F rise in air temperature (Morrill, Bales, and Conklin 2005). Increased water temperature generally reduces dissolved oxygen and can promote algal blooms if nutrients are available in the source. The storm events can transport sediments and other pollutants along the river, while long periods of low flow can increase concentrations of pollutants from wastewater plant and non-point discharges. Increased wildfires may contribute to the turbidity events.

Key water quality considerations are nitrogen concentrations and chlorides in stretches of the river, both of which may be impacted by climate change. Nitrogen concentrations can be influenced by low stream flows and increased temperatures that may promote eutrophication.

Regional Groundwater

Any water quality impacts to groundwater sources due to climate change are expected to be indirect, primarily due to decreased recharge from lower precipitation and increased use of groundwater to make up loss of SWP imported water. Decreased recharge and increased groundwater pumping may allow concentrations of groundwater contaminants such as perchlorate and volatile organic compounds to increase, which may trigger additional treatment requirements and increase groundwater treatment costs.

5.1.2.3.4 Flooding

Flooding is the most costly and destructive natural disaster; thus, a change in flood risk is a potential significant effect of climate change that could have great implications for the Region.

Figure 5.1-10 present the 100-year and 500-year floodplains within the Upper Santa Clara River Watershed, showing areas that would be most vulnerable to flooding, based on data available from FEMA. It should be noted that FEMA does not provide 200-year floodplain maps . In general, the floodplains are primarily located along the Santa Clara River and its major tributaries and correspond to surface water bodies such as Castaic Lake and Bouquet Reservoir. In general, land use within the floodplains typically includes residential, commercial, industrial, and agricultural areas.

While the Cal-Adapt climate change model projects precipitation decrease of 10 percent by 2050 on the long-term basis, research data suggest that there is a risk of increased flooding in California (Kiparsky and Gleick 2005). Flooding depends not only on average precipitation but on the timing and intensity of precipitation. For the purpose of the assessment of future flooding from climate change, Cal-Adapt model results for runoff were used to make a general assessment for the likelihood of future flooding events in the Region. Cal-Adapt provides projections of monthly and annual runoff for the Santa Clarita region for the period 1950 to 2099, based on the four different models. Monthly runoff from the four climate change models were averaged to provide an estimate for the Region. Historical monthly averages were compared with future projections to provide an indication of future changes in runoff due to climate change.

Figure 5.1-11 shows results of the annual runoff for the historical period (1950 to 2000 base period) and projections (2000 through 2099), based on the average of results from the four different climate models under A2 emissions scenario. Overall, future runoff projections are slightly higher than historical trends. On the long-term average, monthly runoff is slightly higher for the future projections (0.26 inches/month from 2000 through 2050) than the historical period (0.24 inches/month for 1950-2000). Similarly, the maximum monthly runoff is also higher for future projections (7.32 inches//month) than historical data (4.62 inches/month). Future projections generally suggest the possibility of increased amount and intensity of runoff than historically observed, in addition to more variable runoff with climate change.

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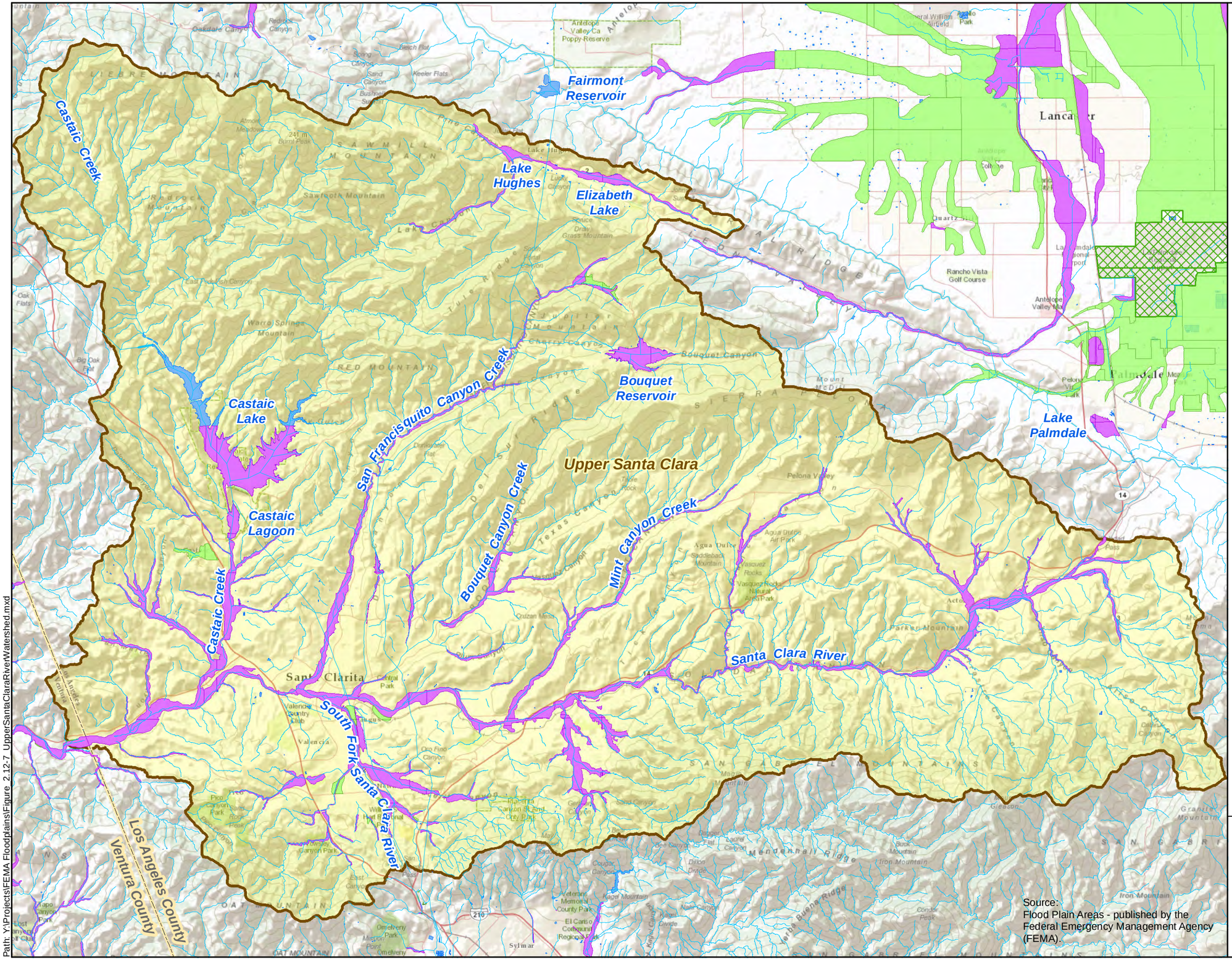


Source:
Flood Plain Areas - published by the Federal Emergency Management Agency (FEMA).

Path: Y:\Projects\FEMA Floodplains\Figure_2.12-7_UpperSantaClaraRiverWatershed.mxd

Kennedy/Jenks Consultants

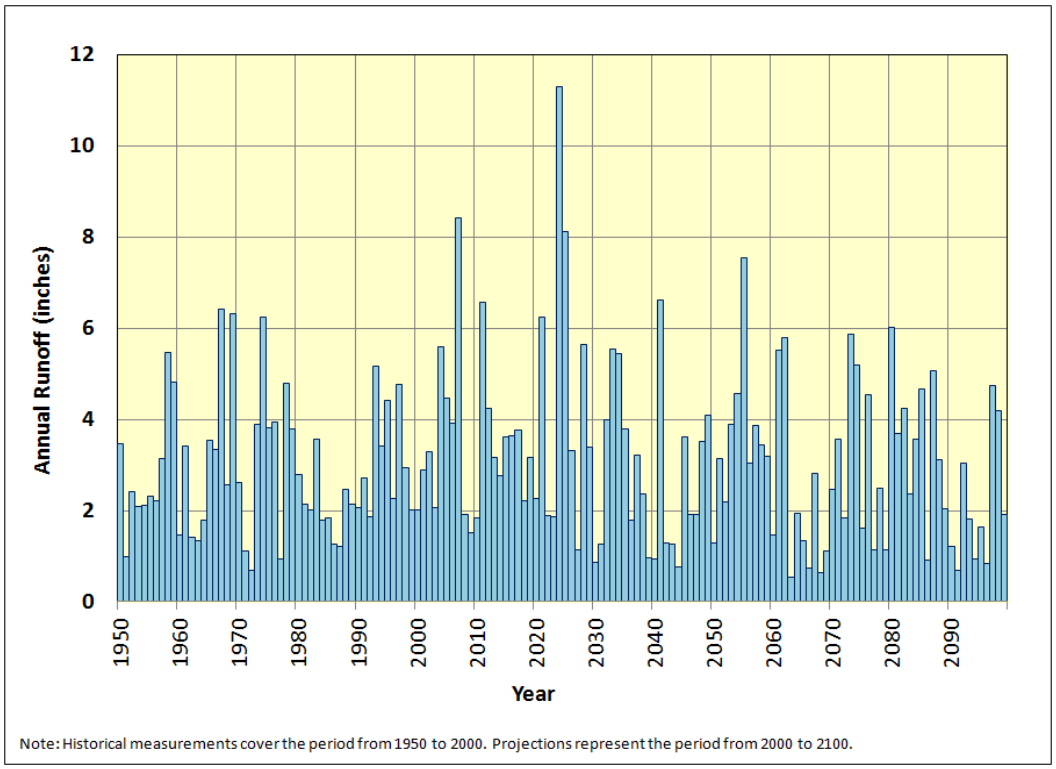
CLWA IRWMP Grant Application
Los Angeles County, California

Upper Santa Clara River Sub-Watershed Flood Plain Areas

1189057*00
February 2012

Figure 5.1-10

FIGURE 5.1-11
HISTORICAL AND PROJECTED RUNOFF FOR SANTA CLARITA REGION



Source: Source data are based on Cal-Adapt website for the Santa Clarita area.

These projections are intended to provide general trends for future projections and are considered reasonable when compared to historical trends over a long-period of time. However, these are runoff estimates over large areas and considered relatively straightforward evaluations of changes in large scale precipitation patterns. The climate change model results may not capture the timing and intensity of runoff and the model resolution is insufficient to account for small-scale watershed characteristics that play a significant role in flooding events.

Historical runoff data used in the climate change models were analyzed for the periods of historical flooding events in the Region to demonstrate if Cal-Adapt model results are able to capture the site specific trends that occurred historically. As presented earlier (Section 4.1), major floods in the Region occurred during the winters of 1969 (January and February) and 1983 (in February and March). Historical runoff data from Cal-Adapt model are 0.68 inches/ month for January 1969 and 3.7 inches/month for February 1969, which are considerably higher than the long-term monthly average runoff of 0.24 inches/month. For the 1983 flood event, runoff of 1.8 inches/month for February and 0.76 inches/month for March predicted by Cal-Adapt are also much greater than the historical long-term averages. While the comparison was done for only limited flood occurrences, Cal-Adapt seems to generally respond to site conditions with anticipated runoff. Therefore, results from Cal-Adapt could be used as a general guidance for potential occurrence of future floods in the Region.

In some ways, risk of flood from climate change could be more problematic than for water supply. Water supply issues usually arise over a period of months to years, allowing time to respond to changes. In contrast, while large floods are relatively rare, they are swift and devastating if preparations are insufficient. There is no window to prepare for a flood once the flood waters arrive; floods must be addressed through advanced preparation and quick response in the course of an event. Various major flood events have occurred within the Region in the past, as described in Section 4.3, resulting in damages to bridges, roads, homes, waterlines and other infrastructure. Increased floods with climate change may increase the risk of, and potentially exacerbate, these types of flood-related damages. Greater flood risk should be considered when evaluating new development in the 500-year floodplain.

5.1.2.3.5 Ecological Health and Habitat

Ecosystem health and habitat protection are important to the Region. Increased temperature, changes in precipitation patterns, and increased wildfire risk projected for potential climate change scenarios are potential stressors to ecosystems and habitat in the Region.

Principal features in the Region include the Upper Santa Clara River and several canyons that provide complex topography that support diverse ecosystems and habitat (see Section 2.4 for a detailed description of ecological processes and environmental resources in the Region). These include at least 26 special status plant species, 45 special status wildlife species, several significant habitats (native grasslands, forests, fresh water marshes, vernal ponds, wetland habitat, and wildlife corridors), and five significant ecological areas (Cruzan Mesa Vernal Ponds SEA, Santa Clara River SEA, Santa Felicia SEA, Santa Susanna Mountains/Simi Hills SEA, and Valley Oak Savannah SEA). All of these species and habitats have acclimated to the historical climate and water resources and may or may not to adapt to potential changes due to future climate change.

Increased air temperature will increase water temperature in rivers, tributary streams, ponds, and lakes, with resulting decreases in DO. This combination may stress fish and biota that depend on higher DO levels and colder water which may impact their sustainability. The increased annual average air temperatures may also alter plant habitat by changing the length and timing of the growing season and/or allowing non-native species to outcompete native species and disrupt ecosystems that depend on the present habitats. Thus, measures to control non-native species may be needed to maintain habitats. Water available for plant habitat could be impacted by potential decreases in annual precipitation and increases in ET due to projected increases in temperature. Decreased precipitation could also directly affect formation of vernal ponds.

Climate change may also affect water-dependent recreation primarily through water quality impacts on recreational lakes in the Region, as described in Section 5.1.2.3.3 Water Quality. Effects may include potential health concerns and aesthetic issues limiting use of these resources.

Fire is an important process in maintaining a diverse ecosystem in the Region. Projected increases in wildfire risk due to climate change are not well understood, but it appears that summer dryness could begin earlier and fires could burn longer and affect more land area. It is unclear at this time whether projected increased fire risk will be beneficial or harmful to long

term ecosystem health and habitat maintenance, but will likely negatively impact water quality as discussed in Section 5.1.2.3.3.

5.1.2.4 Vulnerability Prioritization

This section discusses a list of prioritized vulnerabilities based on the vulnerability assessment presented in the earlier subsections and stakeholder input on the importance of these sectors to the Region. The watershed vulnerability assessment (Section 2.12.2.3) identifies the water resources characteristics for each sector most vulnerable to potential climate change projections. The Region can use the assessment results to prioritize the sectors with vulnerabilities and develop adaptive strategies to respond to potential climate change impacts. Based on the inputs from the stakeholders in the Region, the sector vulnerability prioritization is defined as follows (1 being the sector most prioritized and 4 being the sector least prioritized with respect to climate change vulnerability):

5. Water Supply; Water Quality
6. Water Demand; Flooding
7. Ecosystem and Habitat
8. Sea Level Rise; Hydropower

Table 5.1-4 summarizes the climate change vulnerability based on the results of the vulnerability assessment.

With respect to climate change effects, the vulnerability prioritization is intended to identify if existing sectors can handle the impacts that would occur under future climate change, and to evaluate alternative water management options and projects. This also assists IRWMP's decision making process as part of proposed measures for adapting to climate change (see Section 5.1.3).

The vulnerability assessment and prioritization was conducted based on data currently available and inputs from the stakeholders involved in the preparation of this study for the Region. This assessment can be improved in the future with further data gathering and analyzing of the prioritized vulnerabilities.

5.1.3 Adaptation to Climate Change

Adaptation to climate change involves adjustments in natural and human systems that occur in response to projected impacts of climate change. The goal of adaptation is to minimize risks associated with anticipated impacts and take advantage of beneficial opportunities that may arise from climate change. Adaptation strategies are developed in conjunction with GHG mitigation strategies, which may overlap. For example, promoting water and energy efficiency are both GHG mitigation and climate change adaptation strategies. Adaptation strategies discussed in this section provide the Region with guidance related to projects that will enhance the Region's preparedness to plan and react to these potential impacts.

TABLE 5.1-4
CLIMATE CHANGE VULNERABILITY ASSESSMENT

Watershed Characteristics	General Overview of Vulnerabilities
Water Supply	**Potential Climate Change Vulnerability** – Climate change projections suggest continued highly variable annual precipitation with a slightly drier climate by mid-century. The overall impact on SWP imported water and groundwater supplies would be significant and can affect the long-term planning. **Sector Response in Context of Regional Planning** **SWP Imported Water** - SWP supply to the Region is projected to be impacted by climate change on a long-term basis, based on DWR's latest analysis of SWP delivery reliability with climate change effects. Based on the future conditions with 2050 climate change, the long-term average SWP system-wide deliveries are projected to be reduced by 5%, from 62% of Table A amount without climate change to 57% of Table A amount with climate change. Assuming the Region's SWP supply would be proportional to SWP's system-wide supply reliability, this represents a reduction of 4,900 AFY, of CLWA's SWP Table A amount. While this appears to be a small impact and comprises a small portion of future water supply in the Region, it should be viewed in light of the cumulative effects of climate change on other water resources, such as the local groundwater availability. **Groundwater** – Natural recharge to the local groundwater aquifers is likely to be affected by projected changes in precipitation pattern and amount (a long-term reduction of about 10% by 2050), increased evaporative losses, and warmer and shorter winter seasons. The overall impact on groundwater resources could be significant. Reduced natural recharge would affect the amount of groundwater available in the long-term. Reductions in the SWP imported water imposed by climate change would lead to more reliance on local groundwater. However, with potential reductions in natural recharge, groundwater may only make up a portion of reduced SWP supply. Future planned projects need to meet the water demand to accommodate the effects of climate change on water demand and water supplies. **IRWMP Objective Impacted** – Increase Water Supply **Performance Metric Development** – Performance metrics should be based on SWP delivery and groundwater operation range limitations and quantities of new supply development (reclaimed water, water baking, etc.).

Watershed Characteristics	General Overview of Vulnerabilities
Water Quality	**Potential Climate Change Vulnerability** – Climate change projections suggest continued highly variable annual precipitation with slightly drier climate by mid-century. **Sector Response in Context of Regional Planning** **SWP Imported Water** – SWP imported water stored in Castaic Lake is potentially vulnerable to water quality changes from climate change, mainly because of the vulnerability of SWP source water in the Delta, resulting from sea level rise and increased salinity of SWP water. Extreme storm events could also result in increased turbidity. Potential changes in the water quality of Castaic Lake could present challenges at the surface water treatment plants in the Region and may require modifications to treatment processes. **Regional Surface Water** – The Upper Santa Clara River and its tributaries are vulnerable to potential water quality impacts due to climate change as a result of increased temperature, more frequent heavy rainfall events, increased wildfire risk, and longer periods of low natural stream flow from decreased annual precipitation. Key water quality constituents of concern are nitrogen and chloride, in addition to reduced DO and increased algae growth, turbidity and sedimentation. **Regional Groundwater** – Groundwater aquifers in the Region are subject to indirect water quality impacts, primarily due to decreased natural recharge under future conditions of decreased precipitation and increased use of groundwater to make up for reduced SWP supply. Increased groundwater pumping may present challenges with the management of perchlorate in groundwater, leading to additional treatment or treatment cost. **IRWMP Objective Impacted** – Improve Water Quality **Performance Metric Development** – Performance metrics should be based on source water quality exceedances (e.g., consecutive days with turbidity exceeding a trigger value, frequency of algal blooms) and frequency of meeting water quality standards (e.g., chloride, nitrogen).

Watershed Characteristics	General Overview of Vulnerabilities
Water Demand	**Potential Climate Change Vulnerability** – Projected increase in average annual air temperature by mid-century and increased evaporative losses are expected to increase both urban and agricultural water demand. **Sector Response in Context of Regional Planning** **Urban Water Demand** – Water demand in the Region is affected by weather and shows large seasonal variations, with the largest water use in the summer months and the least in cooler months. Water demand is likely to increase in the Region as a result of projected increase in annual average air temperature due to climate change (about 4°F by 2050). However, water demand increase resulting from this projected temperature increase appears minor relative to other major factors, such as population growth and land use conversion from agriculture to urban. Urban outdoor landscape is expected to be impacted most from climate change, with temperature rise, increased evaporation losses with warmer temperature, and longer growing season. **Agricultural Water Demand –** Climate change is expected to increase agricultural demand, as a result of projected increased annual average temperature, increased evaporation losses with warmer temperature, and longer growing season. The Region's agricultural demand is projected to decrease over time as a result of land use conversion from agriculture to urban. Thus, any climate change effects on agricultural demand are likely to be outweighed by decrease in agricultural activities. **IRWMP Objective Impacted** – Reduce Water Demand **Performance Metric Development** – To be determined. It is unclear that sufficient information is available to develop a performance metric unless a correlation between air temperature and water demand for the Region can be developed (data gap).
Flooding	**Potential Climate Change Vulnerability** – Climate change projections are not sensitive enough to assess short term extreme events such as flooding, but the general expectation is that more intense storms would occur. **Sector Response in Context of Regional Planning** The Region could be potentially subject to more frequent and intense storm events resulting in increased annual runoff and short-term peak flows with climate change. This could present larger areas susceptible to flooding and increase the risk of direct flood damage in the Region. **IRWMP Objective Impacted** – Promote Resource Stewardship. **Performance Metric Development** – Consider excluding placement of critical infrastructure within the 500 year (or 200 year, if defined) floodplain.

Watershed Characteristics	General Overview of Vulnerabilities
Ecosystem and Habitat	**Potential Climate Change Vulnerability** – Climate change projections of increasing annual average temperature suggest potential environmental stressors. **Sector Response in Context of Regional Planning** The Upper Santa Clara River and several canyons in the Region support diverse ecosystems and habitat that may need to adapt to potential changes due to future climate change. Increased air temperature, increased ET, decreased precipitation and resulting water temperature increases, in addition to decreased DO may impact the sustainable habitat of fish and biota. Increased air temperature, increased ET, and decreased precipitation may also change water available to plant habitat, resulting in habitat alteration. Increased risk of wildfire is projected, but the impact is unclear. **IRWMP Objective Impacted** – Promote Resource Stewardship **Performance Metric Development** – Consider use of metrics such as acres of habitat maintained.
Sea Level Rise	**Potential Climate Change Vulnerability** – Studies project the sea level off most of the California Coast to rise by over half a meter by mid-century and by about one meter by the end of the century (NRC 2012). **Sector Response in Context of Regional Planning** The Region is not directly subject to sea level rise. However, potential effects of sea level rise would affect SWP water supply conditions, mainly because of the potential for sea water intrusion to increase Delta salinities (see water quality above). **IRWMP Objectives Impacted** – Improve Water Quality **Performance Metric Development** – No performance metric is recommended because the climate change response will be undertaken by DWR for SWP deliveries.
Hydropower	**Potential Climate Change Vulnerability** – Climate change projections suggest continued highly variable annual precipitation with slightly drier climate by mid-century. **Sector Response in Context of Regional Planning** Currently, the Region produces only minimal hydropower; thus, climate change effects on hydropower are not likely to be considerable. However, DWR operates hydropower projects as part of the SWP and any decreases in hydropower production would result in higher energy costs to the Region. **IRWMP Objective Potentially Impacted** – Increase Water Supply **Performance Metric Development** – Performance metrics should be based on energy charges from DWR.

5.1.3.1 Statewide Adaptation Strategies for the Water Sector

The California Natural Resources Agency (CNRA), working through the Climate Action Team, is responsible for leading the effort to develop adaptation strategies for California. Strategies were published as a report to the Governor entitled *2009 California Climate Adaptation Strategy* (CNRA 2009) and will be updated approximately every two years. Additional guidance for regional and local strategies is provided in the 2012 California Adaptation Planning Guide (CNRA 2012), which helps communities address climate change consequences in a proactive manner. Specific adaptive water management strategies for the water sector were developed by DWR. The statewide adaptation strategies target fundamental improvements in water management systems and enhancements in ecosystem sustainability.

DWR (2008) developed the following 10 statewide adaptation strategies for the Water Management Sector:

- Strategy 1: Provide sustainable funding for statewide and integrated regional water management
- Strategy 2: Fully develop the potential of integrated regional water management
- Strategy 3: Aggressively increase water use efficiency
- Strategy 4: Practice and promote integrated flood management
- Strategy 5: Enhance and sustain ecosystems
- Strategy 6: Expand water storage and conjunctive management of surface and groundwater resources
- Strategy 7: Fix Delta water supply, quality, and ecosystem conditions
- Strategy 8: Preserve, upgrade and increase monitoring, data analysis and management
- Strategy 9: Plan for, and adapt to, sea-level rise
- Strategy 10: Identify and fund focused climate change impacts and adaptation research and analysis

These statewide strategies provide guidance specifically aimed at addressing the impacts of climate change. Some of DWR's strategies can be directly applied to Regional management strategies, while others are supportive of Regional efforts that are discussed in the following section.

5.1.3.2 Regional Adaptation Strategies

In this analysis, potential adaptation strategies have been grouped by watershed characteristics (or sector) and priorities developed in the climate change vulnerability analysis. This approach

will allow the Regional Management Group and other stakeholders to incorporate climate change adaptation and GHG mitigation measures in projects developed and evaluated as part of the IRWMP process. While the focus of this discussion is adaptation, some of the adaptation strategies will overlap with and enhance GHG mitigation measures.

5.1.3.2.1 Vulnerability Priority 1 (Highest) Sectors: Water Supply and Water Quality

Water supply and water quality were identified as the highest priority sectors that could potentially be impacted by climate change. The potential impacts due to climate change and the suggested regional adaptation strategies are summarized below.

5.1.3.2.2 Water Supply

Climate change projections suggest continued highly variable annual precipitation with slightly drier climate by mid-century. The overall impact will include reductions in SWP imported water and greater reliance on groundwater supplies with the potential to affect long-term planning.

Suggested Regional adaptation strategies to address potential reductions in water supply include the following:

- Expand water storage and conjunctive management of surface and groundwater resources.
- Reduce reliance on imported SWP water, which depends on the Sierra snowpack for water supply.
- Enhance use of recycled water for appropriate uses as a drought-proof water supply.
- Enhance practices of water exchanges and water banking outside the Region to supplement water supply.
- Encourage local agencies to develop and implement AB 3030 Groundwater Management Plans as a fundamental component of the IRWM plan.
- Develop plans for local agencies in the Region to monitor the elevation of their groundwater basins.
- Encourage cities and the county agencies in the Region to adopt local ordinances that protect the natural functioning of groundwater recharge areas.

5.1.3.2.3 Water Quality

Climate change projections suggest increased temperature and continued highly variable annual precipitation with slightly drier climate by mid-century that could degrade water quality.

Suggested Regional adaptation strategies to address potential water quality impacts include the following:

- Support DWR strategies that protect or enhance water quality delivered by the SWP.

- Consider coordination with DWR to improve water quality in Castaic Lake through lake aeration practices.
- Consider water quality improvements associated with water transfers and water banking on Regional water supply.
- Consider riparian forest projects that provide cooling for habitat (see Ecosystem Health and Habitat).
- Encourage projects that improve water quality of contaminated groundwater sources.
- Increase implementation of LID techniques to improve stormwater management
- Comply with NPDES permits to ensure water quality protection

5.1.3.2.4 Vulnerability Priority 2 (Second Highest) Sectors: Water Demand and Flooding

Water demand and flooding were identified as the second highest priority sectors that could potentially be impacted by climate change. The potential impacts due to climate change and the suggested regional adaptation strategies are summarized below.

5.1.3.2.5 Water Demand

Climate change projections suggest increases in average annual air temperature by mid-century and increased evaporative losses are expected to increase both urban and agricultural water demand.

Suggested Regional adaptation strategies to address potential increases in water demand include the following:

- Aggressively increase water use efficiency
- Encourage agricultural users to adopt efficient water management practices
- Encourage landscape water users to adopt efficient water management practices, including xeriscaping

5.1.3.2.6 Flooding

Climate change projections are not sensitive enough to assess short term extreme events such as flooding, but the general expectation is that more intense storms will occur.

Suggested Regional adaptation strategies to address potential increases in flood risk include:

- Improve emergency preparedness and response capacity in anticipation of potential increases in extreme events.
- Practice and promote integrated flood management among water and flood management agencies.

- Flood management should be integrated with watershed management on open space, agricultural, wildlife areas, and other low-density lands

- Avoid significant new development in areas that cannot be adequately protected from flooding.

- Encourage land use policies including low impact development (LID) that maintain or restore historical hydrological characteristics.

- Control invasive species, such as arundo donax, within floodplains that could contribute to floods and related damages.

5.1.3.2.7 Vulnerability Level 3 (Third Highest) Sector: Ecosystem and Habitat

Ecosystem Health and Habitat was identified as the third highest priority sector category that could potentially be impacted by climate change. The potential impacts due to climate change and the suggested regional adaptation strategies are summarized below.

Climate change projections of increasing annual average temperature suggest potential environmental stressors that may affect the sustainability of existing ecosystems and habitat. Suggested Regional adaptation strategies to address potential Ecosystem Health and Habitat impacts include the following:

- Promote water resources management strategies that restore and enhance ecosystem services.

- Provide or enhance connected “migration corridors” for animals and plants to promote increased biodiversity and allow the plants and animals to move to more suitable habitats to avoid serious impacts and support increased biodiversity.

- Consider projects that provide seasonal aquatic habitat in streams and support corridors of native riparian forests that create shaded riverine and terrestrial habitat.

5.1.3.2.8 Vulnerability Priority 4 (Lowest) Sectors: Sea Level Rise and Hydropower

Sea level rise and hydropower were identified as the lowest priority sectors for the Region.

5.1.3.2.9 Sea Level Rise

Climate change projections suggest sea level rise off most of the California Coast of over half a meter by mid-century and by about one meter by the end of the century (NRC 2012). Suggested Regional adaptation strategies to address potential reductions in water supply include the following:

- Support DWR strategies that minimize the impact of sea level rise on salinity intrusion into the Delta and impact water quality deliveries in the SWP.

- Support DWR strategies for protecting levees in the Delta from the potential effects of projected sea level rise.

5.1.3.2.10 Hydropower

Climate change projections suggest continued highly variable annual precipitation with slightly drier climate by mid-century, affecting hydropower generation. Strategies to address potential reductions in hydropower generated by the SWP include the following:

- Support DWR strategies to maximize hydropower in SWP facilities that reduce energy charges to the Region.

5.1.4 Next Steps for Future IRWMP Updates

5.1.4.1 Data Improvement

The climate change assessment conducted in this Plan update is qualitative in some areas due to limited data, high level of uncertainty, and, in some cases, because impacts to a given sector are not expected to be severe. The intent of future data gathering is to address gaps in the current vulnerability assessment, to improve the understanding of climate change impacts and vulnerabilities, and to enable a more quantitative analyses. Recommended future data gathering efforts will include data that facilitate more quantitative analysis of the vulnerability, as described in the following sections. Data gathering efforts will be considered in the context of the current and proposed projects and funding available.

This section describes potential areas of future data gathering efforts for the priority sectors identified earlier. The recommendations focus on the top four priority sectors; namely, water supply, water quality, water demand, and flooding. The lower priority sectors include ecosystem health and habitat, sea level rise, and hydropower, which require a lesser degree of data collection. Climate change vulnerability of ecosystem health and habitat is difficult to quantify, and reliance on generalized studies will likely satisfy the Region's needs. As previously noted, sea level rise and hydropower vulnerabilities are not directly applicable to, or not applicable to a considerable extent within, the Region. Rather, they are indirectly important to the imported SWP water supply that is the responsibility of DWR. Thus, the Region should prioritize data gathering efforts for the sectors most vulnerable to climate change impacts.

5.1.4.1.1 Climate Change Models and Scenarios

Cal-Adapt modeling results for the Santa Clarita Region were used for projections of temperature, ET, precipitation, and runoff for the Region. The California Energy Commission maintains the Cal-Adapt site and will update the modeling tools as new climate change modeling results, based on more refined data, become available from the ICCC. Thus, to the extent feasible, the available climate change tools and projections for the Region will be reviewed periodically and the vulnerability assessment updated in future versions of the Plan.

5.1.4.1.2 Updates on Climate Change Research

Research on the climate change impacts on water resources is ongoing and continues to evolve with further analysis and more refined methodologies. During the preparation of this Plan update, key literature resources on climate change have been reviewed. New scientific findings will be reviewed periodically and incorporated into the climate change vulnerability assessment,

especially the findings pertinent to the sectors most vulnerable to the climate change in the Region.

5.1.4.1.3 Vulnerability Assessment Update

As noted above, a goal of further data collection is to enable a more quantitative analysis of the high priority watershed sectors that are more vulnerable to climate change in future Plan updates. Water supply and water quality were identified as the highest priority sectors and water demand and flooding were identified as the second highest priority sectors that could potentially be impacted by climate change.

Water Supply

In this Plan update, the assessment of the vulnerability of water supply to potential climate change impacts is presented for the SWP imported water delivery to CLWA and groundwater pumping. As discussed earlier, climate change impacts on the SWP imported water supply were based on the future projections of SWP deliveries from DWR's modeling analysis reported in the *2011 Reliability Report* (DWR 2012). The assessment of groundwater supply vulnerability is based on existing and planned pumping and the current capacity of the water banking programs to respond to reductions in imported SWP water deliveries. Future assessment of water supply climate change vulnerability will incorporate the most up-to-date data available from DWR and the most current groundwater supply availability.

Suggestions for future data gathering efforts to quantify the climate change effects on water supply include the following:

- Update DWR SWP Delivery Reliability Report projections - DWR provides updated analysis and report every two years.

- Update available groundwater supply projections – Groundwater production in a given year varies depending on hydrologic conditions. Changes in local hydrology and natural recharge are anticipated to have a direct impact on available groundwater storage and may affect current safe operating ranges. Updates on the groundwater safe operating ranges will be needed when further assessments of water supply vulnerability to climate change are performed for future Plan updates.

- Evaluate the effects of reduction in precipitation from climate change on the groundwater operational ranges - A simplifying assumption was used for a 10 percent reduction in the operational range in response to the 10 percent reduction in precipitation. Further analysis is suggested to refine this assumption and quantify the potential reduction in groundwater supply due to reduction in precipitation from climate change.

Water Quality

The assessment of the vulnerability of water quality to potential climate change impacts is qualitative due to the limited Regional monthly and seasonal weather information related to air temperature and precipitation over long time periods and limited access to long-term water quality data. The vulnerability assessment instead relied on Cal-Adapt model outputs for annual air temperature increases and precipitation changes and prior studies of how water quality in the

Region may be affected by these climate change impacts. Key water quality changes identified for the Region include potential increases in taste and odor events due to increased likelihood of algal blooms and short-term high turbidity events due to storms, especially following wildfires. Collection of historical water quality data within the Region (e.g., Castaic Lake and other locations) would greatly improve the understanding of Regional water quality and how it may be impacted by climate change. For imported SWP water, the vulnerability analysis relied on DWR projections of water quality impacts in the Delta due to sea level rise and increases in salinity. Future analyses will incorporate updated DWR studies on the potential impacts of climate change on SWP quality.

Suggestions for future data gathering efforts to quantify the climate change effects on water quality include:

- Monitor future and collect historical water quality data within the Region during storm events.
- Develop a long-term water quality record for Castaic Lake that would assist in improving the understanding of Regional water quality.
- Collect long-term weather records associated with air temperature, precipitation, and ET to assess potential correlations with seasonal water quality.
- Develop, to the extent possible, a long term surface/ground/aerial deposition model that can be continuously updated and refined with newly available data. Model should be ready accessible to stakeholders and in an user-friendly format to allow better understanding of trends over time.

Water Demand

The assessment of the effect of climate change on water demand is based on the Cal-Adapt projections for ET and temperature. Cal-Adapt projections suggest water demand in the Region is likely to increase as a result of higher temperature with the greatest temperature increase anticipated during dry months compared to wet months. The ten percent increase of water demand per capita has been assumed to account for dry years in the *2010 Santa Clarita Valley UWMP*, but historical records of annual water demand data currently available are not specific enough to quantify the effects from increasing temperature. As discussed earlier in the vulnerability assessment (Section 5.1.2), the most important effect of changing weather conditions is likely to be on agricultural demand, but the overall effects on agricultural water demand is uncertain.

Suggestions for future data gathering efforts to quantify the climate change effects on municipal and agricultural water demand include the following:

- Collect and analyze historical monthly records of water demand data for the Region to quantify the weather effects on water use and seasonal variations in response to changes in historical temperature.

- Collect and analyze historical monthly records of water demand data for each purveyor in the Region to demonstrate purveyor-specific patterns in response to changes in climate.

- Based on the water demand and temperature data, develop a regression analysis correlating water demand to temperature on a monthly or seasonal basis for the Region and each purveyor. The historical response can be used to infer future response with the projected changes in temperature with climate change.

- Characterize the variations in indoor and outdoor water use, both for the Region and each purveyor. Future data gathering should focus on the seasonal and monthly patterns both in indoor and outdoor usage to evaluate the effects of weather conditions on each use category.

- Collect and analyze historical agricultural water demand to quantity the weather effects on water use and seasonal variations in response to changes in historical temperature.

- Identify the major industries in the Region that require cooling and/or process water. As water temperature increases, cooling water needs may also increase.

Flooding

A quantitative assessment of the potential impacts of climate change on flooding cannot be performed as climate projections are not sensitive enough to project short-term extreme events such as flooding. Rather, the 100-year and 500-year floodplains were used to define flooding risk zones that should be considered in location of water infrastructure. The Cal-Adapt model runoff outputs appear to represent the historical runoff record available. In examining the historical runoff record, there are data gaps as recording stations have started and stopped operation.

Suggestions for future data gathering efforts to address the potential climate change effects on flooding include the following:

- Perform an inventory of runoff monitoring stations in the Region to see if a more robust runoff record can be developed. Those data may allow an analysis of historical storm events correlated with precipitation events as well as annual precipitation to provide a better understanding of conditions that may lead to more extreme flooding conditions.

As recommended by DWR's Climate Change Handbook for Regional Water Planning, future work should focus on gathering the 200-year floodplain maps for the Region after DWR develops them under the authorization of Senate Bill 5 (SB 5) enacted in 2007. Currently, the 100-year and 500-year floodplain maps are available from FEMA. Additional information on the DWR's Best Available Maps (BAM) program can be found at the following website: http://gis.bam.water.ca.gov/bam/.

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- Coordinate with the Region stakeholders for advanced flood preparation and quick response and document the protocol(s).

- Perform an inventory of critical infrastructure located in floodplains, especially those that were impacted during the historical flood events in 1969 and 1983.

- Update the projections of runoff with climate change as updates from Cal-Adapt become available.

- Work with local flood plain managers and/or equivalent to determine areas of concern as information from FEMA evolves.

5.1.4.2 Future Actions – Create a GHG Baseline

To be accurate in the estimation of each agency's GHG emissions; an agency-specific comprehensive GHG inventory should be developed. The City of Santa Clarita Climate Action Plan recently completed this baseline for their general plan items, which could serve as a reference. A comprehensive inventory would use a well established protocol to calculate all of the GHG emissions created by each agency. It is recommended that each agency eventually conduct a GHG inventory, but in the absence of agency specific GHG inventories, gross GHG emissions can be calculated by developing agency-specific GHG intensity factors. An agency-specific GHG intensity factor calculates the estimated metric tons of CO_2 per acre foot of water delivered or million gallons of wastewater treated by the agency (MT CO_2/AF). Knowing this will enable an estimation of the GHG emission baseline for a particular agency and the Region. It will also allow for the estimation of the GHG emission reductions associated with an individual project or strategy that reduces water demand.

For each of the RWMG water or wastewater entities data will need to be collected for actual annual electricity, natural and fleet fuel used, as well as the amount of imported water from DWR and other suppliers. Using known GHG intensity factors for DWR water supplies, electrical supplies, natural gas and fleet fuel and applying these factors to the amount an agency uses, GHG emissions (MT CO_2/year) can be estimated for each agency. By dividing the total emissions by the total AF of water delivered or the million gallons of wastewater treated, agency-specific GHG intensity factors (MT CO_2/AF) can be developed. The calculation should use data from the same year. While not as precise and accurate as a comprehensive GHG inventory, a GHG intensity factor will create an estimated baseline of GHG emissions for each agency and the Region.

5.1.4.3 Future Actions – Quantify Adaption and Mitigation Strategies at the Project Level

As part of this Plan update, the climate change impacts of specific projects proposed for implementation are being considered (see Section 8). Future Plan updates may have the data available to further quantify climate change adaptation and mitigation strategies and apply them at the project level. For each proposed project it may be desirable to identify GHG emissions and to identify and evaluate GHG mitigation. Proposed projects could be evaluated against the GHG Baseline and evaluated for their ability to reduce agency-specific GHG intensity factors.

5.1.4.4 Future Actions – Develop Performance Metrics

As part of future Plan updates the Region may choose to develop performance metrics specific to water and wastewater projects and climate change. Proposed IRWMP projects would be

evaluated against these metrics and these metrics would provide a measure of Plan performance. Table 5.1-4, shown above, provides a starting point for the development of performance metrics.

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Section 6: Plan Objectives

The purpose of this section is to identify objectives for the IRWMP, or broadly what the Stakeholders and the RWMG have determined they would like the IRWMP to accomplish when implemented. The following pages include an overview of the IRWMP objectives and describe how objectives were developed utilizing the Stakeholder process. To the extent feasible, objectives have been quantified. Quantifying objectives is intended to provide a means by which the future success of IRWMP implementation can be measured.

6.1 Objective Development

Objectives for the Upper Santa Clara River IRWMP Region were developed through regular Stakeholder meetings during the development of the 2008 IRWMP. During the IRWMP Update, objectives were re-evaluated and updated to reflect current issues of importance. As part of the update, the topic and concept of "objectives" was re-introduced to the group, goals and objectives from neighboring IRWMPs were presented and reviewed, and the Stakeholders held brainstorming sessions to revise, update, and enhance the objectives. In developing objectives, Stakeholders determined that it was important that they be measureable in order to gauge successful implementation of the IRWMP. Over three sessions stakeholders developed objectives and applicable measurements.

OBJECTIVES OF UPPER SANTA CLARA RIVER IRWMP

- ***Reduce Potable Water Demand***: Implement technological, legislative and behavioral changes that will reduce user demands for water.
- ***Increase Water Supply:*** Understand future regional demands and obtain necessary water supply sources.
- ***Improve Water Quality***: Supply drinking water with appropriate quality; improve groundwater quality; and attain water quality standards.
- ***Promote Resource Stewardship:*** Preserve and improve ecosystem health, and preserve and enhance water-dependent recreation.
- ***Flooding/Hydromodification:*** Reduce flood damage and/or the negative effects on waterways and watershed health caused by hydromodification and flooding outside the natural erosion and deposition process endemic to the Santa Clara River.
- ***Take Action within the Watershed to Adapt to Climate Change***
- ***Promote Projects and Actions that Reduce Greenhouse Gas Emissions***

The resulting objectives generally apply to the Region as a whole and are meant to focus attention on the primary needs of the Region. During stakeholder meetings, the topic of prioritizing the Regional objectives was discussed. It was concluded that the objectives would not be prioritized in this Plan because all objectives are equally important in the Region. Table 6.1-1 presents the objectives for the Region, the definition of each objective, and proposed means for measuring progress toward achieving each objective as the IRWMP is implemented. The success of the IRWMP will depend on how well the individual Plan objectives are accomplished, which requires ongoing monitoring and evaluation. The discussion related to Plan performance is provided in Section 10.

In developing these objectives, Stakeholders determined that it was important that they not only be measurable, but also that the existing condition of the resources at issue be quantified so that change/progress could be reasonably ascertained at a later date. Stakeholders evaluated a variety of reports and studies to determine existing conditions. These reports also identified and contained valuable insight about how change or progress towards a given objective could be measured. References used to develop measurable objectives included:

- Antelope Valley-East Kern Water Agency (AVEK). *2011. 2010 Urban Water Management Plan.*

- CLWA, Santa Clarita Water Division of CLWA (SCWD), Los Angeles County Waterworks District No. 36 (LACWWD No. 36), Newhall County Water District (NCWD), and Valencia Water Company (VWC). 2012. *The 2011 Santa Clarita Valley Water Report*. June.

- CLWA, SCWD, LACWWD No. 36, NCWD, and VWC. 2012. *The Santa Clarita 2012 Water Quality Report.*

- CLWA, SCWD, LACWWD No. 36, NCWD, and VWC. 2011. *2010 Santa Clarita Valley Urban Water Management Plan.*

- CLWA. 2007. *Recycled Water Master Plan Final Environmental Impact Report.*

- CLWA. *Fiscal Year 2006/2007 Strategic Plan.*

- City of Santa Clarita and County of Los Angeles. 2012. Final Draft Environmental Impact Report. *Santa Clarita Valley Area Plan*. January.

- City of Santa Clarita and County of Los Angeles. 2012*. Santa Clarita Valley Area Plan ("One Valley, One Vision").*

- City of Santa Clarita. 2012. *Climate Action Plan – Draft Report*.

- LACWWD No. 37. 2004. *Acton-Agua Dulce Conceptual Water Master Plan for Water Facilities.*

- Los Angeles RWQCB. *2012. Tentative Order No. R4-2012-XXXX, NPDES Permit No. CAS004001 – Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Los Angeles County Flood Control District, Including the County of Los Angeles, And the Incorporated Cities Therein, Except the City of Long Beach.* June.

- Los Angeles RWQCB. 2008. *Reconsideration of the Upper Santa Clara River Chloride TMDL Implementation Plan & Revise Chloride Water Quality Objectives. Resolution Number R4-2008-012*.

- Los Angeles RWQCB. 2011-2013. Trennial Review. December.

- Penrod, K., C. Cabañero, P. Beier, C. Luke, W. Spencer, and E. Rubin. 2004. *South Coast Missing Linkages Project: A Linkage Design for the San Gabriel-Castaic Connection*. South Coast Wildlands, Idyllwild, CA. www.scwildlands.org

- Stillwater Sciences. 2011. *Assessment of Geomorphic Processes for the Upper Santa Clara River Watershed.* Prepared for VCWPD, LACDPW and US ACE. May.

- Ventura County Resource Conservation District. 2006. *Upper Santa Clara River Watershed Arundo and Tamarisk Removal Program. Long-Term Implementation Plan.*

- Ventura County Watershed Protection District (VCWPD) and LACDPW. 2005. *Santa Clara River Enhancement and Management Plan.*

- US Forest Service. 2003. *Business Plan for the Angeles National Forest*. November. R5-MB-020.

6.2 Regional Objectives

The following paragraphs provide background for the regional objectives developed by the Stakeholders and the various means of measuring whether or not the objectives are being achieved.

6.2.1 Reduce Potable Water Demand

Potable water demand continues to increase as the population continues to grow in the Region, with an anticipated doubling of the population by 2050. Water conservation provides a viable long-term means to reduce potable water demand and enhance supply. It also saves considerable capital and operating costs, particularly energy costs, for both utilities and their rate payers, and can avoid environmental degradation associated with developing new supplies.

Both wholesale (CLWA and AVEK) and retail water agencies are pursuing conservation in the Region. CLWA has programs related to reducing potable water demand. CLWA performs system water audits (to find and correct leaks in its system), conducts public and school education programs within its service area on the need for conservation, and provides financial incentives to its purveyors to advance water conservation. Retail agencies (NCWD, SCWD, VWC, and LACWWD No. 36), in coordination with CLWA have also implemented conservation rates and demand reduction measures, including plumbing retrofit programs, and have undertaken pilot studies on the best ways to implement conservation practices for large landscape areas and commercial, industrial, and institutional customers. In addition, NCWD and VWC have individual programs offered to customers such as free water audits to residential and commercial water users and inviting customers to participate in a pilot program to test the effectiveness of automated irrigation controller systems.

In addition, the retail agencies and CLWA completed the Santa Clarita Valley Water Use *Efficiency Strategic Plan* (SCVWUESP; CLWA, et al. 2008) for their service areas in the Valley, which provides recommendations for a variety of water conservation measures that can be incorporated into the IRWMP through time. Programs outlined in the SCVWUESP promote

TABLE 6.1-1
UPPER SANTA CLARA RIVER IRWMP OBJECTIVES, DEFINITIONS AND MEASUREMENTS

Objective	Measurement
Reduce Potable Water Demand: Implement technological, legislative and behavioral changes that will reduce user demands for water.	Twenty (20) percent overall reduction in projected urban water demand throughout the Region by 2020 through implementation of water conservation measures.
Increase Water Supply*:* Understand future regional demands and obtain necessary water supply sources.	Increase use of recycled water by up to 9,600 AFY by 2030, consistent with health and environmental requirements. Improve water system operational flexibility and efficiency. Increase water supply as necessary to meet anticipated peak demands at buildout in the LACWWD No. 37 service area (7.91 MGD) and peak demands at buildout in the Acton and Agua Dulce areas (up to 12.16 MGD).
Improve Water Quality: Supply drinking water with appropriate quality; improve groundwater quality; and attain water quality standards.	Meet all drinking water standards. Prevent migration of contaminant plumes. Comply with TMDLs.
Promote Resource Stewardship*:* Preserve and improve ecosystem health; improve flood management; and preserve and enhance water-dependent recreation.	In areas of the floodplain where the majority of plant species are invasive: • Reduce invasive plant species to 40 percent or less cover of the understory and canopy in years 1 to 5. • Every five (5) years reduce by half the percentage of invasive species. • In years 20 and beyond, keep invasive species to 5 percent or less. Keep invasive species to 2 percent or less in the upper reaches and tributaries where little to no invasive plants are currently located. Acquire 12 miles along the Santa Clara River for development as a recreational trail/park corridor. Acquire acreage or conservation easements for 10,900 acres of remaining proposed South Coast Missing Linkage. Purchase private property from willing sellers in the 100-year floodplain.
Flooding/Hydromodification: Reduce flood damage and/or the negative effects on waterways and watershed health caused by hydromodification and flooding outside the natural erosion and deposition process endemic to the Santa Clara River.	Meet state permits and policies related to stormwater management. Reduce impervious area within the watershed. Promote low impact development, green streets and other stormwater recharge projects.

Objective	Measurement
Take actions within the watershed to adapt to climate change	Implement strategies that adapt flood management, water supply, water quality, water dependent recreation, water-dependent habitat, and fire risk for climate change, but also have other benefits that would occur in the absence of climate change ("no regrets strategies")
Promote project and actions that reduce greenhouse gas (GHG) emissions	Prioritize development and use of water source with lowest GHG emissions. Identify and implement the use of renewable energy and conservation of energy within water and wastewater systems. With assistance of local energy utility, perform energy audits on all water-related facilities regularly. Reduce, on an agency-by-agency basis, energy use per volume treated or delivered.

more efficient use of water and have been successfully implemented in various combinations by the retail agencies, including the following:

1. High Efficiency Toilet Rebates (Single and Multi-Family)
2. Large Landscape Audits (with incentives)
3. CII Audits and Customized Incentives
4. Landscape Contractor Certification
5. High Efficiency Clothes Washer Rebates
6. New Construction Building Code
7. Valley-Wide Marketing

With the adoption of SBX7-7 water use efficiency targets, the implementation and expansion of conservation programs and efforts has gained increased urgency. The retail agencies and CLWA are intending to update the SCVWUESP with these reduction mandates in mind. The update will analyze current data on water consumption in the Valley, assess the implementation of the 2008 Strategic Plan, and identify additional conservation programs and efforts necessary to meet 2020 urban demand reduction targets of 20 percent.

AVEK has responsibility for the far eastern end of the watershed and according to its 2010 UWMP, is committed to implementing water conservation and has assisted, as a wholesale water agency, with public information and school education programs for conservation purposes. In addition, AVEK audits system losses on a monthly basis and makes regular repairs to minimize water loss. Its service area, however, covers a relatively small portion of the Region (the far eastern edge).

Given past demand reduction success and taking into consideration the state-wide urban water use efficiency targets of SBX7-7, the Stakeholders have identified the following measurement:

- *Twenty (20) percent overall reduction in projected potable water demand throughout the Region by 2020 through implementation of water conservation measures and/or recycled water*

6.2.2 Increase Water Supply

At the same time that water demand is growing in the Region, water supplies to the Region, specifically imported water supplies, are becoming less reliable. A reliable water supply is necessary to protect the economic vigor of the Region and meet anticipated needs of the Region's population. As discussed in Section 3 and the *2010 Santa Clarita Valley UWMP*, the CLWA service area portion of the Region's anticipated demand in a normal year is projected to be about 122,000 AF in 2050 (with conservation), but this could increase in a multi-year dry situation to an estimated 136,000 AF in 2050. Concurrently in a multi-year drought scenario, supplies will decline. For this reason the water agencies in the CLWA service area have planned for other sources to increase their water supply and their water supply reliability, including programs to restore groundwater production, to utilize recycled water, and to bank groundwater (CLWA et al.2011).

With the expansion of the Region's water supply portfolio, there is a need for matching supplies to uses, adapting operations to required outputs and overall improving system efficiencies. These considerations are important to optimize resource uses and are particularly important when expanding certain water supplies that are associated with high costs, as is the case with recycled water.

On a sub-regional scale there is a projected imbalance between supply and demand. Peak demands during the summer need to be accounted for in order to size water supply, treatment, and transmission facilities, which run approximately two times the average daily demands. Existing demand for water in the LACWWD No. 37 service area is 2,300 AFY with peak demand at 4.02 MGD. Existing water supply sources for LACWWD No. 37 include three wells and the imported water from the AVEK water treatment plant (WTP) with a combined capability of delivering about 7.17 MGD. At buildout, the projected demand in the LACWWD No. 37 area is 4,431 AFY with peak demand at 7.91 MGD which exceeds peak supply by 0.74 MGD. Options available to meet the additional demand include expansion of the AVEK WTP, drilling additional wells, water conservation (reducing projected water demands) and water reclamation, or a combination of all four (4) options (LACCWD No. 37 2004).

The Acton and Agua Dulce areas (outside of the LACWWD No. 37 service area) obtain water from local wells and in some cases hauled water. The 2004 LACWWD study of 3,707 parcels in the Acton and Agua Dulce area, adjacent to the LACWWD No. 37 service area, estimated the existing demand to be approximately 3,283 AFY with a peak demand of 5.86 MGD. At buildout estimated water demand for Acton and Agua Dulce areas (excluding LACWWD No. 37) will increase to 6,813 AFY and peak demand to 12.16 MGD. It is uncertain whether local wells will be sufficient to meet future demand. County policy requires that property owners demonstrate proof of reliable potable supply before proceeding with new development (LACWWD No. 37 2004).

Related to water supply the Stakeholders have identified the following measurement:

- *Increase use of recycled water by up to 9,600 AFY by year 2030; consistent with health and environmental requirements*

- *Improve water system operational flexibility and efficiency*

- *Increase water supply as necessary to meet anticipated peak demands at buildout in the LACWWD No. 37 service area (7.91MGD) and peak demands at buildout in the Acton and Agua Dulce areas (up to 12.16 MGD)*

Stakeholders in the Region are taking action to improve water supply. The *2010 Santa Clarita Valley UWMP* projects that 9,600 AFY of recycled water will be available by 2030. The *2010 Santa Clarita Valley UWMP* also contemplates long-term water transfers and groundwater banking programs as a means for enhancing future water supply.

6.2.3 Improve Water Quality

Water quality is an important consideration not only for water delivered to the customer, but for ecosystems.

The majority of drinking water served in the Region is treated at either the ESFP or the RVWTP, both operated by CLWA. These plants use ozone, chemicals, and filtration to treat water. Chloramines and/or chlorine may also be added to the water following treatment to prevent the growth of bacteria in the distribution systems. In the LACWWD No. 37 service area, water is treated at the AVEK WTP. Currently, these facilities provide water that consistently meets drinking water standards.

Outside of the CLWA or LACWWD No. 37 service areas, many water users in the Region rely on privately operated wells for their water supply. In the Acton Valley Groundwater Basin, assessments by DWR and others have indicated that levels of TDS, sulfate, chloride, and boron can exceed drinking water standards. Though data is somewhat limited, there are also indications that nitrates can exceed drinking water standards in the Agua Dulce Groundwater Basin as well (NPRI 0-191-254). Therefore, related to water quality, the Stakeholders have identified the following measurement:

- *Meet all drinking water standards*

The detection of perchlorate in Valley groundwater supplies has raised concerns over the reliability of those supplies and has pointed to the need to monitor for, and mitigate, any contaminant plumes. In cooperation with state regulatory agencies, CLWA and the local retail water purveyors have developed a plan to pump and treat perchlorate in a manner to limit contaminant plume migration. Based on the experience with perchlorate the Stakeholders have identified the following measurement:

- *Prevent migration of contaminant plumes*

TMDLs are Intended to Protect Beneficial Uses, Including Habitat

Surface waters in the Region exceed water quality standards for

various contaminants. As described in Section 3, various waterbodies that do not meet water quality objectives and are not supporting their beneficial uses have been identified on the State's 2010 303(d) list as impaired. Total Maximum Daily Loads or TMDLs have been established for portions of the Upper Santa Clara River in addition to various lakes in the Region. A TMDL must account for all sources of the pollutants that cause the waterbody to be impaired. A TMDL is implemented by reallocating the total allowable pollution among the different pollutant sources to ensure that the water quality objectives are achieved.

Portions of the Upper Santa Clara River are listed as impaired for chloride, nutrients and indicator bacteria, among others.

Chloride can be harmful to salt sensitive agriculture such as strawberry and avocado crops, which is a beneficial use in the adjacent Lower SCR Watershed IRWM region. Sources of chloride include the potable water supply as well as residential, commercial and industrial uses of water. The Upper Santa Clara River Chloride TMDL was originally adopted by the Regional Board in 2002 and subsequently modified several times.

Indicator bacteria affect the Recreational (REC-1 and REC-2) Beneficial Uses of a waterbody. Sources of indicator bacteria include urban runoff from point and non-point sources as well as natural sources. The Santa Clara River Bacteria TMDL was adopted by the Regional Board in March 2012.

The Santa Clara River nutrients TMDL was adopted by the Regional Board in March 2004. Elevated nutrient levels can threaten warm water fish and wildlife habitats and groundwater recharge beneficial uses of the river. As a result of implementation of the nutrients TMDL, the Santa Clara River was de-listed as impaired for nutrients in the 2010 303(d) list.

Trash in three lakes in the Region, Elizabeth Lake, Lake Hughes, and Munz Lake, has led to water quality impairments, requiring adoption of TMDLs in 2008. Targeted efforts have shown improvements in Munz Lake and LA County is now in full compliance with the TMDL having completed installation of trash capture devices on the impaired lakes.

However, there are other constituents of concern in the Region that may result in additional future TMDLs. For example, the three lakes in the Region listed on the 2010 303(d) list are considered to be impaired by various pollutants and stressors, including, but not limited to, eutrophication, organic enrichment, pesticides, and issues with pH. Upper reaches of the Santa Clara River are listed as having impairment related to insecticide residues and coliform bacteria, among other things. Proposed TMDL completion dates for these impairments start in 2019. Therefore, related to water quality the Stakeholders have identified the following measurement:

- *Comply with TMDLs.*

6.2.4 Promote Resource Stewardship

Water is intended for many beneficial uses including agricultural water supplies, groundwater recharge, water replenishment, recreation, wildlife habitat, rare and endangered species, and wetland ecosystems.

To this end, Stakeholders have investigated multiple objectives related to resource stewardship, including removal of invasive species, acquisition of floodplain areas for recreation and flood easements, and acquisition of habitat.

Healthy riparian ecosystems, dominated by native plants, provide a plentitude of benefits that include:

- Soil stabilization – native riparian plants often have extensive root systems that prevent streambank erosion,
- Buffer zones that slow surface runoff and filter out pollutants,
- Flood protection by slowing surface runoff and regulating water flows,
- Enhanced water supply through enhanced infiltration and groundwater recharge,
- Critical wildlife habitat, as a transition zone between aquatic and terrestrial habitats, with unusually high biodiversity, and
- Recreational opportunities (VCRCD 2006).

These benefits may be impacted by invasive species that disrupt the ecological systems in which they spread. Invasive plants in the watershed, such as arundo (*Arundo donax*) and tamarisk (*Tamarix spp.*) negatively affect water quality, crowd out native plants and species, and increase flood risk, erosion hazard, and wildfire risk. With few natural predators and other controls, invasive species can outcompete native species for vital resources. Non-native plants are heavy water users, for example, tamarisk uses almost twice as much water as native riparian vegetation (VCRCD 2006). Increased water uptake reduces water supplies for other uses, including instream flows to support native aquatic species. Reduced water flows also impact water quality by increasing water temperatures and impacting nutrient flows. In addition, enhanced erosion further degrades water quality and aquatic habitat. Both arundo and tamarisk are highly flammable, and due to plant height (up to 30 feet), a fire in arundo or tamarisk can easily spread to nearby tree canopies. These factors contribute to increased fire frequencies among invasive plant species. Fires in turn can enhance flood impacts with increased erosion and reduced water infiltration. Large stands of arundo or tamarisk can also obstruct stream flows and shunt flow outward, exacerbating bank erosion. In addition, invasive species reproduce quickly and resprout more rapidly after disturbances, thereby increasing their dominance and reducing biodiversity in an area.

As stated in a 2012 assessment by the USFS, invasive and nonnative species have severely degraded the Santa Clara River and have increased over time. If the invasive species are not controlled, the ecosystem in the watershed could be dramatically changed with effects including those listed above. Weed management strategies outlined in the National Forest Plan, include coordinated invasive species control and removal that target Bouquet, Arroyo Seco, San Francisquito, and Soledad Canyons, as well as, upper Castaic Creek located in the Region (USFS 2012).

Non-native and Invasive Arundo

Among the invasive species impacting the Upper Santa Clara River Watershed, arundo and tamarisk pose particularly severe threats to the riparian ecosystems and are categorized as the most invasive and widespread wild-land pest plants by the California Invasive Plant Council. Arundo is a destructive invasive species that is affecting all of the large river systems in southern California and dominates large portions of the Santa Clara River and its tributaries. Efforts to control population expansion of arundo beginning in 1995 have been partially successful, such as in Soledad Canyon and San Francisquito Canyon, however small amounts are showing up again in treated areas. Like arundo, tamarisk has spread throughout the Santa Clara River system, and while less prevalent, this invasive species also poses a major problem in portions of the upper watershed with typical invasive characteristics (USFS 2012, VCWPD 2006).

Stakeholders have identified the following measurements related to resource stewardship:

- *In areas of the floodplain where the majority of plant species are invasive:*
    - *Reduce invasive plant species to 40 percent or less cover of the understory and canopy in years 1 to 5.*
    - *Every five (5) years thereafter reduce by half the percentage of invasive plant species.*
    - *In years 20 and beyond, keep invasive plant species to 5 percent or less.*
- *Keep invasive plant species to 2 percent or less in the upper reaches and tributaries where little to no invasive plants are currently located.*

This overall measurement is to remove non-native plant species and promote revegetation by native plant species in the Upper Santa Clara River and protect its 500-year floodplain. In addition, this measurement is intended to prevent establishment of new species of invasive plants within the Watershed, as it is the most cost effective way to control these plants and prevents further habitat degradation. A phased goal has been established over a 20-year period due to the persistence of these species, the expense of removal, the short annual removal period, and the changing nature of the Watershed. Specifically, the overall goal is to keep invasive species to 2 percent or less in the upper reaches and tributaries where little to no invasive plants are currently located and reduce invasive plant species to 5 percent or less in the areas of the floodplain where invasive plant species currently dominate. In areas where invasive plants have taken hold, the goal is to establish areas of the floodplain where invasive species comprise 40 percent or less cover of the understory and canopy in years 1 to 5. The goal will be halved every five (5) years (20 percent: years 6 to 10, 10 percent: years 10 to 15, 5 percent: years 15 to 20). In years 20 and beyond, a goal of 5 percent or less has been established.

Recreation and flood control are both important activities on Pyramid, Castaic, and Elizabeth Lakes, as well as the Upper Santa Clara River and, in many cases, these can be competing interests. However, the purchase of public easements along the Upper Santa Clara River is one method to create land uses that would accommodate both the protection of flood inundation areas and recreational facilities, as described in the Santa Clarita Valley Area Plan (County of Los Angeles 2011). Stakeholders have identified the following measurement related to resource stewardship:

- *Acquire 12 miles along the Santa Clara River for development as a recreational trail/park corridor*

As described in Section 2, within the Region, the South Coast Missing Linkages (SCML) Project is a partnership involving representatives from the US Forest Service, The Wildlands Conservancy, The Nature Conservancy, California State Parks, the National Park Service, Zoological Society of San Diego Applied Conservation, Conservation Biology Institute, the California State Parks Foundation, the Santa Monica Mountains Conservancy, South Coast Wildlands, and many others. This project has focused on defining and preserving ecological linkages throughout Southern California and Baja California, an area collectively termed the South Coast Ecoregion. The principle goal of the SCML-proposed San Gabriel-Castaic Connection, primarily located in the Upper Santa Clara River Region, is to preserve essential open space and viable connections for wildlife movement between two core habitat areas, the San Gabriel Mountains and the Castaic Ranges (including the Sierra Pelona), both part of the Angeles National Forest managed by the US Forest Service. A feature of the proposed linkage is the Santa Clara River as it acts as a natural linkage. The SCML has identified approximately 10,900 acres in Soledad Canyon (between Acton and the mouth of Agua Dulce Canyon), Hauser, Long, Bobcat, Escondido, Upper Mint, and Tick canyons for preservation. For this reason, the Stakeholders have identified the following measurement related to resource stewardship:

- *Acquire acreage or conservation easements for 10,900 acres of remaining proposed South Coast Missing Linkage*

Finally, Stakeholders of this IRWMP process have identified encroachment of private property into the floodplain as an issue. Currently, there are approximately 4,900 acres in the 100-year floodplain of the Upper Santa Clara River. Protection of the Santa Clara River floodplain is important in order to maintain the river's natural character and protect existing and future development from flood hazards. Encroachment and development within the natural floodplain inhibits the rivers natural dynamism during high flow events, while placing developed properties in the path of the river when it does migrate into adjacent areas. Encroachment activities impact the natural hydrology and contribute to faster storm flows, higher water levels, bank failure and increased hazards to people and infrastructure. Protection of the floodplains from development and designation of open space along the river provides multiple benefits, including helping maintain a natural buffer from flood hazards and improving natural watershed functions (Stillwater Sciences 2011, County of Los Angeles 2011).

Encroachment has also been raised as an issue and concern as part of past studies, most notably the *Santa Clara River Enhancement and Management Plan* (VCWPD and LACDPW 2005). This Plan specifically recommended acquisition of land adjacent to the river for open space, recreational, and flood protection uses.

Stakeholders have identified the following measurement related to resource stewardship:

- *Purchase private property from willing sellers in the 100-year floodplain*

6.2.5 Flooding/Hydromodification

Large volumes of runoff and sediments generated within the Region and surrounding foothills and mountains are transported along the Santa Clara River system. The natural drainage system is designed to accommodate and adjust to these processes, however urbanization has modified watershed characteristics, including original runoff and sediment transport patterns, through the construction of impervious areas and man-made drainage structures.

The alteration of natural watershed hydrology and sediment-transport processes impacts the system's natural ability to capture rainfall and convey flows. Hydromodification alters drainage patterns and results in a larger proportion of rainfall becoming runoff, thereby increasing the velocity, flow rate, and often the timing, of runoff. Increased stream discharge rates also decreases the amount of infiltration and recharge to groundwater, and can result in stream channel instability and streambank erosion (SWRCB 2009). All these factors may contribute to new flood management challenges and general degradation of water resources.

The stakeholders have identified measurements with the overall goal of reducing flood damage and the negative effects on waterways and watershed health that is caused by hydromodification and flooding outside of the natural erosion and deposition process of the Santa Clara River.

- *Meet state permits and policies related to stormwater management*
- *Reduce impervious area within the watershed*
- *Promote low impact development, green streets and other stormwater recharge projects*

6.2.6 Adaptation to Climate Change

With growing recognition of the potential impacts of climate change to the Region, particularly related to water resources, Stakeholders have identified the need to take actions within the watershed to adapt to climate change. As described in Section 5, climate change is projected to impact multiple watershed characteristics that may increase the challenges of water resource management in the Region. Stakeholders have therefore identified the following measurement related to climate change adaptation:

- *Implement strategies, that adapt flood management, water supply, water quality, water dependent recreation, water-dependent habitat, and fire risk for climate change, but also have other benefits that would occur in the absence of climate change ("no regret strategies")*

6.2.7 Promote Reduced Greenhouse Gas Emissions

As part of this Plan update, specific projects proposed for implementation will be evaluated in part based on their contribution to climate change, particularly their emissions per acre foot of water deliver, treated, or produced. Stakeholders have identified a goal to promote projects and actions that reduce GHG emissions with the following measurement:

- *Prioritize development and use of water sources with lowest GHG emissions*
- *Identify and implement the use of renewable energy and conservation of energy within water and wastewater systems*
- *With assistance of local energy utility, perform energy audits on all water-related facilities regularly*
- *Reduce, on an agency-by-agency basis, energy use per volume treated or delivered*

6.3 Strategies

Following identification of objectives, the Stakeholders then moved to refining strategies appropriate to achieving the objectives. This process and its outcomes are described in Section 7.

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Section 7: Resource Management Strategies Used to Meet Plan Objectives

7.1 Overview

Section 6 of this IRWMP introduced the resource management objectives for the Region, as identified by the Stakeholders of the Upper Santa Clara River IRWMP. This section of the IRWMP is intended to introduce the reader to resource management strategies, or general means by which the broad objectives listed in Section 6 will be realized. Eventually, individual projects will be identified in Section 8, which are the specific means proposed by the Stakeholders for implementing the resource management strategies identified in this section. Figure 7.1-1 graphically demonstrates the relationship between objectives, strategies, and projects.

This section introduces a diverse menu of resource management strategies available to meet the resource management objectives within the Region. The State of California has identified 27 different resource management strategies that can be used to improve water resource management. Section 7.2 defines and discusses each of the 27 resource management strategies of the *2009 California Water Plan*, in order to provide the reader with an understanding of the State's vision for possible ways to meet future resource management challenges. This section also serves to provide background for the common resource management tools available.

Section 7.3 demonstrates how the Stakeholders have built upon the resource management strategies in the *California Water Plan* and resource management strategies already implemented in the area and have tailored these strategies to meet the resource management objectives of the Region. Finally, Section 7.4 describes the "Call for Projects" process and gives an overview of projects submitted for inclusion in the IRWMP which will implement these strategies to meet the regional objectives.

7.2 California Water Plan Resource Management Strategies

This section describes the *California Water Plan* and each of the 27 resource management strategies (please see Figure 7.2-1). The *California Water Plan*, which is updated every five years as required by the California Water Code, is a resource for water planners, managers and policy-makers faced with the task of acting as stewards of this resource. More concisely, it is a strategic plan for all regions of the State that addresses the uncertainty of future water needs by recommending a diversified approach, consisting of multiple strategies and a range of short- and long-term actions. Given the many water challenges the State must actively respond to, the *California Water Plan* deems it imperative that planning take place on a regional scale and that planning constitute an inclusive process involving multiple players, particularly local agencies and governments and their citizens.

FIGURE 7.1-1
RELATIONSHIP BETWEEN OBJECTIVES, STRATEGIES, AND PROJECTS

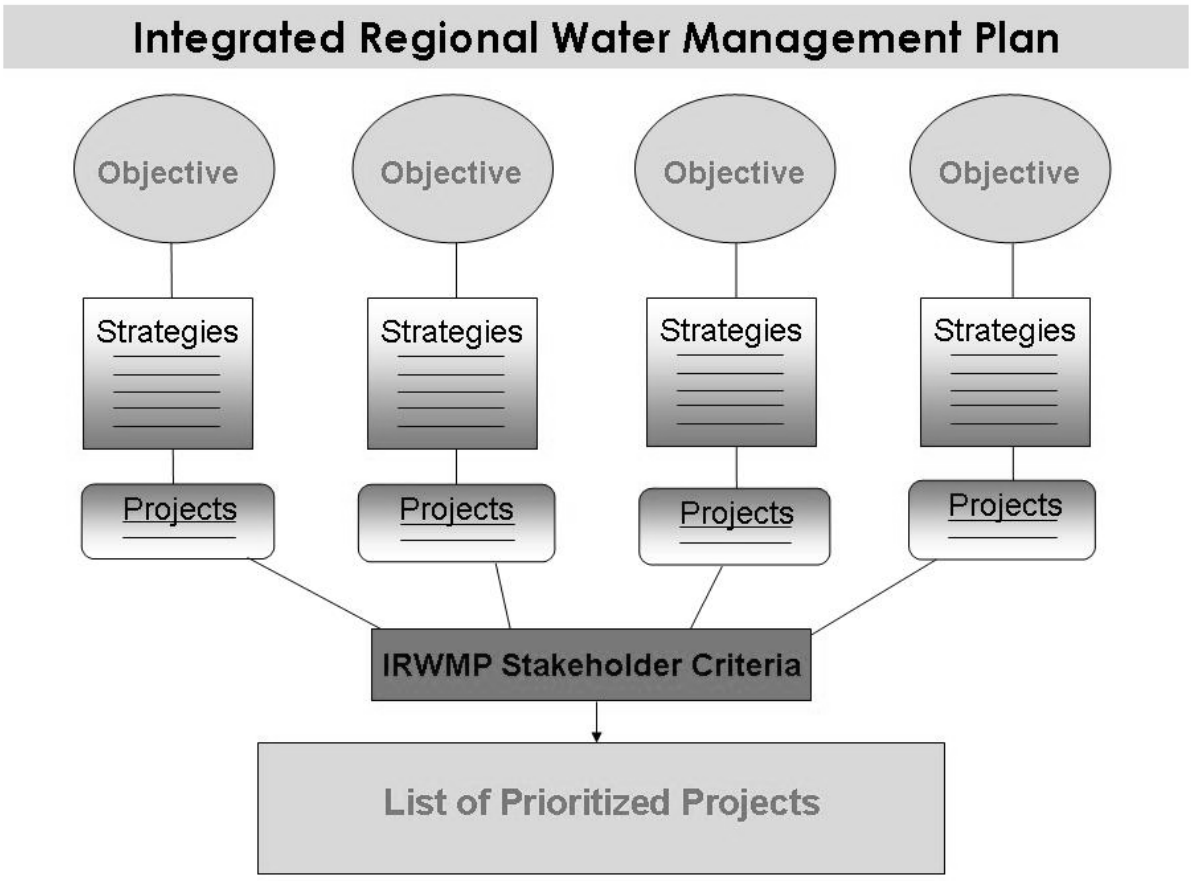
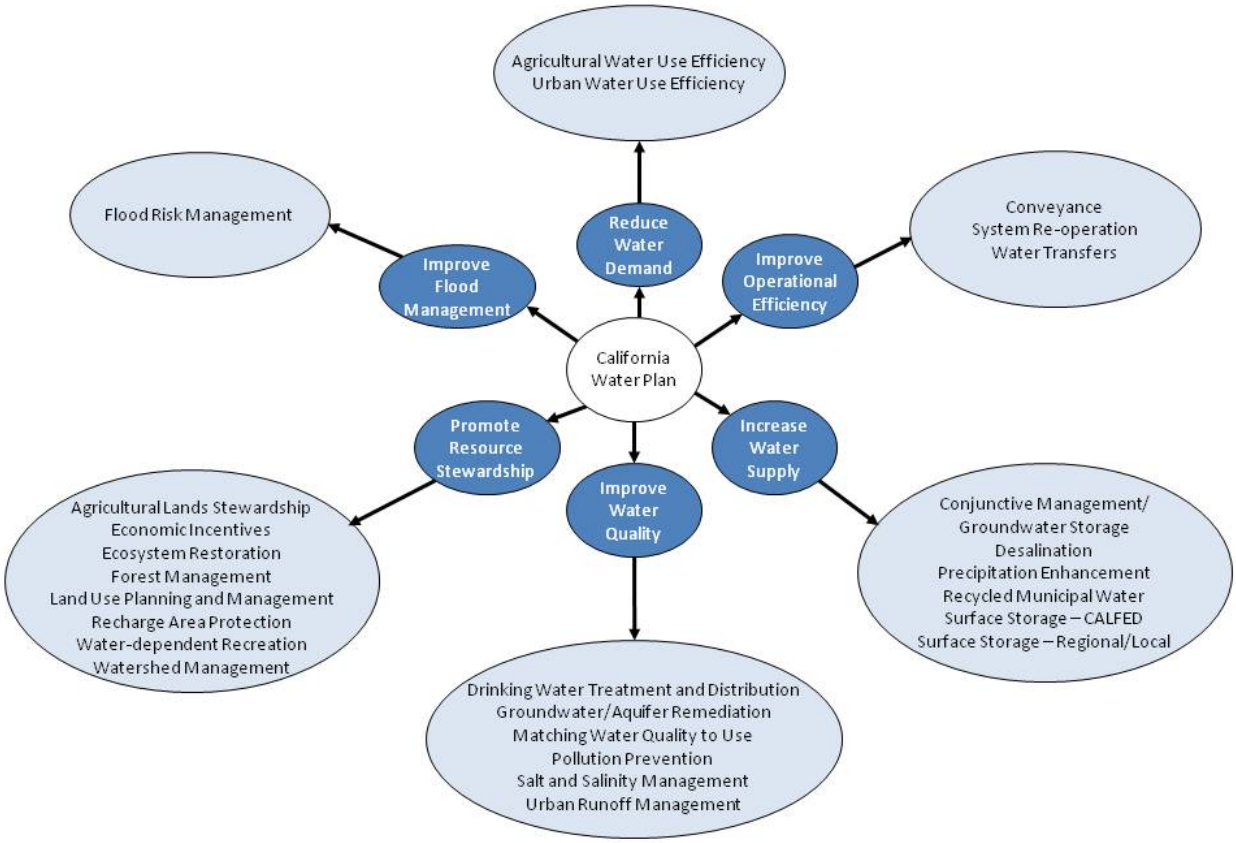


FIGURE 7.2-1
TWENTY SEVEN RESOURCE MANAGEMENT STRATEGIES OF THE CALIFORNIA WATER PLAN



The following resource management strategies are projects, programs or policies that can be used to manage water and related resources in such a way that will expand local water portfolios and encourage efficient water allocation and use. The following descriptions are taken from the *California Water Plan.*

7.2.1 Reduce Water Demand

7.2.1.1 Agricultural Water Use Efficiency

Agricultural water use efficiency involves improvements in technologies and management of agricultural water that result in water supply, water quality, and environmental benefits. Efficiency improvements can include on-farm irrigation equipment, crop and farm water management, and water supplier distribution systems.

7.2.1.2 Urban Water Use Efficiency

Urban water use efficiency involves technological or behavioral improvements in indoor and outdoor residential, commercial, industrial, and institutional water use that lower demand, lower per capita water use, and result in benefits to water supply, water quality, and the environment.

7.2.2 Improve Operational Efficiency

7.2.2.1 Conveyance

Conveyance provides for the movement of water. Specific objectives of natural and managed water conveyance activities include flood management, consumptive and non-consumptive environmental uses, water quality improvement, recreation, operational flexibility, and urban and agricultural water deliveries. Infrastructure includes natural watercourses as well as constructed facilities like canals, pipelines and related structures including pumping plants, diversion structures, distribution systems, and fish screens. Groundwater aquifers are also used to convey water.

Installation of a conveyance pipeline in the City of Santa Clarita by Castaic Lake Water Agency

7.2.2.2 System Re-operation

System re-operation means changing existing operation and management procedures for such water facilities as dams and canals to meet multiple beneficial uses. System re-operation may improve the efficiency of existing uses, or it may increase the emphasis of one use over another. In some cases, physical modifications to the facilities may be needed to expand the re-operation capability.

7.2.2.3 Water Transfers

A water transfer is defined in the California Water Code as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or

water rights. A more general definition is that water transfers are a voluntary change in the way water is usually distributed among water users in response to water scarcity. Transfers can be from one party with extra water in one year to another who is water-short that year.

7.2.3 Increase Water Supply

7.2.3.1 Conjunctive Management and Groundwater Storage

Conjunctive management is the coordinated operation of surface water storage and use, groundwater storage and use, and the necessary conveyance facilities. Conjunctive management allows surface water and groundwater to be managed in an efficient manner by taking advantage of the ability of surface storage to capture and temporarily store storm water and the ability of aquifers to serve as long-term storage.

7.2.3.2 Desalination – Brackish/Seawater

Desalination is a water treatment process for the removal of salt from water for beneficial use. Desalination is used on brackish (low-salinity) water as well as seawater. In California, the principal method for desalination is reverse osmosis. This process can be used to remove salt as well as specific contaminants in water such as disinfection byproduct precursors, volatile organic compounds, nitrates, and pathogens.

7.2.3.3 Precipitation Enhancement

Precipitation enhancement, commonly called “cloud seeding,” artificially stimulates clouds to produce more rainfall or snowfall than they would naturally. Cloud seeding injects special substances into the clouds that enable snowflakes and raindrops to form more easily.

7.2.3.4 Recycled Municipal Water

Water recycling, also known as reclamation or reuse, is an umbrella term encompassing the process of treating wastewater, storing, distributing, and using the recycled water. Recycled water is defined in the California Water Code to mean “water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.”

7.2.3.5 Surface Storage – CALFED

The CALFED *Record of Decision* (2000) identified five potential surface storage reservoirs that are being investigated by DWR, the US Bureau of Reclamation, and local water interests. Building one or more of the reservoirs would be part of CALFED’s long-term comprehensive plan to restore ecological health and improve water management of the Bay-Delta. The five (5) surface storage investigations are: Shasta Lake Water Resources Investigation, In-Delta Storage Project, Upper San Joaquin River Basin Storage Investigation, North-of-the-Delta Offstream Storage, and Los Vaqueros Reservoir Expansion.

7.2.3.6 Surface Storage – Regional/Local

Surface storage is the use of reservoirs to collect water for later release and use. Surface storage has played an important role in California where the pattern and timing of water use

does not always match the natural runoff pattern. Most California water agencies rely on surface storage as a part of their water systems. Surface reservoirs can be formed by building dams across active streams or by building off-stream reservoirs where the majority of the water is diverted into storage from a nearby water source.

7.2.4 Improve Water Quality

7.2.4.1 Drinking Water Treatment and Distribution

Drinking water treatment includes physical, biological, and chemical processes to make water suitable for potable use. Distribution includes the storage, pumping, and pipe systems to protect and deliver the water to customers.

7.2.4.2 Groundwater/Aquifer Remediation

Groundwater remediation involves extracting contaminated groundwater from the aquifer, treating it, and discharging it to a water course or using it for some purpose. It is also possible to inject the treated water back into the aquifer. Contaminated groundwater can result from a multitude of sources, both naturally occurring and anthropogenic. Examples of naturally occurring contaminants include heavy metals, high TDS, and high salinity from specific geologic formations or conditions. Groundwater can also be contaminated from anthropogenic sources with organic constituents, inorganic constituents, and radioactive constituents from many point and non-point sources. These anthropogenic sources include industrial sites, mining operations, leaking tanks and pipelines, landfills, impoundments, dairies, agricultural and storm runoff, and septic systems.

7.2.4.3 Matching Quality to Use

Matching water quality to water use is a management strategy that recognizes that not all water uses require the same quality water. One common measure of water quality is its suitability for an intended use, and a water quality constituent is often only considered a contaminant when that constituent adversely affects the intended use of the water. High quality water sources can be used for drinking and industrial purposes that benefit from higher quality water, and lesser quality water can be adequate for some uses, such as irrigation. Further, some new water supplies, such as recycled water, can be treated to a wide range of purities that can be matched to different uses.

7.2.4.4 Pollution Prevention

Pollution prevention can improve water quality for all beneficial uses by protecting water at its source, reducing the need and cost for other water management and treatment options. By preventing pollution throughout a watershed, water supplies can be used, and re-used, for a broader number and types of downstream water uses. Improving water quality by protecting source water is consistent with a watershed management approach to water resources problems.

7.2.4.5 Salt and Salinity Management

Salts are materials that originate from dissolution or weathering of rocks and soils, whereby the term salinity describes the condition where these dissolved minerals are present. With the exception of freshly fallen snow, salt is present to some degree in virtually all natural water supplies, because soluble salts in rocks and soil begin to dissolve as soon as water reaches them. While generally beneficial when present in low concentrations, salinity very quickly becomes a problem when consumptive use and evaporation concentrates salts to levels that adversely impact beneficial uses. Water reuse can contribute to increased salinity since each use subjects the water to evaporation and additional dissolved salts will be picked up when this water resource passes through soil. Salt and salinity management contributes to improving water supplies and reducing the salt loads impacting a region through salt treatment, disposal, storage, and by achieving a sustainable salt balance.

7.2.4.6 Urban Runoff Management

Urban runoff management is a broad series of activities to manage both storm water and dry-weather runoff. Dry weather runoff occurs when, for example, excess landscape irrigation water flows to the storm drain. Urban runoff management is linked to several other resource strategies including pollution prevention, land use management, watershed management, water use efficiency, recycled water, protecting recharge areas, and conjunctive management (combined use of surface and ground water systems to optimize resource use and minimize adverse effects of using a single source).

7.2.5 Promote Resource Stewardship

7.2.5.1 Agricultural Lands Stewardship

Agricultural lands stewardship broadly means conserving natural resources and protecting the environment by land managers whose stewardship practices conserve and improve land for food, fiber, watershed functions, soil, air, energy, plant and animal and other conservation purposes. It also protects open space and the traditional characteristics of rural communities. Further, it helps landowners maintain their farms and ranches rather than being forced to sell their land because of pressure from urban development.

7.2.5.2 Economic Incentives (Loans, Grants, Water Pricing)

Economic incentives are financial assistance and pricing policies intended to influence water management. For example, economic incentives can influence the amount of use, time of use, wastewater volume, and source of supply. Economic incentives include low-interest loans, grants, and water pricing rates. Free services, rebates, and the use of tax revenues to partially fund water services also have a direct effect on the prices paid by the water users. Governmental financial assistance can provide incentives for resource plans by regional and local agencies. Also, government financial assistance can help water agencies make subsidies available to their water users for a specific purpose.

7.2.5.3 Ecosystem Restoration

Ecosystem restoration can include changing the flows in streams and rivers, restoring fish and wildlife habitat, controlling waste discharge into streams, rivers, lakes or reservoirs, or removing barriers in streams and rivers so salmon and steelhead can spawn. Ecosystem restoration improves the condition of our modified natural landscapes and biotic communities to provide for the sustainability and for the use and enjoyment of these ecosystems by current and future generations.

7.2.5.4 Forest Management

California's major water development projects rely on water produced in forested watersheds. Almost all forest management activities can affect water quantity and quality. This strategy focuses on those forest management activities that are designed to improve the availability and quality of water for downstream users, on both publicly and privately owned forest lands. Examples of forest management activities include vegetation and fuels management to enhance soil moisture, groundwater recharge and streamflows.

7.2.5.5 Land Use Planning and Management

Integrating land use and water management consists of planning for the housing and economic development needs of a growing population while providing for the efficient use of water, water quality, energy, and other resources. The way in which we use land – the pattern and type of land use and transportation, and the level of intensity – has a direct relationship to water supply and quality, flood management, and other water issues. For example, more compact development within existing urban areas can limit development in the floodplains, leading to improved flood management. Low impact development and stormwater recharge strategies can also provide benefits related flood management, as well as water quality and water supply.

7.2.5.6 Recharge Areas Protection

Recharge area protection includes keeping groundwater recharge areas from being paved over or otherwise developed and guarding the recharge areas so they do not become contaminated. Protection of recharge areas, whether natural or man-made, is necessary if the quantity and quality of groundwater in the aquifer are to be maintained. However, recharge areas only function when aquifer storage capacity is available and when adequate supply of good quality water to recharge the aquifer is secured. Existing and potential recharge areas must be protected so that they remain functional and continue to serve as valuable components of a conjunctive management and groundwater storage system.

7.2.5.7 Water-Dependent Recreation

Water-dependent recreation includes a wide variety of outdoor activities that can be divided into two (2) categories. The first category includes fishing, boating, swimming, and rafting, which occur on lakes, reservoirs, and rivers. The second category includes recreation that is enhanced by water features but does not require actual use of the water, such as wildlife viewing, picnicking, camping, and hiking.

7.2.5.8 Watershed Management

Watershed management is the process of creating and implementing plans, programs, projects, and activities to restore, sustain, and enhance watershed functions. These functions provide the goods, services and values desired by the community affected by conditions within a watershed boundary. A primary objective of watershed management is to increase and sustain a watershed's ability to provide for the diverse needs of the communities that depend on it, from local to regional to State and federal stakeholders. Using watersheds as an organizing unit has proven to be an effective scale for natural resource management. The watershed is an appropriate scale to coordinate and integrate management of the numerous physical, chemical, and biological processes that make up a river basin ecosystem. It serves well as a common reference unit for the many different policies, actions, and processes that affect the system. Using the watershed as a basic management unit also provides a basis for greater integration and collaboration.

7.2.6 Improve Flood Management

7.2.6.1 Flood Risk Management

Flood Risk Management is a strategy specifically intended to enhance flood protection. It includes projects and programs that assist individuals and communities to manage floodflows and to prepare for, respond to, and recover from a flood. This strategy is a key element of integrated flood management, which considers land and water resources at a watershed scale,

Flooding in the Upper Santa Clara River Region

employs both structural and nonstructural measures to maximize the benefits of floodplains and minimize loss of life and damage to property from flooding, and recognizes the benefits to ecosystems from periodic flooding.

7.3 Resource Management Strategies Adopted by Stakeholders

In this report, we have organized the 27 different management strategies into five broad categories, under consideration of the *California Water Plan* and based on the measureable objectives defined by the Stakeholders (reduce potable water demand, increase water supply, improve water quality, promote resource stewardship, and improve flood management). In addition to these five categories, this IRWMP also includes two objectives that relate to multiple resource management strategies: adaptation to climate change and actions to reduce greenhouse gases. These latter two objectives take into consideration the strong link between climate change and water use, supply, and quality, as well as natural resource stewardship. The objectives developed by the Stakeholders, including those related to climate change, factored into the selected resource management strategies.

As shown in the adjacent text box, seven broad objectives were adopted by the Stakeholders in the process described in Section 6.1:

OBJECTIVES OF UPPER SANTA CLARA RIVER IRWMP

- ***Reduce Potable Water Demand***: Implement technological, legislative and behavioral changes that will reduce user demands for water.
- ***Increase Water Supply:*** Understand future regional demands and obtain necessary water supply sources.
- ***Improve Water Quality***: Supply drinking water with appropriate quality; improve groundwater quality; and attain water quality standards.
- ***Promote Resource Stewardship:*** Preserve and improve ecosystem health, and preserve and enhance water-dependent recreation.
- ***Flooding/Hydromodification:*** Reduce flood damage and/or the negative effects on waterways and watershed health caused by hydromodification and flooding outside the natural erosion and deposition process endemic to the Santa Clara River.
- ***Take Action within the Watershed to Adapt to Climate Change***
- ***Promote Projects and Actions that Reduce Greenhouse Gas Emissions***

As described in Section 6, a Stakeholder process was used to develop objectives for the IRWMP. The same Stakeholder process was used to develop strategies to meet the IRWMP objectives. While brainstorming issues, goals, and objectives for the Upper Santa Clara River Region, Stakeholders discussed and developed potential strategies to address these issues. A long "laundry list" of potential resource management strategies was presented to the Stakeholder Group during the March 2012 Stakeholder meeting. A matrix matching strategies, objectives, and *California Water Plan* strategies was prepared for the March 2012 Stakeholder meeting and this matrix has been refined at subsequent meetings. Table 7.3-1 demonstrates the relationship of the Region's resource management strategies with the *California Water Plan* strategies. Note that the table, due to its size, has been placed at the end of this section. There are several strategies in the matrix that are not described in detail herein; the list serves as a starting point for potential future strategies as this IRWMP evolves based on Stakeholder review and input. Strategies will be reviewed, enhanced, added or subtracted as the IRWMP progresses through time.

7.3.1 Reduce Potable Water Demand

Existing methods to reduce water demand in the Region include the various water conservation programs implemented in the Region by the retail water purveyors for both urban and agricultural users.

7.3.1.1 Agricultural Water Use Efficiency

Agricultural water use is diminishing in the Region as land uses change through time to generally more urban uses. The Region has no formal water use efficiency programs targeted specifically at agricultural users. However, certain users located within the Region have installed drip irrigation or utilize on-farm practices to maximize efficiency of water use.

7.3.1.2 Urban Water Use Efficiency

CLWA, the retail purveyors and LACWWDs are signatories to the "Memorandum of Understanding Regarding Urban Water Conservation in California" (MOU). The urban water conservation Best Management Practices (BMPs) included in the MOU are intended to reduce California's long-term urban water demands. By signing the MOU, CLWA, LACWWDs and the purveyors became members of the California Urban Water Conservation Council (CUWCC) and report their progress on BMP implementation to the CUWCC.

Castaic Lake Water Agency's Conservatory Garden and Learning Center

LACWWDs signed on behalf of the various district service areas in 1996. CLWA signed the urban MOU in February 2001 on behalf of its wholesale service area and pledged to implement several BMPs (listed below) at a wholesale support level. NCWD signed the MOU in 2002 on behalf of its retail service area. VWC signed the MOU in 2006 on behalf of its own retail service area. CLWA and the purveyors coordinate wherever possible to maximize efficiency and ensure the cost effectiveness of their conservation programs.

The MOU and BMPs were substantially revised by the CUWCC in 2008. The revised BMPs now contain a category of "Foundational BMPs" that signatories are expected to implement as a matter of their regular course of business. These include Utility Operations (metering, water loss control, pricing, use of a conservation coordinator, wholesale agency assistance programs and water waste ordinances) and Education (public information and school education programs). The remaining "Programmatic" BMPs have been placed into three categories: Residential, Large Landscape, and Commercial, Industrial, Institutional (CII) Programs and are similar to the original quantifiable BMPs.

In coordination with the purveyors, CLWA has been implementing the foundational BMPs. For example, in connection with water loss control, CLWA does a monthly review of metered sales within their wholesale system compared to metered supply to determine if there is any water loss within their system. CLWA recently completed the American Water Works Association's M36 Water Loss analysis, which included categorizing leaks into "revenue" and "non-revenue" categories, and an economic analysis of recoverable loss. Since 2001, CLWA has also instituted implementation of residential programmatic BMPs, including Residential Plumbing Retrofits and Residential Ultra Low Flush Toilet Replacement Programs on behalf of the purveyors. After signing the MOU, the purveyors have initiated implementation of the remaining BMPs that are specific to retail water suppliers. Currently, programmatic BMPs that these purveyors are implementing include residential survey and audit programs; residential and large landscape survey and incentive programs; and rebate programs for WaterSense Specification toilets; among other programs.

Descriptions and reports to the CUWCC on BMP implementation by CLWA and the purveyors were included in the 2010 UWMP. The retail purveyors met the CUWCC BMP reporting requirements by providing information on their demand management measures in the associated section of the 2010 UWMP. LACWWD Nos. 36 and 37 submit reports to the CUWCC separately. Additional savings are occurring Region-wide due to state interior plumbing code requirements that have been in effect since 1992, as well as due to changes in lot size and reduction in exterior square footage of new housing and commercial developments. These have begun to impact overall demand in the Region. Water demand trends are continuously monitored to assess factors leading to water use reduction and to quantify and water demand reductions.

CLWA is also working with its retail purveyors to identify and implement water use efficiency programs that meet long-term reduction goals, in addition to meeting its MOU commitments. In 2007, CLWA and the retail water purveyors entered into an MOU to prepare a Santa Clarita Valley Water Use Efficiency Strategic Plan (SCVWUESP). The purpose of the effort was to prepare a comprehensive long-term conservation plan for the Santa Clarita Valley by adopting objectives, policies and programs designed to promote proven and cost-effective conservation practices. A consultant was hired to prepare the SCVWUESP, which included input from stakeholders and the community at large. The SCVWUESP was completed in 2008 and provides a detailed study of existing residential and commercial water use, and recommends programs designed to reduce overall Valley-wide water demand by ten percent by 2030. The programs are designed to provide Valley residents with the tools and education to use water more efficiently. The seven programs identified in the SCVWUESP are:

1. High Efficiency Toilet Rebates (Single and Multi-Family)
2. Large Landscape Audits (with incentives)
3. CII Audits and Customized Incentives
4. Landscape Contractor Certification
5. High Efficiency Clothes Washer Rebates
6. New Construction Building Code
7. Valley-Wide Marketing

In addition to these seven programs, the SCVWUESP also identifies other key factors that will help reduce the Valley's overall water demand including passive conservation and new, more water efficient building ordinances. By 2009, CLWA and the water purveyors were implementing the majority of the programs identified in the SCVWUESP.

In addition to the commitment of compliance with the BMPs as signatories to the MOU, CLWA and the retail purveyors are subject to the Urban Water Management Planning Act, Assembly Bill (AB) 1420 (Chapter 628, statutes of 2007), in effect as of January 2009. AB 1420 requires any urban water supplier to demonstrate implementation or plans for implementation of water use efficiency demand management measures (equivalent to CUWCC BMPs) in order to be eligible for grant or loan funding administered by DWR, the SWRCB or the Bay-Delta Authority (such as funding through Propositions 50 and 84).

Additionally, Senate Bill 7 of Special Extended Session 7 (SBX7-7) (Chapter 4, statutes of 2009), was signed into law in November 2009, which calls for progress towards a 20 percent reduction in per capita water use statewide by 2020. The legislation mandates each urban retail supplier to develop and report a water use target in the retailer's 2010 UWMP. The legislation further requires that retailers report an interim 2015 water use target, their baseline daily per capita use and 2020 compliance daily per capita use, along with the basis for determining those estimates. Descriptions of the compliance efforts by the retail purveyors are described in the 2010 UWMP.

CLWA and the purveyors are intending to update the SCVWUESP. The update will analyze current data on water consumption in the Valley, the implementation of the 2008 SCVWUESP, and identify conservation programs necessary to reduce urban demand by 20 percent by 2020. The update was proposed by the IRWM Region for funding under the Proposition 84 Round 2 Planning Grant process and was recommended for funding by DWR in 2012.

Outside of the Valley, the only portion of the Region included in an urban water use efficiency program is LACWWD No. 37, by merit of LACWWDs being a signatory to the CUWCC MOU.

7.3.2 Increase Water Supply

Several studies and assessments have been conducted in recent years in order to identify potential methods to increase water supply to the Region. A brief summary of these plans is provided below.

7.3.2.1 Conjunctive Management and Groundwater Storage

As discussed in Section 3.1.3, CLWA produced a *Water Supply Reliability Plan (Reliability Plan)* in 2003 and updated it in 2009. The *Reliability Plan* outlines primary elements that CLWA should include in its water supply mix to obtain maximum overall supply reliability enhancement. These elements include both conjunctive use and groundwater banking programs, which enhance the reliability of both the existing and future supplies, as well as water acquisitions.

CLWA has established conjunctive use management efforts through water banking and groundwater storage as discussed in Section 2.6.4. Existing water banks in which CLWA

participates for the benefit of its service area include the Semitropic Water Storage District, West Kern Water District and Rosedale-Rio Bravo Water Storage District water banks.

The Reliability Plan presents the implementation schedule recommended for both water banking storage and pumpback capacity beginning in 2010 and incrementally increasing through 2050. CLWA's plans call for development of additional groundwater banking programs, with pumpback capacity of at least an additional 10,000 AF by 2025, and a second 10,000 AF by 2035.

AVEK is in the process of developing a groundwater banking program in its service area. This program has not yet been developed to a level that would provide detailed information about its capabilities or its availability to users within the Region.

7.3.2.2 Desalination

7.3.2.2.1 Groundwater/Brackish Water

The two sources of groundwater in the Region are water drawn from the Alluvial Aquifer and from the Saugus Formation. Neither of these supplies can be considered brackish in nature, and desalination is not required.

Water managers in the Region could partner with SWP contractors and provide financial assistance for the construction of regional groundwater desalination facilities, in exchange for SWP supplies. The desalinated water would be supplied to users in communities near the desalination plant, and a similar amount of SWP supplies would be exchanged and allocated to CLWA or AVEK (the two SWP contractors in the Region).

In addition, should an opportunity emerge with a local agency other than an SWP contractor, an exchange of SWP deliveries would most likely involve a third party, such as the Metropolitan Water District of Southern California (MWD). Most local groundwater desalination facilities would be projects implemented by retailers of SWP contractors and, if an exchange program were implemented, would involve coordination and wheeling of water through the contractor's facilities to CLWA or AVEK (CLWA 2010).

7.3.2.2.2 Seawater

Because the Region is not in a coastal area, it is neither practical nor economically feasible for water managers in the Region to implement a seawater desalination program. However, similar to the brackish water and groundwater desalination opportunities described above, water managers in the Region could provide financial assistance to other SWP contractors in the construction of their seawater desalination facilities in exchange for SWP supplies.

Most of the existing and proposed seawater desalination facilities are or would be operated by agencies that are not SWP contractors. However, in these cases (as described above for groundwater/brackish water), an exchange for SWP deliveries would most likely involve a third party (SWP contractor), the local water agency constructing the desalination facility (retailer), and CLWA or AVEK (CLWA 2010). For example, the Bay Area Regional Desalination Partnership, made up of five agencies collaborating on a Regional Desalination Project in the San Francisco Bay Area, is working to develop desalination as a water supply for that region. This partnership, comprised of San Francisco Public Utilities Commission, Santa Clara Valley

Water District, East Bay Municipal Utilities District, Contra Costa Water District, and Alameda County Flood Control, is in the process of planning regional seawater/brackish water desalination facilities. CLWA could participate in this regional desalination project on an exchange basis (CLWA 2010), and would receive exchanged SWP Table A Amount from one of the partners who is an SWP contractor.

7.3.2.3 Precipitation Enhancement

At this time, no known precipitation enhancement efforts have occurred or are planned in the Region. Data are very limited to assess the feasibility of precipitation enhancement activities in the Region and funding for research and implementation of such projects has been largely unavailable, so that efforts in the Region are being focused more on strategies whose results can generally be better assessed.

7.3.2.4 Recycled Municipal Water

CLWA is preparing its 2012 Recycled Water Master Plan Update, which is based on its 1993 and 2002 *Draft Recycled Water Master Plan*. The *Recycled Water Master Plan Update* identifies the sources of recycled water in the CLWA service area, potential recycled water use constraints, and potential recycled water users. A recycled water model was prepared to size the recommended recycled water infrastructure system. Additionally, the *Recycled Water Master Plan* Update presents the regulatory and permitting requirements, potential funding opportunities, and an implementation plan for the proposed system. The Final EIR for the 2002 *Recycled Water Master Plan* was certified in March 2007, and the Notice of Determination was filed on March 29, 2007. To date, Phase 1A of the proposed recycled water system has been completed.

7.3.2.5 Water Transfers

CLWA has entered into a long-term agreement with Buena Vista Water Storage District/Rosedale-Rio Bravo Water Storage District for a transfer of 11,000 AFY of firm water supply. The supply is based on existing long-standing Kern River water rights. This transfer is an example of a voluntary agreement among parties for an exchange of water. Some of the parties have rights to supplies in excess of their needs, and another party will be assisted in meeting its increasing demands. This transfer also allows for conjunctive use options, in that water not needed in a given year can be banked in Rosedale-Rio Bravo Water Storage District until a later time when it may be needed. This flexibility provides several operational efficiencies as well as increasing water supply to the Region. In addition, Newhall Land has also acquired a water transfer from Kern County totaling 1,607 AFY in supplies.

7.3.2.6 Surface Storage – CALFED

The CALFED Record of Decision from 2000 identified five potential surface storage reservoirs that have since been undergoing investigation by DWR, US BR, and local water interests. The projects include: Shasta Lake Water Resources Investigation, North-of-the-Delta Offstream Storage (Sites Reservoir), In-Delta Storage Project, Los Vaqueros Reservoir Expansion, Upper San Joaquin River Basin Storage Investigation (Temperance Flat Reservoir. By 2013, Final Environmental Impacts Studies and Reports are anticipated to be complete for the surface storage projects, with the decision phase ending in 2014 (DWR 2010). These analyses will help

determine if the water agencies in the Region will be willing to financially participate in the construction and operations and maintenance of either of these surface storage options in the future.

7.3.2.7 Surface Storage – Regional/Local

As part of its water supply contract with DWR, CLWA has access to a portion of the storage capacity of Castaic Lake. This Flexible Storage Account allows CLWA to utilize up to 4,684 AF of the storage in Castaic Lake. Any of this amount that CLWA borrows must be replaced by CLWA within five years of its withdrawal. CLWA manages this storage by keeping the account full in normal and wet years and then delivering that stored amount (or a portion of it) during dry periods. The account is refilled during the next year that adequate SWP supplies are available to CLWA to do so. In 2005, CLWA negotiated with Ventura County SWP contractors to obtain the use of their Flexible Storage Account. This allows CLWA access to another 1,376 AF of storage in Castaic Lake. CLWA access to this additional storage is available on a year-to-year basis through 2015. The total storage amount is 6,060 AF.

7.3.2.8 Conveyance

Every three years, CLWA prepares a *Capital Improvement Plan*, which outlines the necessary infrastructure improvements needed to maintain operational efficiency. These include modifications to pipelines or pump stations, as well as operations management systems (such as supervisory control and data acquisition [SCADA]). The *Capital Improvement Plan* outlines the costs for the recommended facilities.

7.3.2.9 System Re-operation

LACWWD No. 37 is currently planning a potential system modification to add the areas of Acton and Agua Dulce to its service area. This modification is discussed in the *Acton-Agua Dulce Conceptual Master Plan for Water Facilities* (2004) and is based on an assessment of current capacity and projected buildout water demands for Acton, Agua Dulce and LACWWD No. 37. The addition would improve operational efficiency in the two areas not currently being supplied. Among other infrastructure improvements, the expansion would require expansion of AVEK's treatment plant and supply pipeline and storage systems, as well as expansion of the Vincent Pump Station in LACWWD No. 37.

Water managers in the Region are constantly looking for ways to improve system operation efficiencies, with a particular emphasis on energy efficiency. Treatment plant and distribution system pumping schedules are constantly reviewed and assessed to obtain maximum operational efficiency. For example, NCWD participates in energy efficiency programs in partnership with Southern California Edison (SCE). They have implemented SCADA upgrades that provide NCWD the ability to operate pumps remotely including the ability to turn pumps off during high peak times. They have made these upgrades at three locations: Castaic Forebay, Newhall Well 12, and Pinetree Lost Canyon Booster Station. NCWD also participates in EnerNOC's demand response program. SCE calls for energy load reduction through EnerNOC and NCWD shuts down equipment for a period of time to help reduce load on SCE. Initially, it was estimated that demand response events would occur up to six times a year; however, during the summer months, due to high demand for electricity, it may happen more often. SCE also tests pumps and motors for operational efficiency and if found to be inefficient, NCWD will

replace the equipment and obtain a rebate from SCE. In addition, NCWD practices time-of-day pumping whereby pumping is conducted during off-peak hours. An example location where this program is conducted is within NCWD's Tesoro system. NCWD's Tesoro SCADA system is set so that the pumps fill the storage tanks only during off-peak hours.

SCWD is also always looking for ways and programs to improve efficiencies. SCWD currently works with SCE to test all of the system's pumps and motors for efficiency. If they are found to be inefficient they are enrolled in the Agriculture Energy Efficiency Program for replacement. This program pays incentives for replacement of inefficient pump and motors. SCWD meets with SCE regularly to discuss rate structure for its facilities and adjusts them to fit current conditions. In 2012, SCWD applied for SCE's Technical Assistance and Technology Incentives program, which will analyze SCWD operations and recommend ideas to improve energy efficiency. In addition, SCWD is currently enrolled in a demand response program with EnerNOC; SCE calls for energy load reduction through EnerNOC and SCWD shuts down equipment for a period of time to help reduce load on SCE. Similar to NCWD, SCWD also installed a new SCADA system in 2011 that will allow SCWD to take advantage of time of use pumping (SCWD 2012).

VWC is also continually looking for ways to improve efficiencies. VWC currently has SCE test all of the system's pumps and motors annually for efficiency. Based on the results, VWC schedules inefficient units for upgrades and modifications through SCE's Agriculture Energy Efficiency Program. VWC has most of its facilities on SCE time of Use schedules which help shift electric load to periods of low demand. VWC also participates in the EnerNOC / SCE program wherein VWC has a number of facilities that are subject to request from EnerNOC for shut down/load reduction during high demand periods.

CLWA is taking measures to increase treatment plant efficiency and reduce the waste of water. As part of the RVWTP Expansion, CLWA implemented new means of treating waste washwater whereby more water will be recovered and put back into the treatment process. Another example is the Valencia WRP where power is generated using byproducts of the treatment process. At the Valencia WRP, a 500 kilowatt (kW) generator is driven by a reciprocating engine that runs on compressed digester gas. The electricity generated is returned to the Valencia WRP power grid, thus reducing the amount of electricity purchased for use at the WRP. In addition, the thermal energy generated by the engine is used to produce hot water, which is used to heat the WRP digesters.

In 2011, CLWA completed installation of approximately 3.4 acres of high efficiency solar panels on its property. This 1 megawatt solar power system is anticipated to supply more than 98 percent of the energy needed to power CLWA's headquarters and the Rio Vista Water Treatment Plant. Additionally, through a 20-year power purchase agreement, CLWA will be paying a set rate for electricity with an annual increase less than that expected for traditional energy. This newly implemented solar power system will thereby help mitigate rising energy costs while cutting CLWA's greenhouse emissions.

7.3.3 Improve Water Quality

7.3.3.1 Drinking Water Treatment and Distribution

In 2005, CLWA completed a Chloramines Conversion Project. The project involved the system-wide conversion from chlorine disinfection methods to chloramines disinfection techniques. There are multiple benefits from using chloramines instead of chlorine for disinfection of water. Chloramines last longer in water, they are effective at inactivating pathogens like bacteria and viruses, and they produce fewer disinfection by-products (e.g., Trihalomethanes). CLWA converted to chloramines in order to meet drinking water standards as required by the US EPA. This project ensures that the higher water quality standards are met.

Castaic Lake Stores SWP Water for Treatment

CLWA operates two water treatment plants: the ESFP located in Castaic and the RVWTP located in the City of Santa Clarita. In 2008, the RVWTP was expanded from 30 mgd to 60 mgd. The RVWTP obtains its raw water supply from SWP water stored in Castaic Lake via a 201-inch diameter pipeline (the Foothill Feeder) owned and operated by MWD, one 42-inch diameter pipeline connection to the Foothill Feeder and one 102-inch diameter pipeline (that conveys raw water to CLWA's Intake Pump Station [IPS]), and a 102-inch diameter raw water pipeline between the IPS and the RVWTP site. The increase in capacity of the RVWTP was in response to current and new water quality standards, and has improved the ability to meet existing customer demands and planned future demand. The 16,790 AFY of additional treated water is able to serve approximately between 17,309 and 18,054 households, or between approximately 55,389 and 57,773 persons (CLWA 2006).

The ESFP was expanded from 33.6 mgd to 56 mgd and the upgraded facility went online in August 2005. Originally built in 1980 and expanded in 1987, the ESFP treats SWP water transported to Castaic Lake. From there, the water is piped to the ESFP for treatment. The expansion project had several components: improvements to the existing raw water treatment system, including replacement of the existing raw water pumping plant with a 56 mgd capacity pump facility, and installation of a 54-inch bypass pipeline within the existing easement to improve the existing raw water gravity flow system; at the filtration plant, construction of a new structure containing new ozone facilities for primary disinfection and chemical system for secondary disinfection; pre-filtration improvements, including new contact clarifiers and other equipment; conversion of the filtration system to deep bed monomedium filters using anthracite filter media and related equipment upgrades; and modifications to the washwater recovery system including installations of a new treatment system within an existing structure. Some of the proposed modifications were needed to comply with changing regulations that regulate drinking water quality. The existing ESFP would have been out of compliance by 2004. Expansion of the water treatment plant provided a component of the CLWA water delivery system necessary to treat the water for a portion of planned growth in the Valley (CLWA 2002).

7.3.3.2 Groundwater/Aquifer Remediation

The detection of perchlorate in Valley groundwater supplies has raised concerns over the reliability of those supplies, in particular the Saugus Formation, where six out of a total of twelve wells have been impacted by perchlorate. Perchlorate was initially detected in four Saugus Formation production wells operating near the former Whittaker-Bermite site in 1997 and were removed from service. In 2002, perchlorate was detected in the SCWD Stadium well located directly adjacent to the Whittaker-Bermite site. This Alluvial well was also removed from service and subsequently capped in 2009. It was replaced with a new well, the SCWD Santa Clara well, also in 2009.

Since the initial detection of perchlorate and resultant inactivation of impacted wells, the retail water purveyors have continued to conduct regular monitoring of active wells near the Whittaker-Bermite site. In late March 2005, that monitoring detected the presence of perchlorate in VWC's Alluvial Well Q2, located immediately northwest of the confluence of Bouquet Creek and the Santa Clara River. VWC subsequently removed the well from active service and immediately pursued permitting and installation of wellhead treatment. The well was returned to water supply service in October 2005.

In 2006, NCWD's Saugus Well N-13 had concentrations of perchlorate below the detection limit for reporting and has remained in active water supply service.

Most recently, in August 2010, VWC's water sample tests, taken from August 2010 through April 2011, confirmed the presence of perchlorate above the regulatory standard at VWC's Saugus Well 201. VWC immediately took the well out of service and notified the California Department of Public Health (DPH). VWC continues to monitor the inactive well on a monthly basis. The most recent sample confirmed that perchlorate is still present and that remediation is needed as outlined by the 2007 Whittaker-Bermite Litigation Settlement Agreement.

Based on the results of CLWA's investigation of perchlorate removal technologies, a technical group's evaluation, and DPH's approval of single-pass ion exchange for treatment in other settings, CLWA and the local retail water purveyors have selected and installed single-pass ion exchange as the treatment technology for restoration of impacted capacity (wells). The perchlorate treatment facility includes an ion exchange process located at the Rio Vista Intake Pump Station. This wellhead treatment was successfully implemented at VWC Well Q2 in 2007 and is being considered for installation at the recently impacted VWC Well 201 to restore that impacted Saugus well's capacity.

The Final Interim Remedial Action Plan for containment and extraction of perchlorate was completed and approved by DTSC in January 2006. Construction of the perchlorate treatment facility and related distribution system, the main components of the "pump and treat program," began in November 2007 and was completed in May 2010. In combination with start-up of the treatment system, the SCWD Saugus 1 and 2 wells (two of the four wells that were taken out of service in 1997) were returned to service in January 2011 after DPH issued an amendment to CLWA's Operating Permit in December 2010. After consideration of groundwater modeling results and engineering analysis, the parties to the Settlement Agreement agreed to operate the Saugus 1 and 2 wells at 1,100 gallons per minute (gpm) each (2,200 gpm total) in order to optimize both the contaminant plume containment and well production. An extended test of the

wells that were eventually returned to service was performed as part of restoring a portion of the impacted well capacity and controlling the migration of perchlorate in the aquifer.

See also Section 3 for additional discussion on perchlorate contamination in the Region.

7.3.3.3 Matching Quality to Use

Not all water uses require the same quality of water or level of water treatment. Potable water should be reserved for those uses that require potable water standards (e.g., drinking water supplies), while other uses that do not require potable water (industrial, construction, landscape and agricultural irrigation) can use recycled water. Various laws are in place to ensure water quality matches use, including Title 22, Chapter 4 of the California Code of Regulations (Title 22). Title 22 identifies several levels of recycled water based on level of treatment and disinfection, including: Disinfected Tertiary Recycled Water; Disinfected Secondary-23 Recycled Water; Disinfected Secondary-2.2 Recycled Water; and Undisinfected Secondary Recycled Water. Title 22 further identifies allowable uses for each of these different levels of recycled water based on the potential impacts to public health. Table 7.3-2 summarizes the allowable uses of water given various treatment levels.

Table 7.3-2 demonstrates that there are many potential uses for recycled water. The Saugus and Valencia WRPs provide primary, secondary and tertiary treatment. Primary treatment removes a large portion of wastewater solids using settling basins and flocculation (primary treated water is not used in California). Secondary treatment adds biological treatment and may or may not include disinfection. Tertiary treated recycled water involves coagulation, flocculation, clarification, filtration and disinfection steps. The Saugus and Valencia WRPs produce disinfected tertiary recycled water, suitable for the anticipated use of recycled water for landscape irrigation for users identified in the 2002 *Draft Recycled Water Master Plan*. As noted in Chapter 3, advanced treatment consisting of ultraviolet disinfection and reverse osmosis will be added to enable the WRPs to comply with the chloride TMDL, which may result in new opportunities for water recycling that require this level of treatment.

Matching quality of water to use is not limited to recycled water. For example, water high in nitrate must be blended in order to make this water appropriate for drinking water. However, this same water, if managed properly, can be used for irrigation. Water high in nitrate is only recommended for certain types of crops and must be applied in combination with the right fertilizers. For some applications, nitrate in irrigation water reduces the need to apply fertilizers with nitrogen.

7.3.3.4 Pollution Prevention and Urban Runoff Quality and Quantity

IRWMP stakeholders have identified objectives that combine the California Water Plan strategies of Pollution Prevention and Urban Runoff Management.

Pollution prevention acts to limit discharges to water that negatively affect beneficial uses. The Los Angeles RWQCB seeks to avoid pollution by regulating discharges from various land uses, industrial uses, septic systems, leaking underground storage tanks, and by controlling dredging. Improving water quality/pollution prevention assists other resource management strategies such as “Promote Resource Stewardship.” Implementation of programs such as the TMDL program

and National Pollutant Discharge Elimination System (NPDES) are key to integrated water management in the Region.

TABLE 7.3-2
ALLOWED USES OF RECYCLED WATER

Potential Use	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Use of Recycled Water for Irrigation				
Food crops where recycled water contacts the edible portion of the crop, including all root crops.	Allowed	Not allowed	Not allowed	Not allowed
Parks and playgrounds.	Allowed	Not allowed	Not allowed	Not allowed
School yards.	Allowed	Not allowed	Not allowed	Not allowed
Residential landscaping.	Allowed	Not allowed	Not allowed	Not allowed
Unrestricted access golf courses.	Allowed	Not allowed	Not allowed	Not allowed
Food crops where edible portion is produced above ground and not contacted by recycled water.	Allowed	Allowed	Not allowed	Not allowed
Cemeteries.	Allowed	Allowed	Allowed	Not allowed
Freeway landscaping.	Allowed	Allowed	Allowed	Not allowed
Restricted access golf courses.	Allowed	Allowed	Allowed	Not allowed
Ornamental nursery stock and sod farms.	Allowed	Allowed	Allowed	Not allowed
Use of Recycled Water for Irrigation				
Pasture for milk animals.	Allowed	Allowed	Allowed	Not allowed
Nonedible vegetation with access control to prevent use as a park, playground or school yard.	Allowed	Allowed	Allowed	Not allowed
Orchards with no contact between edible portion and recycled water.	Allowed	Allowed	Allowed	Allowed
Vineyards with no contact between edible portion and recycled water.	Allowed	Allowed	Allowed	Allowed
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest.	Allowed	Allowed	Allowed	Allowed
Fodder crops (e.g., alfalfa) and fiber crops (e.g., cotton).	Allowed	Allowed	Allowed	Allowed

Potential Use	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Seed crops not eaten by humans.	Allowed	Allowed	Allowed	Allowed
Food crops that undergo commercial pathogen-destroying processing before consumption by humans.	Allowed	Allowed	Allowed	Allowed
Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest.	Allowed	Allowed	Allowed	Allowed
Use of Recycled Water for Impoundments				
Non-restricted recreational impoundments, with supplemental monitoring.	Allowed[(a)]	Not allowed	Not allowed	Not allowed
Restricted recreational impoundments and publicly accessible fish hatcheries.	Allowed	Allowed	Not allowed	Not allowed
Landscape impoundments without decorative fountains.	Allowed	Allowed	Allowed	Not allowed
Use of Recycled Water for Cooling				
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist.	Allowed[(b)]	Not allowed	Not allowed	Not allowed
Industrial or commercial cooling or air conditioning not involving a cooling tower, evaporative condenser, or spraying that creates a mist.	Allowed	Allowed	Allowed	Not allowed
Use of Recycled Water for Other Purposes				
Groundwater recharge	Allowed under special case-by-case permits by RWQCBs[(c)]	Groundwater recharge	Allowed under special case-by-case permits by RWQCBs[(c)]	Groundwater recharge
Flushing toilets and urinals	Allowed	Flushing toilets and urinals	Allowed	Flushing toilets and urinals
Priming drain traps	Allowed	Priming drain traps	Allowed	Priming drain traps
Industrial process water that may contact workers	Allowed	Industrial process water that may contact workers	Allowed	Industrial process water that may contact workers
Structural fire fighting	Allowed	Structural fire fighting	Allowed	Structural fire fighting

Potential Use	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Decorative fountains	Allowed	Decorative fountains	Allowed	Decorative fountains
Use of Recycled Water for Other Purposes				
Commercial laundries	Allowed	Not allowed	Not allowed	Not allowed
Consolidation of backfill material around potable water pipelines.	Allowed	Not allowed	Not allowed	Not allowed
Artificial snow making for commercial outdoor uses.	Allowed	Not allowed	Not allowed	Not allowed
Commercial car washes not done by hand & excluding the general public from washing process.	Allowed	Not allowed	Not allowed	Not allowed
Industrial boiler feed.	Allowed	Allowed	Allowed	Not allowed
Nonstructural fire fighting.	Allowed	Allowed	Allowed	Not allowed
Backfill consolidation around nonpotable piping.	Allowed	Allowed	Allowed	Not allowed
Soil compaction.	Allowed	Allowed	Allowed	Not allowed
Mixing concrete.	Allowed	Allowed	Allowed	Not allowed
Dust control on roads and streets.	Allowed	Allowed	Allowed	Not allowed
Cleaning roads, sidewalks and outdoor work areas.	Allowed	Allowed	Allowed	Not allowed
Flushing sanitary sewers.	Allowed	Allowed	Allowed	Allowed

Notes:
(a) With "conventional tertiary treatment." Additional monitoring for two years or more is necessary with direct filtration.
(b) Drift Eliminators and/or biocides are required if public or employees can be exposed to mist.
(c) Refer to Groundwater Recharge Guidelines, California Department of Health Services.
Source*:* California Health Laws Related to Recycled Water, "The Purple Book" *Excerpts from the Health and Safety Code, Water Code, and Titles 22 and 17 of the California Code of Regulations. Last Update: June 2001*

7.3.3.4.1 Total Maximum Daily Loads

The portion of the Santa Clara River within the Region currently has two TMDLs for chemical impairments adopted by the Los Angeles RWQCB, one for nitrogen compounds (Reaches 7 and 8) and one for chloride (Reaches 5 and 6). An Indicator Bacteria TMDL also recently went into effect, in 2012, for reaches 5 through 7. Table 7.3-3 identifies and describes the geographic locations of the reaches of the Upper Santa Clara River that lie within the Region as identified in the adopted Basin Plan (see also Figure 2.1-1). Another TMDL is in place for three lakes within the Region that are impaired with trash.

TABLE 7.3-3
UPPER SANTA CLARA RIVER REACHES

Reach Number	Reach Name	Geographic Description
5 (part of Reach 5 is outside the Region, in Ventura County)	Blue Cut	Upstream of USGS Blue Cut Gauging Station to the West Pier Highway 99/Old Road Bridge
6	Highway 99	Upstream of Highway 99 to Bouquet Canyon Bridge
7	Bouquet Canyon	Upstream of Bouquet Canyon to Lang Gauging Station
8	Above Lang Gauging Station	Lang Gauging Station to headwaters

The nitrogen compounds TMDL was established due to the listing of various reaches of the Santa Clara River for Nitrate + Nitrite on the 303(d) list of impaired water bodies initially in 1998 and again in 2002. The primary source of the identified nitrogen compounds to the Santa Clara River were wastewater discharges, with possible other sources being agricultural runoff, stormwater runoff, groundwater discharge and atmospheric deposition. Given these sources, wasteload allocations for nitrogen compounds were assigned to the various sources. These findings led to a Basin Plan Amendment for a nitrogen compounds TMDL for the Santa Clara River that went into effect on March 23, 2004. Since that time, there has been success in reducing nitrate in the river; the Upper Santa Clara River was not listed as nitrate impaired in the 2010 303(d) list.

The chloride TMDL was established due to the listing of Reaches 5 and 6 of the Upper Santa Clara River for chloride on the 303(d) list of impaired water bodies in 1998. Wastewater discharges from the Saugus and Valencia WRPs were determined the principal sources, contributing up to 70 percent of the chloride load into Reaches 5 and 6. As a result, the TMDL established waste load allocations for the Saugus and Valencia WRPs. The implementation schedule allowed for a number of special studies to provide scientific certainty over the appropriate wasteload allocations and objectives for chloride that are necessary to protect various beneficial uses, including salt-sensitive agriculture and endangered species.

In 2008, a trash TMDL became effective for Lake Elizabeth, Munz Lake, and Lake Hughes. Targeted efforts in the vicinity of Munz Lake have paid off, in 2011 it was determined that the lake was no longer impaired by trash. In September, 2012, LA County completed implementation of five trash capture devices at the impaired lakes and is thereby in full compliance with the TMDL.

Resulting from an assessed impairment to beneficial uses, an Indicator Bacteria TMDL was adopted by the RWQCB for Santa Clara River Reaches 5, 6, and 7 on July 8, 2010 and went into effect on March 21, 2012. Initially, Reach 6 of the upper Santa Clara River was listed as impaired by elevated levels of indicator bacteria in 1996. During the 1998 Water Quality Assessment, Reaches 5 and 7 were also found to be impaired by high coliform counts and were added to the 303(d) List. Primary contributors of bacteria to the Upper Santa Clara River have been found to be discharges from the stormwater conveyance system that drains urban areas.

A more detailed discussion on 303(d) listings and TMDLs is also found in Sections 3.2.1.3 and 3.2.1.4.

7.3.3.4.2 Stormwater Runoff

The US EPA approved the SWRCB and nine RWQCBs for enforcement of the stormwater regulations identified in the Clean Water Act. The SWRCB issues permits for Construction and Industrial sites. Cities and Los Angeles County are issued the joint permit. The RWQCBs issue the NPDES permit for municipal discharges, known as the MS4 permit.

Construction

The SWRCB elected to issue one statewide General Construction Activities Stormwater Permit (General Construction Permit), the most recent of which was adopted in 2009 and became fully enforceable in September 2011. This General Construction Permit applies to all construction projects that encompass one or more acres (except those areas on Indian lands and the Lake Tahoe Hydrologic Unit). In the Region, the Los Angeles RWQCB enforces stormwater regulations.

The General Construction Permit requires the development and implementation of Stormwater Pollution Prevention Plans (SWPPP), emphasizing stormwater BMPs and monitoring programs. All dischargers must prepare, retain at the construction site, and implement a SWPPP. The SWPPP has two major objectives:

- To help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges.
- To describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater and non-stormwater discharges.

The SWPPP should include the following information:

- Site description addressing the elements and characteristics specific to the site, including site maps showing drainage patterns across the project.
- Descriptions of BMPs the discharger will use to prevent stormwater runoff and the placement of those BMPs. These must include:
  - BMPs that address source control
  - BMPs that address pollutant control
  - BMPs that address treatment control
- Acknowledgement and implementation of approved local plans.
- Proposed post-construction controls, including description of local post-construction erosion and sediment control requirements.

- Non-stormwater management.

Prior to issuing a grading or building permit, the City of Santa Clarita and County of Los Angeles require that each entity applying for such demonstrate compliance with the General Permit (where applicable) or by implementation of alternative grading and construction activity run-off control programs.

Industrial

The statewide NPDES General Permit for Stormwater Discharges Associated with Industrial Activities is currently being updated and the new order is anticipated to become effective in 2013. The Industrial General Permit regulates discharges associated with 10 broad categories of industrial activities, including for example manufacturing facilities and wastewater treatment works. Industrial activities that fall under this permit must implement management measures that will achieve the performance standard of best available technology economically available and best conventional pollutant control technology. Similar to the Construction General Permit, the Industrial Permit also requires the development of a stormwater pollution and prevention plan, and a monitoring plan. The SWPPP shall identify sources of pollutants and describe methods for managing those sources to reduce stormwater pollution. Under the new Industrial General Permit, dischargers are required to implement a set of minimum BMPs, in combination with additional facility specific BMPs. Reports are required to be submitted on an annual basis.

The City of Santa Clarita and County of Los Angeles require that entities engaged in industrial activities and subject to the General Industrial Activities Stormwater Permit demonstrate compliance with that permit prior to making any discharges to the sewer system.

Municipal

Municipal sewer system discharges are regulated under regional MS4 permits. The City of Santa Clarita is one of 84 cities along with the LACFCD (the primary permitee) that are covered by the Los Angeles County Municipal Stormwater National Pollutant Discharge Elimination System Permit (NPDES No. CAS004001), issued by the Los Angeles RWQCB. The objective of this permit is to protect the beneficial uses of receiving waters in the County. To meet this objective, the permit requires that BMPs will be implemented to reduce the discharge of pollutants in stormwater to the maximum extent practicable. The Los Angeles County municipal permit includes: non-storm water discharge prohibitions (such as irrigation flows, potable water discharges), receiving water limitations, monitoring programs, incorporation of TMDLs, as well as minimum control measures. Minimum control measures require programs in illicit connection and discharges, public education and outreach, commercial and industrial inspections (where cities/county are required to perform inspections of the SWRCB issued industrial NPDES Permits), development programs (where cities/county require to enforce the SWRCB issued construction NPDES Permit and require post construction treatment for new and redevelopment), public agency activities (such as street and catch basin maintenance), and trash management.

Permitees are currently negotiating a new Los Angeles County Municipal Stormwater NPDES Permit.

In addition to construction, industrial and municipal NPDES stormwater regulations, stormwater regulations also exist for irrigated farmland activities. In 2005, the LA RWQCB adopted a Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Within the Los Angeles Region. This program requires owners of irrigated farmlands to measure and control discharges from their property, but allows individual landowners and growers to collectively work towards compliance. In Ventura County, agricultural organizations, water districts and individuals came together in 2006 to form a unified discharger group, the Ventura County Agricultural Irrigated Lands Group (VCAILG).

7.3.3.4.3 Wastewater Discharges

The City of Santa Clarita owns the local sewers within its borders, and Los Angeles County owns the majority of the local sewers located in unincorporated areas. Local lines are sewers that, typically, convey wastewater from a user's property line to the trunk sewers. The Los Angeles County Consolidated Sewer Maintenances District operates and maintains these local sewers (LACSD 2012). The Santa Clarita Valley Sanitation District owns, operates, and maintains the wastewater conveyance system for the Santa Clarita Valley, conveying wastewater and wastewater solids from the local sewer lines to the Saugus and Valencia water reclamation plants. The Saugus and Valencia water reclamation plants are subject to waste discharge requirements issued by the Los Angeles RWQCB. Effluent limitations have been set for 21 parameters, including BOD, TDS, chloride, and nitrogen compounds.

The Newhall Ranch WRP that is planned for construction is described in the individual NPDES Permit and waste discharge requirements issued by the RWQCB in 2007. The NPDES Permit contains effluent limitations to control the amount of conventional, non-conventional, and toxic pollutants discharged to receiving waters, including chloride. In addition, the smaller, proposed plant for Vista Canyon Ranch is also in the process of obtaining applicable wastewater discharge permits that will contain effluent limitations to protect water quality and beneficial uses.

In addition to the NPDES waste discharge requirements mentioned above, the SWRCB adopted statewide general waste discharge requirements for sanitary sewer systems in an effort to address sanitary sewer overflows. Under this order, public agencies in the Region that own or operate sanitary sewer systems are required to develop and implement sewer system management plans and report all sanitary sewer overflows to the SWRCB's online database.

7.3.3.5 Salt and Salinity Management

A Salt and Nutrient Management Plan is being prepared for the Santa Clara River Valley East Groundwater Subbasin. The SWRCB adopted a statewide Recycled Water Policy on February 3, 2009 to establish uniform requirements for the use of recycled water. The purpose of this Policy is to increase the use of recycled water in a manner that implements state and federal water quality laws. A Salt/Nutrient Management Plan Task Force was convened to work with the RWMG, Regional Water Quality Control Board and Stakeholders to establish clear and specific objectives to protect water quality given use of recycled water. The Salt and Nutrient Management Plan has identified sources of salt and nutrients and has evaluated the subbasin's assimilative capacity for these constituents. The Salt and Nutrient Management Plan includes

BMPs to avoid impacts from salt and nutrients and lays out a groundwater monitoring program to monitor groundwater quality.

7.3.4 Promote Resource Stewardship

Existing practices employed in the Region as part of ongoing resource stewardship efforts include the following broad-based land use, watershed and floodplain management activities, policies and programs implemented by various entities in the Region for both urban and agricultural users.

Aerial View of the Upper Santa Clara River Watershed

Efforts include, but are not limited to: land use management plan development; land and habitat conservation plan development; land use designation for conservation; land acquisition for conservation; impact mitigation plan development; endangered species recovery plan development; restoration and enhancement plan development; Sensitive Resource Area designation; SEA planning (County); and the work of private resources, conservation organizations, tasks forces, and concerned citizen groups, as summarized below (VCWPD and LACDPW 2005).

7.3.4.1 Agricultural Lands Stewardship

Agricultural lands stewardship is a critical component of planning for resource conservation and water use efficiency. Approximately 38,400 acres in the Upper Santa Clara River Watershed are zoned agricultural. Several well-established incentive programs to support agricultural land preservation are implemented throughout the Region. A Williamson Act Contract, prepared pursuant to the California Land Conservation Act of 1965, provides an approximately 25 to 75 percent property tax break to private landowners in exchange for a voluntary agreement to maintain ongoing agricultural use for a rolling 10-year period. The contract automatically renews at the end of 10 years unless a notice of non-renewal is filed prior.

Numerous federal programs administered by the Natural Resource Conservation Service (NRCS) provide support for protecting water resources and natural habitats while preserving agricultural and grazing lands. These Farm Bill programs, resulting from passage of the Farm Security and Rural Investment Act of 2002 and renewal of funding for its key conservation programs in 2007, provide farmers and ranchers incentives such as cost-share, land rentals, incentive payments, and technical assistance, to respond to the range of emerging natural resource challenges related to the management of their lands.

Local land use planning also serves as an important venue to promote agricultural land stewardship. Updates and modifications to policies further supporting and protecting existing and future agricultural use from urban encroachment and conversion are included as part of the Los Angeles *Countywide General Plan* update and the Valley's *OVOV Area Plan* update. National and regional non-profit organizations are also involved in implementing resource conservation strategies that focus on agricultural land management. The Nature Conservancy provides one example. Currently, The Nature Conservancy is exploring possibilities to

implement a program designed to encourage ecologically compatible and economically viable local farming operations to act as a buffer zone between the river and developed areas.

7.3.4.2 Economic Incentives

Economic incentives to promote resource stewardship include the provision of grants and other forms of financial assistance to land owners, water purveyors, and wastewater agencies, bonding and tax policies, as well as the implementation of pricing to promote efficient water use. Land acquisition for the purpose of protection and restoration of significant ecological areas is another important strategy that utilizes the financial market to help achieve stewardship goals.

In addition to the incentive programs discussed under the agricultural land stewardship section, other voluntary restoration programs offer financial incentives to landowners. US FWS "Partners for Fish & Wildlife" Program is one such program offered in the Region. The Partners for Fish & Wildlife Program provides funds and technical assistance to landowners, and supports the restoration and enhancement of wetlands, native grasslands, and other declining habitats, for the benefit of threatened and endangered species, migratory birds, and other wildlife. Supported regional activities include the removal of invasive non-native plants, such as arundo, and reintroduction of native plant species to riparian areas. Large land acquisition efforts are also underway by the Coastal Conservancy and The Nature Conservancy for watercourse expansion, flood management activities, and the protection and restoration of habitat and wildlife corridors along the Upper Santa Clara River.

For several years, the City of Santa Clarita has been working to purchase land around the City to create a greenbelt buffer of preserved, undeveloped property and make a positive and significant impact on the retention of wildlife corridors. In July 2007, the City of Santa Clarita property owners voted to create the Open Space Preservation District, funded by a special assessment paid by property owners. As of 2012, the City of Santa Clarita had over 7,000 acres in dedicated open space.

7.3.4.3 Ecosystem Restoration

Ecosystem restoration refers to the restoration of natural areas that have been altered as a result of anthropogenic pressures such as agriculture, urban development and pollution. In many ways, the purpose of ecosystem restoration is not only to improve the intrinsic value of the lands themselves, but to strengthen their ability to provide important ecosystem services such as groundwater recharge and flood protection.

Various restoration efforts are underway throughout the Region. The Nature Conservancy is facilitating restoration of southern steelhead habitat along the Santa Clara River through a variety of measures, including planting vegetation filter strips along urban and agricultural interfaces to filter contaminants, planting native vegetation along riverbanks to lessen erosion and to reduce sediment loading, and conducting exotic plant removal and native vegetation restoration pilot projects. The Nature Conservancy has acquired 40 acres in the Upper Santa Clara River Watershed with immediate plans to acquire an additional 350 acres (3 parcels total) in the floodplain (personal communication, EJ Remson 2007). In addition, the Sierra Club's Santa Clara River Greenway Campaign is underway to bring the entire 500-year floodplain of the Santa Clara River from the City of Fillmore to the community of Acton into public ownership and protection for improved water quality and quantity, enhancement of plant and wildlife

species habitats, protection of open space attributes and aesthetics, increased river fluvial dynamics, and maintenance of agricultural resources.

The Friends of the Santa Clara River (Friends) is another non-profit conservation group with a focus on the protection, preservation and enhancement of the Region's riparian and watershed-dependent resources. In the Upper Santa Clara River Watershed, Friends works with The Nature Conservancy and Southcoast Wildlands on some of their acquisition efforts in the Soledad Canyon area. They also have a stream team that samples the river water once a month at two Upper Santa Clara River sites.

Other restoration efforts underway include implementation of the *ARCO Oil Spill Restoration Plan*, developed by the US FWS and the CDFW's Office of Spill Prevention and Response. This restoration plan resulted from an oil spill settlement that stipulated funds be used for habitat rehabilitation, re-vegetation and/or protection of areas within the Santa Clara River Watershed, and for wildlife projects that benefit endangered species.

In July 2007, voters in the City of Santa Clarita voted to form an open space preservation district. The annual cost to single family homeowners will be $25; condominium and townhouse owners will pay slightly less and those who own larger, non residential parcels will pay more. In future years, fees for the open space preservation district can increase by no more than $1 per year and only if approved by the City Council, following a public hearing. The open space preservation district is intended to purchase lands in and around the City and finish the City's greenbelt buffer (City of Santa Clarita 2007).

Increasing threats by invasive weeds in the Upper Santa Clara River watershed have resulted in various efforts to enhance management of these weeds. The Santa Clara River Invasive Weeds Task Force was created to restore the Santa Clara River through collaborative management of invasive weeds in the watershed. Stakeholders involved in the task force include government agencies, non-profit organizations, agricultural interests, environmental consultants, landowners, local academic institutions, and represent members from the upper and lower watersheds, as well as both, the Los Angeles and Ventura County Weed Management Areas.

This task force has proposed to implement a regional arundo and tamarisk eradication program that will demonstrate measureable improvements with goals and objectives consistent with the national nonpoint source program and water management initiative. This program has resulted in the development of the Upper Santa Clara Arundo River Watershed Removal Plan (SCARP), a long-term eradication, monitoring, and maintenance plan. The goal of the plan is to provide a comprehensive document to allow any agency or organization to perform arundo/tamarisk removal projects within upper Santa Clara watershed of any scale. In order to facilitate implementation of projects under this program, the plan takes into consideration, among other things, how to comply with environmental agency restrictions and permits, including CEQA, NEPA, which permits need to be obtained by individuals and organizations, as well as mechanisms for funding projects.

In addition, the Santa Clara/Mojave Rivers Ranger District of the Angeles National Forest is proposing a long-term invasive plant treatment project in the Santa Clara River watershed. The project will consist of long-term invasive plant management, at least 15 years that could include the use of herbicides, manual, mechanical, biological, and fire wilting methods. The project area will include all National Forest System lands within the watershed, potentially including

treatment areas outside of the National Forests. An Environmental Assessment for this project was released for public review in 2012.

7.3.4.4 Forest Management

A large portion of the Santa Clara River watershed includes the Angeles National Forest and the Los Padres National Forest. National forest watersheds are managed to provide many benefits including flood protection and quality drinking water for downstream communities, as well as protection of Wildland/Urban Interface areas from wildland fires. They also offer a haven for native plants and animals, and provide unique and irreplaceable habitat for threatened, endangered, and sensitive species. The four national forests in southern California (Angeles, Cleveland, Los Padres, San Bernardino) are among the most urban-influenced, national forests in the total National Forest System.

Revised in 2005, the land management plans, also known as the Forest Plans, were developed for the southern California national forests, based on the concept of sustainable use of the national forests. These plans outline the goals and strategic direction for land and natural resource management activities on a program-level over the next 10 to 15 years. The forest plan defines the parameters for management, but offers the flexibility to adapt decisions to accommodate rapidly changing resource conditions. Strategies are designed to achieve the national forests' desired conditions relating to ecological, economic, and social attributes. Among the 12 goals described in Part 1 of the Forest Plan, based on the Forest Service National Strategic Plan, are (a) Improve watershed conditions through cooperative management and (b) Improve riparian conditions. The desired condition is that national forest watersheds are healthy, dynamic and resilient, and are capable of responding to natural and human caused disturbances while maintaining the integrity of their biological and physical processes. Additionally, with respect to riparian systems, the desired condition is that watercourses are functioning properly and support healthy populations of native and desired nonnative riparian dependent species. Specific objectives that help achieve these desired conditions are:

- Assess and restore high-priority watersheds and maintain riparian habitat within these watersheds.
- Monitor water quality impacts of activities on National Forest System lands.
- Restore and maintain native and desired nonnative plant and animal species diversity within terrestrial and aquatic ecosystems and reduce the rate of species endangerment by contributing to species recovery.

7.3.4.5 Land Use Planning and Management

Urban land use decisions generally occur at the local level, but these decisions can impact the ecological health of regional systems, including the hydrologic cycle and local water quality and supply. General plans throughout the Upper Santa Clara River Watershed are therefore important policy tools that can guide land use decision-making to simultaneously protect the community's economic interests and public and environmental health needs. A joint planning process by the City of Santa Clarita and County of Los Angeles, "One Valley, One Vision" (OVO) was completed in 2012. The OVOV creates a single general plan for the Valley and its communities. In addition to policies established by local land use plans, existing local policies

and ordinances encourage and, in some cases, mandate low impact development adjacent to affected waterways in the Region. For example, development setbacks and landscape guidelines for fuel management zones are established by the applicable land use jurisdiction for new development adjacent to or within the immediate vicinity of a water body, and the identification and implementation of sensitive biological resource areas overlay zones are under consideration, such as the one described below.

Los Angeles County Department of Regional Planning has proposed (but not yet adopted) the creation of a SEA that encompasses the entire County reach of the Santa Clara River. The proposed SEA meets several designation criteria and supports the protection and preservation of many regional biological resources, including habitat for core populations of endangered species, migration corridors, diverse and abundant plant and wildlife species assemblages, regionally distinct biotic communities, and areas that have high value for preservation because they represent relatively undisturbed examples of natural biotic communities in the Region. Management recommendations for the proposed SEA include limiting new developments to outside the existing floodplain margins to obviate the necessity for further bank stabilization, stringent review of proposals for new or increased groundwater extraction to prevent overdrafting of the shallow aquifer supporting riparian habitat areas, and requiring agricultural activities to employ BMPs to avoid unnecessary impacts to habitats. This range of proposed management strategies above represents the variety of resource stewardship approaches discussed so far.

The Newhall Land and Farming Company (NLF) is currently planning for the development of Newhall Ranch, a new community that will be located on NLF land west of the Interstate-5 freeway. The site is comprised of 12,000 acres, of which approximately half will be developed and half will be preserved as open space. NLF has obtained long term federal and state environmental permits from agencies including the US ACOE, CDFW, and US FWS, as well as the County, with an aim to balance development with environmental protection. In September of 2012, the LA RWQCB issued a 401 Water Quality Certification and Waste Discharge Requirements, which was the last outstanding federal permit relating to environmental issues on Newhall Ranch. Under the issued Waste Discharge Requirements, the project will preserve and protect approximately 612 acres of waters of the United States, including 272 acres of wetlands in perpetuity.

7.3.4.6 Recharge Areas Protection

The availability of local groundwater supplies is derived in part from the sustainability of the groundwater resource, or its ability to recharge. Groundwater resources rely heavily on groundwater recharge areas such as natural drainage channels, floodways and floodplains that help to replenish underlying aquifers. Identification and management of recharge areas is one of 14 elements comprising CLWA's 2003 *Groundwater Management Plan*. Such activities are critical to ensuring that the Valley groundwater basin continues to readily recharge, as historical operating experience demonstrates it has in the past.

The Los Angeles RWQCB is charged with the responsibility of developing solutions which will restore water quality and protect beneficial water uses, including groundwater recharge. The Los Angeles RWQCB's implementation of pollution prevention programs such as the federal Nonpoint Source Pollution Program, and participation in the US EPA's Brownfields Cleanup and Redevelopment Agency Program, are significant components of recharge area protection.

Regional arundo removal efforts and the removal of other invasive, water-intensive plants also contribute to the protection of groundwater recharge areas.

A significant improvement to recharge area protection in the Valley will be provided by the ongoing remediation of the former Whittaker-Bermite site, which still contains soils contaminated with perchlorate and other contaminants. Additionally, TMDLs in place for nitrogen compounds and chloride will contribute to improved water quality and thereby contribute to recharge area protection in the Region.

7.3.4.7 Water-Dependent Recreation

Water-dependent recreation includes activities such as boating and fishing, which occur on lakes, reservoirs and rivers, and passive recreation such as camping and hiking that is enhanced by water features. Multiple lakes within the Upper Santa Clara River Watershed provide recreational opportunities of the first type to Region residents and seasonal visitors. Castaic Lake State Recreation Area, owned by DWR and managed by Los Angeles County Department of Parks and Recreation, offers boating, swimming and fishing opportunities. For anglers, Castaic Lake is known primarily for its largemouth bass fishing, but the lake also hosts a variety of additional game fish including trout and striped bass. Castaic Lake hosts team bass tournaments in the summer. Fall through spring, CDFW stocks Castaic Lake Lagoon with rainbow trout; Bouquet Creek, a tributary of the Santa Clara River, is stocked late spring through summer. In addition to fishing, Castaic Lake offers boating, waterskiing and jet skiing opportunities in approved areas.

The *Parks and Recreation Element* of City of Santa Clarita's *General Plan* has established the goal of utilizing the Santa Clara River as a central corridor for recreation. Policies proposed to achieve this goal included establishing the Santa Clara River as a major recreational focal point within the Valley, in part through the development of a regional plan for the Santa Clara River. Because of the ephemeral nature of the river, water-dependent recreation in the Upper Watershed is severely limited and, throughout much of the year, non-existent. However, the County's backbone trail system runs along the river, improving river access and providing trails for walking, hiking and equestrian uses. The City of Santa Clarita has constructed a bike path system along major portions of the river and its tributaries within its jurisdictional limits.

City of Santa Clarita Equestrian and Bike Trail

7.3.4.8 Watershed Management

Watershed management is a holistic and politically inclusive approach to protecting water and other natural resources that focuses on land use and development within the boundaries of an identified watershed. Following a *Reconnaissance Phase Study* initiated in March 2002, the Los Angeles District of the US ACE determined that a Santa Clara River Watershed feasibility study was merited. This effort would cover the whole Watershed, and would assess the predevelopment conditions of the Watershed, the current condition, and future condition

scenarios. The effort will involve extensive modeling of the Watershed, and will be designed as a tool for decision makers. The study will include a comprehensive update of hydrologic, hydraulic, and sediment (yield and transport) models for a range of flow rates for existing conditions and future conditions within the Santa Clara River. The study will include generating new cross section data from new topographic maps for specific areas with existing urbanization and areas with the potential of urbanization in the near future within the Santa Clara River Watershed. One outcome of the study will be computer models that can simulate the existing and future land use changes upstream and provide data to forecast changes to the flood flows (10-, 20-, 100-year floods) and low flows (daily, 1-year, 2-year flows) in the Santa Clara River. A sediment transport study has been completed, but, due to a lack of funding, the Santa Clara River Watershed feasibility study is behind schedule.

The Goals of improving watershed and riparian system conditions have also been described in the updated Forest Plans, as described above in Section 7.3.5.4.

7.3.5 Improve Flood Management

7.3.5.1 Flood Risk Management

The Santa Clara River system plays a major role in transporting large volumes of runoff generated within the Region and the surrounding foothills and mountains. The natural and constructed drainage system is designed to accommodate runoff from normal precipitation (15 to 19 inches per year on average throughout the watershed with up to approximately 30 inches in high elevations [County of Los Angeles 2011, Stillwater Sciences 2011]); however, the rapid urbanization in the Region that began in the 1960s has increased the amount of impervious areas with more roof tops and paved parking lots and streets, thereby modifying original runoff patterns. In order to prevent increased velocities and flows through stormwater channelization, the majority of the Santa Clara River has been kept in a natural condition and flood control improvements necessary to protect development from flood hazards have generally consisted of buried bank stabilization projects. Buried bank stabilization has been implemented along various reaches of the Upper Santa Clara River, including along the South Fork and San Francisquito Creek within Reach 6.

The Santa Clara River Enhancement and Management Plan finalized in 2005 provides guidance on the resources management within the 500-year floodplain limits, including acquisition of land adjacent to the river for flood protection, among other uses. Hundreds of acres of such land have since been acquired by the City of Santa Clarita for such purposes. Land adjacent to the River has also been set aside within Los Angeles County's adopted Newhall Ranch Specific Plan, where floodplain protection will be achieved through projects that include bank stabilization, detention basins combined with habitat areas, rip rap, and soft-bottom channels.

LACFCD operates and maintains major flood control facilities, including drainage channels, storm drains, sediment basins, and streambed stabilization structures and has constructed concrete-lined portions of the Santa Clara River and tributaries. Within the County areas, future major drainage improvements will primarily be constructed by developers as required for new master-planned communities. The City of Santa Clarita currently has no plans for new major drainage facility improvements.

The original flood maps for the City of Santa Clarita were produced over 30 years ago. FEMA embarked on a national Map Modernization Program in 2005 to update the country's aging flood maps. The Santa Clara River and eight major tributaries in the Santa Clarita Valley have been restudied and are in draft form. After a quality assurance review and public notification process, the City expects to have the new data adopted in three to five years. These maps, together with the local floodplain ordinance, are used by the City to regulate development in floodplains (C. Monde 2012).

More detail on ongoing flood management is described in Section 4.

7.3.6 Resource Management Strategies

In addition to the 27 main water resource management strategies, the 2009 California Water Plan lists and describes other strategies that have potential to contribute to meeting one or more resource management objectives. Strategies listed in the Water Plan are:

- Crop idling for water transfers
- Dewvaporation or atmospheric pressure desalination
- Fog collection
- Irrigated land retirement
- Rainfed agriculture
- Waterbag transport/storage technology

While it was recognized in the Water Plan that these strategies have limited capacity for strategically addressing long-term regional water planning needs and may still require further research and development, these strategies were discussed among IRWMP stakeholders. It was concluded that these additional strategies are currently not feasible options for the Region. Strategies relating to agriculture, including crop idling, irrigated land retirement and rainfed production would provide only limited benefits to this Region, as agriculture makes up less than 1 percent of the approximately 654 square miles of the Region (1,994 acres according to County of Los Angeles 2011). The inland location and topographical and climatic conditions in the Region are not conducive to intense fog development, rendering fog collection a less feasible resource management strategy for the Region. Other strategies listed above are still in the research and development stages and may be considered in the future once they have been better established. As a result, no efforts will be pursued at this time to incorporate these strategies into the set of regional resource management strategies in this IRWMP.

7.4 Call for Projects

Projects are the specific means for implementing strategies and the way objectives are ultimately achieved. To identify the many potential projects in the Region and to assess the collective contribution of these projects towards meeting the IRWMP objectives, development of this IRWMP includes a “Call for Projects” which gives stakeholders the opportunity to directly submit their projects and project concepts for consideration. Stakeholders are encouraged to

submit projects at any stage of development. Avenues available for participating in the Call for Projects include submission of projects on a standard project information form, either submitted by electronic mail, by facsimile, or sometimes directly on-line via the IRWMP website (www.scrwaterplan.org).

The 2008 IRWMP also included a "Call for Projects". In order to track progress of projects, to reflect changes in Plan objectives, and to insure projects in the Plan are periodically reviewed and vetted by stakeholders, a project had to be submitted or resubmitted during the "Call for Projects" period in order to be included in this IRWMP Update. To facilitate resubmittal of projects from the 2008 Plan, all 2008 project sponsors were provided with electronic copies of their project forms and changes in the project submittal form were denoted by colored text.

While many of the projects lack detailed supporting information, the Call for Projects provided a mechanism to engage Stakeholders in the process of sharing project information and discussing the issues related to the integration of projects. Many of the projects discussed in this section provide multiple benefits, spanning more than one strategy. Therefore, some assumptions were made with regard to which resource management strategy a particular project would most benefit, to begin the initial organization of the projects. For example, a groundwater recharge project generally was assumed to provide water supply benefits, with a possible secondary benefit of addressing water quality needs. Section 8 will address this issue further by examining in greater detail how these projects can be integrated to provide multiple benefits.

The RWMG can hold a "Call for Projects" and update the IRWMP Project list at anytime. Revision of the IRWMP Project list does not require that the entire IRWMP be revised and re-adopted, rather the updated project list can be amended to the existing plan upon simple majority vote by the RWMG.

Appendix D, Part 3, demonstrates the relationship between the projects received as part of the Call for Projects and the 27 *California Water Plan* resource management strategies. In Appendix D, the projects are organized by project proponent (e.g., project sponsored by CLWA are given the names CLWA-1, CLWA-2, etc.).

TABLE 7.1-3
UPPER SANTA CLARA RIVER REGION RESOURCE MANAGEMENT STRATEGIES AND CALIFORNIA WATER PLAN RESOURCE MANAGEMENT STRATEGIES

	California Water Plan Strategies																										
	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance	System Reoperation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – CALFED	Surface storage – Regional/Local	Drinking Water Treatment and Distribution	GW/Aquifer Remediation	Matching Water Quality to Water Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Areas Protection	Water-Dependent Recreation	Watershed Management	Flood Risk Management	Other
REDUCE WATER DEMAND																											
BMPs																											
Conservation Coordinator																											
Water Waste Prevention																											
Water Loss Control																											
Metering with Commodity Rates																											
Retail Conservation Pricing																											
Public Information Programs		•				•						•					•		•				•				
School Education Programs																											
Residential Survey and Retrofit																											
Residential Landscape Water Survey																											
WaterSense Specification Toilets																											
Commercial, Industrial, Institutional																											
Large Landscape																											
Agricultural Water-Use Efficiency Measures	•					•												•	•				•				
INCREASE WATER SUPPLY																											
Surface Reservoir or Storage Tank									•	•																	
Surface Water Diversion				•																							
Groundwater Extraction Facilities						•																					
Aquifer Storage and Recovery						•							•														
Groundwater Management and Planning Policies						•										•											
Groundwater Replenishment Including Spreading Grounds and Injection Wells																											
Aquifer Recharge with Reclaimed Water						•																					
Aquifer Recharge with Septic																											
Hydrologic Modeling and Monitoring			•	•						•	•					•	•										•
Recycled Water for Irrigation or Other Beneficial Uses																											
Surplus Recycled Water from Other Regions									•					•													
Increased Uses for Recycled Water through Policy Change and Education									•					•													
Imported Water	•	•	•	•	•	•				•	•	•													•		
Watershed Planning																•		•				•			•		

	CALIFORNIA WATER PLAN STRATEGIES																												
	AGRICULTURAL WATER USE EFFICIENCY	URBAN WATER USE EFFICIENCY	CONVEYANCE	SYSTEM REOPERATION	WATER TRANSFERS	CONJUNCTIVE MANAGEMENT AND GROUNDWATER STORAGE	DESALINATION	PRECIPITATION ENHANCEMENT	RECYCLED MUNICIPAL WATER	SURFACE STORAGE – CALFED	SURFACE STORAGE – REGIONAL/LOCAL	DRINKING WATER TREATMENT AND DISTRIBUTION	GW/AQUIFER REMEDIATION	MATCHING WATER QUALITY TO WATER USE	POLLUTION PREVENTION	SALT AND SALINITY MANAGEMENT	URBAN RUNOFF MANAGEMENT	AGRICULTURAL LANDS STEWARDSHIP	ECONOMIC INCENTIVES	ECOSYSTEM RESTORATION	FOREST MANAGEMENT	LAND USE PLANNING AND MANAGEMENT	RECHARGE AREAS PROTECTION	WATER-DEPENDENT RECREATION	WATERSHED MANAGEMENT	FLOOD RISK MANAGEMENT	OTHER
Rainwater Collection Systems (Cisterns)		•				•											•										
Greywater Systems		•							•																		
Water Banking, Exchange and Transfer Projects			•	•	•	•																					
Drought Contingency and Emergency Planning	•	•	•	•	•	•					•	•	•														
Urban Water Management Planning		•																									
Removal of Invasive, Water-Thirsty Plants																				•			•		•	•	
Understand Total Water Usage in Region	•	•				•																	•		•		
Rehabilitation, Replacement, or Removal of Existing Facilities	•	•	•	•																							
Improved Operational Efficiency Measures	•	•																									
Intertie Projects			•	•	•																						
IMPROVE WATER QUALITY																											
Build Sewer Treatment Collection and Distribution Systems															•												
Rehabilitate or Upgrade Sewer Treatment Collection and Discharge Systems															•												
Relocate and Protect Sewer Treatment Collection and Discharge Systems - Remove from Vulnerable Locations															•												
TMDL Development and Implementation															•	•	•		•								
Pump and Treat Water for Quality Enhancement															•		•		•								
Remove or Prohibit On-Site Water Softening Devices															•												
Replacement of Problematic Septic Tank Systems with Sewer Hook-Ups															•												
Fertilizer, Herbicide, and Pesticide Application Reduction	•														•			•									
Low Level Storm Water Treatment															•	•	•									•	
Non-Point Source Pollution Control Landscape/Hardscape Retrofits															•	•											
Water Quality Monitoring (Requires Coordination Among Sampling Entities to be Effective)															•												
Improve Water Quality Being Discharged									•			•	•	•	•	•	•						•	•		•	
Brownfields Remediation													•						•				•	•		•	

	California Water Plan Strategies																												
	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance	System Reoperation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – CALFED	Surface storage – Regional/Local	Drinking Water Treatment and Distribution	GW/Aquifer Remediation	Matching Water Quality to Water Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Areas Protection	Water-Dependent Recreation	Watershed Management	Flood Risk Management	Other
Wellhead Recharge and Protection													•	•	•	•												
Emerging Contaminant Problems - Monitoring and Management									•			•			•													
Control and/or Enforce Prohibitions on Illegal Discharge of Controlled or Toxic Substances													•		•													
Leaking Underground Storage Tank Remediation						•									•													
Outreach and Education															•													
Biological Treatment of Water (e.g., Treatment Via Wetlands)																				•	•					•		
Improve Riparian Habitat																				•	•							
Practice Resource Stewardship																												
Levee Construction																										•		
Channel Improvement Projects																										•		
Detention Basins																										•		
Debris Basins																										•		
Ongoing Facility Maintenance																										•		
Removal of Hazards or Facilities from Floodways																										•		
Storm Monitoring and Modeling - Flows, Water Quality																										•		
Coordinated Hydrogeomorphic Modeling																				•			•			•		
Incentives for Landowners - Public/Private Partnerships																			•	•	•					•		
Evaluate Process for Reconstruction Following Emergencies (Floods, Landslides)																												
Public Information Programs Regarding Flood Prevention																										•		
Land Acquisition for Watercourse Expansion/Flood Management																			•		•					•		
Protect And Enhance Native Ecosystem Diversity																				•	•							
Control, Remove, and Prevent Invasive Species																				•	•							
Protect Existing Habitats from Degradation																				•	•							
Urban Stream Restoration and Revitalization																				•		•				•		
Land Acquisition and/or Easements for Protection and Restoration of Habitat Areas Landscape Linkages/Wildlife Movement																				•	•	•						

	California Water Plan Strategies																											
	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance	System Reoperation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – CALFED	Surface storage – Regional/Local	Drinking Water Treatment and Distribution	GW/Aquifer Remediation	Matching Water Quality to Water Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Areas Protection	Water-Dependent Recreation	Watershed Management	Flood Risk Management	Other
Protect and Restore Fish and Wildlife Migration Corridors and Landscape Linkages; Where Necessary Create Or Modify Structures to Facilitate Fish and Wildlife Movement, such as Fish Ladders, Road Undercrossings, etc.																				•	•						
Restore Natural Hydrograph and Sediment Transport in Local Watercourses																				•						•	
Mitigation Banking																				•							
Integrated Watershed GIS "Spatial Database"																									•		
Identify and Collect Biological Resources Data for Comprehensive Database: (1) Ecosystem Function Analysis (2) Water Quantity and Quality Needs of Fish and Wildlife																				•					•		
Provide for Long-Term Stewardship of Natural Resources, Especially Public Land: Staff, Funding, Organizational Structure (District or Conservancy) Monitoring and Enforcement																				•					•		
Conservation Plans: (1) Evaluate Multiple Scale Habitat Needs of Aquatic and Riparian Dependent Species																				•					•		
Active and Passive Recreation Areas Related to Water Resources																				•				•			
Enhance Appropriate Public Access																				•		•	•	•	•	•	
Updates and Modifications to General Plan Policies																		•		•		•					
Watercourse Set-Back Ordinances or Policies																				•					•	•	
Riparian Corridor Buffers																				•							
Floodplain Development Restrictions																										•	
Sensitive Biological Areas Overlay Zones																				•							
Flood Hazard Mapping																										•	
Require Evaluation of Footprint Impacts in Newly Developing Areas																				•							
Create Incentives (Tax Credits) for Landowners to Protect and Restore Habitats and Ecosystems on Their Property																			•	•							
Agricultural Lands Stewardship																		•									
Post-Fire Rehabilitation															•		•										
Landscape Guidelines for Fuel Modification/Defensible Space in New Development																						•					
Urban Landscape Management Planning																						•					
Open Space Acquisition/Purchase																				•		•					

Section 8: Project Priorities and Implementation

8.1 Project Prioritization Process

The Upper Santa Clara River IRWMP will be implemented through specific studies and actions. In order to identify potential projects that facilitate IRWMP implementation (e.g., "Candidate Projects"), the RWMG held an open "call for projects." Stakeholders and others were encouraged to submit projects during multiple stakeholder meetings, in email correspondence solicitations, and via the project website. Project proponents that had submitted projects as part of the 2008 IRWMP were given copies of their previous submittals and asked to revise the forms to reflect the current project status and to provide information relevant to the latest IRWM Guidelines (e.g., climate change information, cost-benefit information), and resubmit the project for consideration. To implement water management strategies identified in the IRWMP, Stakeholders identified 55 separate projects during this 2014 IRWMP update.

The timeline for project solicitation was as follows:

April 2012	Development of project ranking and review criteria by RWMG, development of project solicitation forms
May 2012	Review of project ranking criteria, introduction to data needed for project submittal, announcement of "Call for Projects" during Stakeholder Meeting
July 2012	Refresher on data needed for project submittal, reminder of "Call for Projects" during Stakeholder Meeting
August 2012	Project submittals due
September 2012	Presentations by Stakeholders on projects "ready to proceed", review of opportunities to integrate projects, project refinement
October 2012	Presentations by Stakeholders on projects "ready to proceed", review of opportunities to integrate projects, project refinement
November 2012	Initial Project Ranking by RWMG
December 2012	Selection of IRWM Plan Projects Review and refinement of project ranking by Stakeholders Final IRWMP project ranking

The RWMG, with input from Stakeholders, developed a process to prioritize projects, with the intent that highest-ranked projects be put forth in applications for funding. The prioritization of projects is based upon a detailed screening process. The process had five major steps:

1. Development of Project Ranking and Scoring Criteria
2. Call for Projects
3. Development and Refinement
4. Initial Project Ranking
5. Review and Finalization of Ranking by RWMG and Stakeholders

All projects will be maintained on the IRWMP Project list, and the list will be updated on a regular basis as new projects are submitted and as projects are developed through time and re-prioritized. The RWMG can hold a "Call for Projects" and update the IRWMP Project list at anytime. Revision of the IRWMP Project list does not require that the entire IRWMP be revised and re-adopted, rather the updated project list can be amended to the existing plan upon simple majority vote by the RWMG.

8.1.1 Development of Project Ranking and Scoring Criteria

The RWMG determined that it was important to develop a systematic process to review projects for inclusion in the IRWMP. To this end the RWMG prepared a project review structure based on a point system. Points are awarded based on (1) how well a project implements the IRWMP objectives and (2) to what extent the project is consistent with the 2012 IRWM Proposition 84 Guidelines. The project ranking and scoring criteria are shown in Table 8.1-1. The project review criteria were developed by the RWMG and reviewed and confirmed by the broader Stakeholder group.

8.1.2 Call for Projects

Once the project review process was established, the project solicitation forms were developed. The RWMG wanted to encourage broad participation and directed the preparation of two different forms, a long-form for projects "ready to proceed" and a short-form for more conceptual projects. The long forms were intended to capture all the information needed to rank and review a project; the short-forms were intended to collect the information necessary to determine if a project is consistent with the IRWMP. Forms were distributed at Stakeholder meetings, provided to the email list, and posted at the IRWMP website (www.scrwaterplan.org). Completed forms could be submitted to the IRWMP website, submitted via email to the IRWMP consultant, via email to Castaic Lake Water Agency, or provided in hardcopy during a Stakeholder meeting. Forms submitted during the 2012 "Call for Projects" are provided in Appendix E.

TABLE 8.1-1
PROJECT RANKING AND REVIEW CRITERIA

Criterion	Possible Points
Project and Project Applicant Eligible	Pass/Fail Criteria If project affects groundwater: (1) There must be a GWMP prepared an implemented in compliance with CWC §10753.7 or applicant consents to be subject to a GWMP or other program that meets the requirements of CWC §10753.7. (2) Or the proposal must include development of a GWMP within 1 year of grant submittal date. (3) Or the project conforms to requirements of an adjudication of water rights in the subject groundwater. *If no to all 3 = Fail* If project proponent or project beneficiary is Urban Water Supplier: (1) They must have completed and submitted an Urban Water Management Plan (2) And be incompliance with AB1420 (3) And meet water meter requirements (CWC §525) *If no to any of the three = Fail* 5 points if Project Proponent has adopted or will adopt the Integrated Plan
Readiness to Proceed	25 points for each item below*, up to 200points: Local Cost Share Confirmed Construction Drawings completed Permits completed CEQA/NEPA completed Project benefits and costs defined at a level of detail that will allow cost-effectiveness analysis or benefit-cost analysis Preliminary Design and Cost Estimates complete Feasibility complete Conceptual Plans complete *Points were awarded if item was not applicable.
Addresses Multiple Objectives	15 points for each objective addressed, up to 100 points
Integrates Multiple Resource Management Strategies	5 points for each applicable Resource Management Strategy, up to 100 points
Benefits a Disadvantaged Community/Increases Disadvantaged Community Participation	Yes = 50 points No = 0 points

Table 8.1-1 cont.

Criterion	Possible Points	
Addresses Critical Water Issues for Native American Tribal Communities	Yes = 50 points No = 0 points	If Native American Tribal Community Qualifies as DAC, points will be awarded per box above and this box will not apply.
Environmental Justice Concerns	50 points	Project redresses inequitable distribution of environmental burdens
Consistent with Local Land Use Plans	Yes = 100 points No = 0 points	
Improves Interregional Coordination	Yes = 100 points No = 0 points	
Tie – Breaker Points	For any projects ranked in the top 15 with the same score the following points will be awarded:	
	10 pts	Project with lower cost per acre-foot of water conserved
	10 pts	Project with the greatest reduction in electrical/energy use per acre-foot of water
	10 pts	Project with lower cost per new acre-foot of water supply
	10 pts	Project with lower cost per acreage of habitat improved
	10 pts	Project with lower cost for per unit of flood reduction

8.1.3 Development and Refinement

Over the course of two workshops, those project proponents with projects "ready to proceed" presented information on their projects and took questions from the Stakeholders and public. These workshops served to: (1) identify opportunities for collaboration between Stakeholders, (2) identify opportunities for integrating different implementation projects, and (3) utilize the collective group experience to refine and improve proposed projects.

CANDIDATE PROJECTS

A large number of projects were submitted by Stakeholders. During the project development and refinement process, two project proponents observed commonalties in their projects and decided to form a partnership and

8.1.4 Initial Project Ranking

Based on information provided in the project solicitation forms as well as information gained at the project workshops, the RWMG scored each of the projects that had an associated long-form using the project ranking and review criteria (Table 8.1-1). The scoring criteria and resulting points for each of the 18 "long-form" projects was displayed in a matrix form. As a group the RWMG reviewed and refined project scores. Where necessary, project proponents were asked to provide additional information about their proposed project.

The RWMG also reviewed each of the 37 short-form projects for consistency with the IRWMP. The "short-form" projects are more conceptual and do not have the information necessary to be ranked. While these conceptual projects are not yet ready for implementation they offer ideas about how to further the objectives of the IRWMP and improve water management in the Region. For this reason the RWMG and Stakeholders want to capture these projects for further consideration.

8.1.5 Review and Finalization of Ranking by RWMG Stakeholders

The initial project ranking developed by the RWMG was presented to the Stakeholders during the regular December 2012 Stakeholder meeting. The Stakeholders were given the opportunity to review scoring for each of the 18 long-form projects as well as the review of each of the 37 short-form projects for consistency with the IRWMP.

8.1.6 Selected Plan Projects

Those Candidate Projects selected for inclusion in the IRWMP by the RWMG and Stakeholders become IRWM Plan Projects. The ranked IRWM Plan Projects are presented in Table 8.1-2; conceptual IRWM Plan Projects (not ranked) are presented in Table 8.1-3.

It should be noted that Tables 8.1-2 and 8.1-3 represent a "snapshot" particular to this edition of the IRWMP. Over time, new Candidate Projects will be evaluated, added to the plan, and ranked according to the established criteria. The list of IRWM Plan Projects is intended to continually grow and change as projects are completed and new project concepts are added.

The list of IRWM Plan Projects is provided in this IRWMP, was distributed to Stakeholders at the December 2012 Stakeholder meeting, and is available at the IRWMP website (www.scrwaterplan.org).

8.2 Integration of Water Management Strategies

CWC § 79501 states the following:

> *The people of California find and declare that it is necessary and in the public interest to do all of the following…*
>
> *Establish and facilitate integrated regional water management systems and procedures to meet increasing water demands due to significant population growth that is straining local infrastructure and water supplies.*
>
> *Improve practices within watersheds to improve water quality, reduce pollution, capture additional storm water runoff, protect and manage groundwater better, and increase water use efficiency.*

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TABLE 8.1-2
RANKEND IRWM PLAN PROJECTS

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives							Rank
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*	
SC-1	Upper Santa Clara River Arundo/Tamarisk Removal Program (SCARP) Implementation	City of Santa Clarita	Santa Clara River Conservancy; Angeles National Forest; Santa Clara Invasive Weeds Task Force	$0.5M-$20M (Capital); $25 - $100k/yr over 15 years (O&M)	◆	◆	◆	◆	◆	◆	◆	1
SCVSD-1	SCVSD Automatic Water Softener Rebate and Public Outreach Program	Santa Clarita Valley Sanitation District	City of Santa Clarita; County of Los Angeles	$1.1M/yr over 3 years (O&M)			◆				◆	2
NCWD-2	Pellet Water Softening Treatment Plant - Phase 1	Newhall County Water District	NA	$250,000 - $500,000 (Capital)	◆		◆	◆			◆	3
AA/BCN-1	Bouquet Canyon Creek Restoration, Control of Invasive Weeds	Agricultural Access/Bouquet Canyon Network (Currently no eligible applicant as Sponsor Agency)	Antelope Valley Resource Conservation District; Natural Resource Conservation District; Cooper Ecological Monitoring/Leathermann BioConsulting, Inc.; LA County Fire; Angeles National Forest	$20,240 - $52,852 (Capital); $13,052/yr over 5 years (O&M)		◆	◆	◆	◆	◆	◆	4
SCWD-2	July 2012 Santa Clarita Water Division Water Use Efficiency Strategic Plan Water Use	Santa Clarita Water Division	Castaic Lake Water Agency; City of Santa Clarita	$301,930-$2,520,469 (Capital); $62,370-	◆	◆	◆	◆			◆	5
SCVSD-2	Saugus Water Reclamation Plan - Ultraviolet Light Disinfection Facility	Santa Clarita Valley Sanitation District	Castaic Lake Water Agency	$8M-$14M (Capital); $2K/yr for 20 years (O&M)	◆	◆	◆	◆				6
CLWA-3	Santa Clarita Valley Water Use Efficiency Strategic Plan	Castaic Lake Water Agency	LACWD#36; Newhall County Water District; Santa Clarita Water Division; Valencia Water Company	$1M-$5M/yr over 8 years (Capital)	◆	◆	◆					7
LADPW-9	SCR South Fork Rubber Dam No. 1 and Spreading Grounds	Los Angeles County Flood Control District	NA	$5M-$9M (Capital); $50K/yr over 50 years (O&M)		◆	◆	◆	◆			8
CLWA-8	Foothill Feeder Connection	Castaic Lake Water Agency	Newhall County Water District; City of Santa Clarita; LACWD#36	$3M-$5M (Capital); $50K/yr over 50 years (O&M)		◆						9
SC-5	Biofiltration and Low Impact Development Retrofits	City of Santa Clarita	Los Angeles County; Castaic Lake Water Agency	$4M-$6M (Capital); $200,000/yr over 15 years (O&M)	◆	◆	◆	◆	◆	◆		10
SC-6	Septic to Sewer Retrofit Project	City of Santa Clarita	NA	$25M-$35M (Capital); unknown O&M		◆	◆	◆				11

Table 8.1-2 cont.

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives							Rank
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*	
CLWA-7	Castaic Conduit	Castaic Lake Water Agency	NA	$14,910,000-$16M (Capital); $5,000/yr (O&M)		◆						12
CLWA-10	Distribution System - RV-2 Modification	Castaic Lake Water Agency	NA	$2,880,000-$3,200,000 (Capital); $5,000/yr (O&M)		◆						13
CLWA-9	West Saugus Formation Groundwater Resources Monitoring Project	Castaic Lake Water Agency	NA	$628,675			◆	◆				14
NCWD-1	Santa Clara River – Sewer Trunk Line Relocation Phase II and III	Newhall County Water District	NA	$2,500,000 - $4,000,000 (Capital); $30K/yr over 50 years (O&M)		◆	◆	◆				15
NCWD-3	Santa Clarita Valley Residential Turf Removal Program	Newhall County Water District	Castaic Lake Water Agency; Santa Clarita Water Division; Valencia Water Company; LA County Waterworks #36	625000 (Capital); $312,500/yr over 2 years (O&M)	◆				◆			16
CLWA-11	Santa Clarita Valley Volatile Organic Carbon Groundwater Investigation	Castaic Lake Water Agency	Newhall County Water District; City of Santa Clarita; LACWD#36	$250,000-$5M (Capital)			◆	◆				17

TABLE 8.1-3
CONCEPTUAL IRWM PLAN PROJECTS

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives						
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*
AA/BCN-2	Feasibility of Arundo Stem Cutting Ram (ASCR)	Agricultural Access/Bouquet Canyon	NA	<$100K		◆		◆	◆		◆
CLWA-1	Irrigation Efficiency Program	Castaic Lake Water Agency	NA	$100K-$1M	◆					◆	
CLWA-2	Water Use Efficiency Certification	Castaic Lake Water Agency	NA	$100K-$1M	◆					◆	
CLWA-4	ESFP Sludge Collection System	Castaic Lake Water Agency	NA	$1M-$1M		◆	◆				
CLWA-5	Saugus Formation Replacement Wells	Castaic Lake Water Agency	NA	$1M-$10M		◆		◆			
CLWA-6	Santa Clarita Valley Drought Relief Wells	Castaic Lake Water Agency	NA	$1M-$1M		◆					
CLWA-12	Update Rio Vista WTP Education Model	Castaic Lake Water Agency	NA	<$100,000	◆			◆		◆	
LACWD36-1	Advanced Meter Infrastructure	LACWD#36	NA	<$100,000	◆						
LACWD36-2	Cash for Grass Rebate Program	LACWD#36	NA	<$100,000	◆						
LACWD36-3	Landscape Irrigation Efficiency Program	LACWD#36	NA	<$100,000	◆						
LACWD36-4	Apam and Bayfield Water Main	LACWD#36	NA	$100K-$1M		◆					
LACWD36-5	Hasley Canyon Road Water Main, Turnout Connection, and Pump Station Project	LACWD#36	NA	$1M-$10M		◆					

Table 8.1-3 cont.

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives						
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*
LACWD36-6	Replacement of 8-inch Water Main along Del Valle Road	LACWD#36	NA	$100K-$1M		◆					
LADPW-1	Lower San Francisquito Spreading Grounds	Los Angeles County Flood Control District	NA	$3M-$6M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-2	Newhall Creek In-River Spreading Grounds	Los Angeles County Flood Control District	NA	$2M-$5M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-3	Placerita Creek Off-River Spreading Grounds	Los Angeles County Flood Control District	NA	$3M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-4	Santa Clara In-River Spreading Grounds No. 1	Los Angeles County Flood Control District	NA	$4M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		

Table 8.1-3 cont.

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives						
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*
LADPW-5	Santa Clara In-River Spreading Grounds No. 2	Los Angeles County Flood Control District	NA	$2M-$5M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-6	Santa Clara Off-River Spreading Grounds	Los Angeles County Flood Control District	NA	$4M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-7	Santa Clara River Rubber Dam No.1	Los Angeles County Flood Control District	NA	$5M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-8	Santa Clara River Spreading Grounds	Los Angeles County Flood Control District	NA	$7M-$10M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-10	SCR South Fork Rubber Dam No. 2	Los Angeles County Flood Control District	NA	$5M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-11	SCR South Fork Rubber Dam No. 3	Los Angeles County Flood Control District	NA	$5M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		

Table 8.1-3 cont.

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives						
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*
LADPW-12	SCR South Fork Rubber Dam No. 4	Los Angeles County Flood Control District	NA	$5M-$7M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
LADPW-13	Upper San Francisquito Spreading Grounds	Los Angeles County Flood Control District	NA	$3M-$6M (Capital); $25K/yr over 50 years (O&M)		◆	◆	◆	◆		
NCWD-4	Recycled Water Onsite Conversion	Newhall County Water District	NA	$100K-$1M	◆					◆	
NCWD-5	Advanced Metering Infrastructure Program	Newhall County Water District	NA	$1M-$10M	◆	◆		◆			◆
SC-2	Upper Santa Clara River Arundo/Tamarisk Removal Program (SCARP) Implementation	City of Santa Clarita	Forest Service; Santa Clara River Conservancy	$1M-$10M	◆	◆	◆	◆	◆	◆	◆
SC-3	City of Santa Clarita Biofiltration and Low Impact Development Retrofits	City of Santa Clarita	NA	$1M-$10M	◆	◆	◆		◆	◆	
SC-4	Septic to Sewer Retrofit Project	City of Santa Clarita	NA	>$10M		◆	◆	◆			
SCEEC-1	Linking SCEEC to the Upper Santa Clara River IRWMP	Santa Clarita Environmental Education Consortium	NA	<$100K	◆		◆	◆	◆	◆	

Table 8.1-3 cont.

Project ID	Project Name	Sponsor Agency	Coordinating/ Partnering Agency	Estimated Cost	Objectives						
					Reduce Potable Water Demand	*Increase Water Supply*	*Improve Water Quality*	*Promote Resource Stewardship*	*Flooding/ Hydromodification*	*Climate Change Adaptation*	*GHG Reduction*
SCWD-1	Advanced Metering Infrastructure Program	Santa Clarita Water Division	NA	$1M-$10M	◆	◆		◆			◆
SCWD-3	GIS Development and Implementation	Santa Clarita Water Division	NA	$1M-$10M		◆	◆				◆
VWC-1	Regional High Resolution GIS Mapping	Valencia Water Company	NA	$100K-$1M				◆			
VWC-2	Valleywide Conservation Database	Valencia Water Company	NA	<$100K	◆			◆		◆	
VWC-3	Advanced Metering Infrastructure Program	Valencia Water Company	NA	$1M-$10M	◆	◆		◆			◆
VWC-4	CII Consevation Plan	Valencia Water Company	NA	<$100K	◆					◆	

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Protect urban communities from drought, increase supplies of clean drinking water, reduce dependence on imported water, reduce pollution of rivers, lakes, streams, and coastal waters, and provide habitat for fish and wildlife.

Integrated regional water management planning meets this intent by encouraging broad evaluation of watershed related issues as well as identification of projects to address these needs. Integrated regional water management planning solicits the input and expertise of various groups, including water agencies, flood control agencies, local planning entities, conservancies, sanitation districts, business organizations, open space and recreation interests, and habitat preservation interests. One of the benefits of this planning process is that it brings together this broad array of groups into a forum to discuss and better understand shared needs and opportunities. This format assures that a full range of issues and needs are considered. It also ensures that an extensive range of expertise is used to evaluate projects and identify means to improve and integrate projects.

BENEFITS OF PLAN IMPLEMENTATION

- Regional planning and communication
- Creation of partnerships
- Efficiency (shared data and know-how)
- Consideration of all watershed components
- Sharing of potential impacts and benefits

Examples of regional integration took place in the Upper Santa Clara River IRWMP process. During the stakeholder meetings, all entities that submitted Candidate Projects for inclusion in the IRWMP were asked to give presentations on their proposals. These presentations and subsequent discussions allowed the group to become familiar with the various Candidate Projects. This information assisted with project sorting, but also led to suggestions for project improvement and led to integration of two Candidate Projects. As part of the initial "Call for Projects," two separate stakeholders proposed projects that focused on removal of the non-native plant *Arundo donax*. Following Stakeholder discussions on these various proposals, entities decided to join and collaborate rather than duplicate effort and are now jointly sponsoring a single, more regional project for Arundo removal.

8.3 Benefits of Plan Implementation

8.3.1 Benefits of Plan Implementation

The primary benefit of the Upper Santa Clara River IRWMP is development of a framework supportive of collaborative regional planning. This IRWMP allows for Stakeholders in the community to create a vision for watershed planning in the Region, and identify appropriate means to achieve this vision. Creation of the IRWMP has facilitated partnerships between local, State, and Federal entities. For example, several IRWM Plan Projects are being jointly sponsored by multiple local entities.

The IRWMP process fosters coordination, collaboration, and communication among entities in the Region and has resulted in greater efficiencies (e.g., efforts are not duplicated, information is shared), will enhance public services, and will facilitate public support for watershed projects. As part of preparing this IRWMP, the regional agencies have provided input as to their ongoing

research and data collection projects. Knowledge of these research and data collection projects assists other agencies from duplicating efforts. Knowledge of each other's efforts has allowed Stakeholders to better coordinate data (developing consistent formats and consistent means of examining data). This "pooled" data results in a larger and more significant data set. For example, CLWA, SCWD, LACWWD No. 36, NCWD, and VWC annually coordinate preparation of a summary of water supplies and demands. In addition, during IRWMP preparation many of the agencies and non-profit groups shared the experience gained in implementing past projects – passing their know-how to others. For example, the City of Santa Clarita provided details related to their experience with Arundo removal, including information on successful removal techniques and the tradeoffs with various approaches. VWC provided information on their experience with water softening technologies. Efficiencies have also been achieved by cooperating on regional efforts rather than separate localized efforts.

A regional planning effort ensures that all potential components of watershed planning are considered rather than one particular area or project type dominating. Regional planning improves the likelihood that benefits and impacts are shared instead of one group or area reaping the benefits while another bears the impacts. Regional planning efforts also increase the likelihood that projects that implement one particular objective (e.g., water supply) are considerate of other objectives (e.g., flood control or habitat preservation). As part of project integration, projects can be refined so that they achieve multiple objectives.

The IRWMP will allow otherwise separate agencies to speak as a region and to improve policies, regulations and laws related to water demand, water supply, water quality, operational efficiency, and resource stewardship.

The range of projects identified by this IRWMP meet all objectives identified by the Stakeholders:

- Implement technological, legislative and behavioral changes that will reduce user demands for water.
- Understand future regional demands and obtain necessary water supply sources.
- Supply drinking water with appropriate quality; improve groundwater quality; and maintain water quality standards.
- Promote resource stewardship:
  - Preserve and improve ecosystem health
  - Improve flood management
  - Preserve and enhance water-dependent recreation
- Reduce flood damage and/or the negative effects on waterways and watershed health caused by hydromodification and flooding outside the natural erosion and deposition process endemic to the Santa Clara River.
- Take actions within the watershed to adapt to climate change.
- Promote project and actions that reduce greenhouse gas (GHG) emissions.

Full implementation of this IRWMP will result in multiple benefits associated with these objectives. In addition, the IRWMP will provide for the following specific benefits through implementation of these projects:

- Projects to Reduce Potable Water Demand. IRWM Plan Projects include preparation of a Valley-wide conservation strategic plan and technical support to improve water use efficiency in large landscape areas. More efficient water use will result in less demand on imported water supplies from the Delta, less energy usage for treatment and delivery of water, and reduced demand for new or expanded water supply infrastructure. In addition, improved outdoor irrigation reduces the flows of poor quality urban run-off.

- Water Supply Projects. The majority of IRWM Plan Projects submitted by Stakeholders relate to water supply, particularly stormwater capture, groundwater recharge, and development of recycled water supplies. Stormwater capture and subsequent groundwater recharge provides for increased use of local supplies rather than imported water. These projects assist in maintaining the long-term sustainability of the groundwater supply. Depending on project specifics, these projects can also serve to decrease peak flood flows and provide opportunities for habitat improvement and restoration. Recycled water supplies, likewise, decrease demand for imported water. Recycled water can offset potable water demand, recharge groundwater, and be used to create and restore wetland areas.

- Water Quality Improvement Projects. IRWM Plan Projects include efforts to reduce use of water softeners in the Region, removal of septic systems, and installation of improved water treatment technologies. The primary benefit from implementing some of these water quality projects would be the reduced potential for human exposure to potentially harmful substances. These projects would also improve the efficiency of both water and wastewater treatment processes. Besides improving drinking water, these projects could potentially benefit other types of water users, such as agricultural water users and water dependent wildlife habitat.

Preservation of Ecosystem Health is an IRWMP Objective

- Resource Stewardship Projects. IRWM Plan Projects include invasive species removal programs. Projects that remove trash and non-native species, such as Arundo, improve overall habitat quality. These projects also reduce flooding by removing obstructions in the river that can result in significant erosion and damage to public facilities. Arundo removal also increases water supply as this plant utilizes large quantities of surface and groundwater.

- Flooding/Hydromodification Projects. Several projects focus on reducing flood damage and improving stormwater management. These include invasive species removal projects, low impact development projects, and on- and off-stream groundwater recharge projects. These activities will help avoid damage to property from floods,

reduce impervious surfaces and associated runoff, and reduce the amount of polluted runoff which could enter waterways.

8.3.2 Plan Beneficiaries

The potential beneficiaries of the Upper Santa Clara River IRWMP are residents of the Region, water agencies, local, State and Federal agencies, businesses, wildlife and associated habitats, and others within the jurisdictions served by IRWMP projects. These beneficiaries are represented by members of the RWMG and the larger Stakeholder group.

Potential benefits and impacts from Plan implementation are summarized in Table 8.3-1.

8.3.3 Interregional Benefits

The Region is bounded by the San Gabriel Mountains to the south and southeast, the Santa Susana Mountains to the southwest, and the Liebre Mountains and Transverse Ranges to the northeast and northwest. Therefore, projects implemented in the Region are unlikely to directly affect IRWMP efforts in the neighboring Antelope Valley or greater Los Angeles areas. However, the Region does have a hydrologic connection to the portion of the Santa Clara River in Ventura County. It is likely that projects to enhance and protect the watershed may have downstream benefits.

8.4 Impacts of Plan Implementation

Negative impacts that may be associated with the Plan Projects include (1) short-term, site-specific impacts related to site grading and construction, and (2) long-term impacts associated with project operation. For the purposes of this IRWMP, impacts are discussed at a screening level below.

Project-specific and/or programmatic environmental compliance processes (consistent with CEQA and, if applicable, the National Environmental Policy Act) will evaluate the significance of the impacts. Under CEQA, impacts determined to be significant must be mitigated to a level of non-significance (unless the lead agency makes findings of overriding consideration). The IRWMP itself does not lead to the implementation of any specific project. It has been determined that the IRWMP itself is exempt from CEQA. The following provisions of the State CEQA Guidelines apply:

- Statutory Exemption (15262 for Feasibility and Planning Studies)
- Categorical Exemption (15306-Information Collection)

CEQA review of specific projects will provide an evaluation of impacts in much greater detail than discussed below:

- Aesthetics. Projects that include construction activities and new infrastructure have the potential to affect aesthetics. However, it is likely that projects would be constructed in areas that are already disturbed, or would include mitigation measures that would return disturbed areas to their pre-construction conditions.

TABLE 8.3-1
POTENTIAL BENEFITS AND IMPACTS FROM PLAN IMPLEMENTATION

	Within IRWM Region		Inter-Regional	
	Potential Benefits	*Potential Impacts*	*Potential Benefits*	*Potential Impacts*
Projects to Reduce Potable Water Demand	• Less demand for imported water • Less energy usage for treatment and delivery of water • Avoided need to expand water supply infrastructure • Reduced urban runoff • Benefits extend to broad Region, including any disadvantage communities	Water conservation projects are unlikely to result in ground disturbance or other related impacts. Development of recycled water could have temporary impacts to aesthetics, air quality, biological resources, cultural resources, noise and soils. Use of recycled water could increase salinity in groundwater and the Santa Clara River. No environmental justice or DAC impacts anticipated	Reduced demand for potable water would reduce demands for Sacramento-San Joaquin Delta water and this would have benefits outside of the Upper Santa Clara River Region	Development of recycled water to offset potable demand could introduce salts to the lower Santa Clara River
Projects to Increase Water Supply	• Increased supply • Enhanced supply reliability • Reduced dependence on imported water • Potential wetland restoration • Improved groundwater recharge • Benefits extend to broad Region, including any disadvantaged communities	Development of water supply projects could result in ground disturbance and have temporary impacts to aesthetics, air quality, biological resources, cultural resources, noise, soils, and transportation systems. Use of recycled water could increase salinity in groundwater and the Santa Clara River. No environmental justice or DAC impacts anticipated	Reduced demand for imported water, resulting from development of local supplies, would reduce demands for Sacramento-San Joaquin Delta water and this would have benefits outside of the Upper Santa Clara River Region	Development of recycled water to offset potable demand could introduce salts to the lower Santa Clara River

Table 8.3-1 cont.

	Within IRWM Region		Inter-Regional	
	Potential Benefits	*Potential Impacts*	*Potential Benefits*	*Potential Impacts*
Projects to Improve Water Quality	• Reduced human exposure to pollutants • Improved efficiency of water and wastewater treatment • Preservation of aquatic habitat • Improvement of water-based recreation • Benefits extend to broad Region, including any disadvantaged communities	Projects to improve water quality that involve construction could result in temporary impacts to aesthetics, air quality, biological resources, cultural resources, noise, soils, and transportation systems. No environmental justice, or DAC, or tribal community impacts anticipated	Improved water quality in the Upper Santa Clara River would also benefit the Lower Santa Clara River and associated groundwater basins	No inter-regional impacts anticipated
Projects to Promote Resource Stewardship	• Improved habitat quality • Reduced erosion • Reduced fire risk • Improved water supply • Improved water quality • Benefits extend to broad Region, including any disadvantaged community	Projects to remove invasive species could have temporary negative impacts to aesthetics, biological resources, cultural resources, and soils No environmental justice, or DAC, or tribal community impacts anticipated	Removal of invasive species in the Upper Santa Clara River would reduce the transport and deposition of invasive species to the Lower Santa Clara river.	No inter-regional impacts anticipated

Table 8.3-1 cont.

	Within IRWM Region		Inter-Regional	
	Potential Benefits	*Potential Impacts*	*Potential Benefits*	*Potential Impacts*
Flooding/ Hydromodification Projects	• Reduced erosion • Reduced flood damages • Improved groundwater recharge • Benefits extend to broad Region, including any disadvantaged community	Flood reduction projects could result in ground disturbance and have temporary impacts to aesthetics, air quality, biological resources, cultural resources, noise, soils, and transportation systems Depending on the location of the flood-related project, there could be inequitable distribution of impacts affecting disadvantaged or minority communities.	Flood reduction projects in the Upper Santa Clara River could benefit the Lower Santa Clara River through: • Reduced erosion • Reduced flood damages • Improved groundwater recharge	Depending on the nature of the flood reduction project, flood-related impacts could be increased downstream.
Actions to Adapt to Climate Change	Actions to incorporate climate change will occur in conjunction with other types of projects described above.			
Actions to Reduce Greenhouse Gas Emissions	Actions to incorporate climate change will occur in conjunction with other types of projects described above.			

- Air Quality. Short-term air quality impacts could result from construction of Plan Projects. However, through the CEQA process potential air emissions would be minimized through application of BMPs identified by the air quality management district or mitigation measures.

- Biological Resources. Short-term biological impacts could result from construction activities as well as non-native plant removal. Most of these negative effects would be avoided or minimized through mitigation efforts related to CEQA. Additionally, the IRWMP includes preservation of ecosystem health as one of its objectives. Thus, if implemented, Plan Projects could result in overall benefits to biological resources.

- Cultural Resources. Impacts to cultural resources (historical, archeological, and paleontological resources) could result from construction activities from Plan Projects. As part of the CEQA process it will be necessary to develop mitigation measures to avoid or minimize these potential impacts.

- Geology and Soils. Plan Projects with the potential to impact geologic resources would be required to undergo geological feasibility studies which would specify the appropriate engineering standards the contractor would have to comply with during construction. Compliance with these standards would mitigate project site geological and soil impacts.

- Hydrology and Water Quality. It is anticipated that impacts to hydrology and water quality would be generally beneficial because in the long-term Plan Projects are intended to improve water supply reliability and water quality. For short-term erosion or sedimentation, project-specific BMPs would be identified as part of the NPDES permitting process.

  A number of Plan Projects proposed in this IRWMP are groundwater recharge projects using either stormwater or recycled water. Because recycled water generally contains more salts than other water sources in the Region, recharge with recycled water could increase the salinity of the local groundwater. There is also concern that groundwater recharge with stormwater and recycled water will result in decreased flow in the Santa Clara River. These issues merit particular analysis in project specific CEQA documentation.

- Land Use and Planning. The Plan Projects were evaluated as to their compatibility with other planning documents for the Region, including local and regional General Plans. Therefore, no significant land use changes or inconsistencies with policies are anticipated.

- Noise. Noise impacts could result from construction activities from some of the proposed projects. However, through the CEQA process most of these activities would be minimized through mitigation efforts and no long-term noise impacts are expected.

- Population and Housing. No adverse impacts to population and housing are anticipated. IRWMP implementation would help to meet the water demands of the existing and anticipated future population.

- Public Services and Utilities. Many of the IRWM Plan Projects are intended to enhance water supply, water quality, and improve storm water management and flood control. These types of projects would benefit the utilities and service systems in the Region.

- Recreation. One of the objectives of the IRWMP is to preserve and enhance water-dependent recreation. Therefore, impacts to recreation from IRWMP implementation are likely to be beneficial.

- Transportation and Circulation. Transportation and circulation could be temporarily impacted during construction of some of the Plan Projects. Construction can temporarily increase traffic congestion due to transportation of equipment and trips by workers. Construction of projects located near roadways can result in temporary lane closures and detours. However, through the CEQA process most of these activities would be avoided or minimized and no long-term transportation and circulation impacts are expected.

8.5 Institutional Structure for Plan Implementation

The RWMG governance structure and approach used to-date have been successful in adopting the IRWMPand communicating with stakeholders about progress made in developing and implementing the IRWMP goals. After the 2008 IRWMP adoption, the RWMG formed a governance subcommittee based on the need to develop a more formal agreement to facilitate the sustained development of regional water management and the IRWM process, both now and beyond the state grant IRWM funding programs.

The Subcommittee, comprised initially of a subset of the RWMG group, identified and prioritized objectives for the re-established governance structure, as well as recommended roles and responsibilities for all participants in the IRWMP process, as discussed below.

The Governance Subcommittee first identified the purposes that a governance structure would be designed to fulfill for the benefit of IRWMP implementation, and subsequently identified which group (e.g., RWMG, Stakeholders, etc.) would best govern each of those efforts:

- Provide focused leadership for implementing and updating the IRWMP (RWMG in lead, with input from Stakeholders).

- Track and report progress in meeting IRWMP goals (RWMG and Stakeholders).

- Identify potential sources of outside funding and assist local entities to compete for those funds (RWMG, Stakeholders, and other sources of information).

- Provide leadership to focus cooperation for broad regional planning and implementation efforts such as (RWMG with input from Stakeholders):
  - regional water recycling
  - regional water quality preservation
  - regional water conservation programs

    - regional data and information management
- Select a contracting agency for any State or Federal grant funds obtained for implementation of the IRWMP (RWMG to select Grantee from among its members in accordance with applicable grant requirements, once the RWMG is formalized).

The Governance Subcommittee next identified the following factors that must be provided within a new governance structure to successfully accomplish these purposes and serve the recommended roles:

- Staff dedicated to provide leadership in the following areas:
    - Initiate actions
    - Collaborate with others
    - Call public/stakeholder meetings, set agendas, and lead meetings
    - Prepare background documents for IRWMP updates
    - Identify, select, and apply for appropriate funding opportunities
    - Oversee update of the IRWMP
- Capability to gather, compile and manage data and information.
- Ability to execute and manage contracts.
- Ability to receive and process financial transactions and meet Generally Accepted Accounting Principles.
- Expertise to make a valuable contribution of services to IRWMP preparation.
- Ability to obtain funds to contribute to IRWMP preparation.
- Ability and willingness to serve as a point of contact for IRWMP related information.
- Willingness to support process facilitation and outreach.

8.5.1 Implementing Plan Activities

The expectation is that the same stakeholder process that guided the selection of water management strategies applicable to the Region, regional goals and objectives, a project prioritization framework, and Disadvantaged Community Outreach, will be used to implement the Plan.

The roles and responsibilities of the various participants envisioned to carry out the broad purposes of the governance structure have been described in Section 1.

In addition to the RWMG, another subset of the Stakeholder Group critical for Plan implementation is the local project sponsors, as described below.

8.5.1.1 Local Project Sponsors' Roles and Responsibilities

Local Project Sponsors are those IRWMP Stakeholder agencies or entities having IRWM Plan Projects that are included in the IRWMP database. Information on each of the IRWM Plan Projects and a summary list of all IRWM Plan Projects is maintained at www.scrwaterplan.org ("Projects" tab). The database is intended to be a comprehensive list of projects that, when completed, will aid in advancing the IRWMP's regional objectives. It is envisioned that the Local Project Sponsors will have the following roles and responsibilities:

1. Provide project-specific information for the database that may aid in advancing the IRWMP's regional objectives.
2. Seek opportunities to integrate, where possible and practical, IRWM Plan Projects in the database in order to most-efficiently achieve the regional objectives. This process may be facilitated at Stakeholder meetings, but Local Project Sponsors are also encouraged to seek these opportunities outside of that forum.
3. Provide updated project-specific information for the database as necessary to reflect major project milestones (e.g., CEQA completion, 100% design, construction underway, construction complete, and project completion). Although this particular role is not a requirement, it is in the best interest of the Local Project Sponsors to keep the database current, so the most updated information is used to evaluate projects using the project prioritization framework as outside funding sources become available.
4. Participate in Stakeholder meetings to educate others about the Local Project Sponsor's project(s) in the database. This happens naturally as a result of casual collaboration with other Local Project Sponsors but may also be in the form of presentations made at Stakeholder meetings.
5. Identify a point person for each project who will provide in a timely manner to the RWMG and/or consultant, requested information for projects selected for inclusion in a grant application.
6. Identify a point person for each project who will provide in a timely manner to the Grantee and/or consultant, requested information for projects selected for funding through a funding agency.
7. Comply with grant requirements, as identified by the funding agency, in order to qualify for grant funding.

8.5.1.2 IRWMP Term and Plan Revisions

The first IRWMP was adopted in July 2008. The stated goal of the RWMG is to update and re-adopt the plan a minimum of every five years, sooner if one of the following events triggers re-adoption within 1 year of the event, prior to the scheduled five-year interval:

- Significant change in conditions as defined by the RWMG with input from the Stakeholders.
- Achievement of an objective which necessitates setting a revised or replacement regional objective.

- The need, as determined by the RWMG with Stakeholder input, to set new regional objectives.

8.5.1.3 IRWMP Adoption

The decision of which entities should appropriately adopt the IRWMP is directly related to the intent of the IRWMP's governance structure. The RWMG's membership is intended to ensure balanced representation across the IRWMP's three main regional objectives (i.e., water supply, water quality, and resources stewardship), as well as geographic diversity across the Region. Given this balanced representation, it is therefore appropriate that all the RWMG entities with governing bodies adopt the IRWMP. Additionally, given the benefits to all Stakeholders in the Region of achieving the regional objectives set forth in this IRWMP, it is further appropriate that any stakeholder (including Local Project Sponsors) with an interest in this Region's watershed issues also be encouraged adopt the IRWMP, provide a resolution in support of the IRWMP or provide a letter in support of the IRWMP, whichever is appropriate based on the type of entity.

Because the IRWMP is envisioned to "live through time" regardless of the makeup or turnover of the RWMG, a change in RWMG membership would not trigger re-adoption of the IRWMP. Additionally, modifying or updating the IRWMP in order to qualify for funding through a funding agency would not automatically trigger re-adoption of the IRWMP.

Ongoing review of plan performance and an adaptive management process will allow the IRWMP to evolve in response to changing conditions and ensure that the IRWMP and associated objectives are current.

Section 9: Finance Plan

9.1 Potential Funding Options

Initial funding for IRWMP preparation was provided by the RWMG through an MOU; IRWMP implementation will require additional funding. There are opportunities for grant funding that are available to the Stakeholders in the Region and that are well suited to many Plan Projects. Many of these grant opportunities require that the Local Project Sponsor provide matching funds ("local match") and funds for operations and maintenance once a project or program is constructed. The source of local match and funds for operations and maintenance may include: water and wastewater service charge revenues/connection fees; capital improvement funds; and general funds from local Cities, County departments, private organizations, member dues, etc. Local taxpayers may also fund these projects through rate increases, bond measures, and tax increases.

This section identifies various funding sources and their associated requirements and guidelines to assist with implementation of Plan Projects. Sections 9.2 through 9.4 present information on local, state, and federal funding sources, while Section 9.5 focuses on direct funding options for Plan Projects. Table 9.1-1 provides a summary of funding opportunities broken into local, state, and federal funding sources and provides contact information for each funding program. Due to the length of Table 9.1-1 it is provided at the end of this section.

Table 9.1-2 below documents near-term funding for the IRWMP.

9.2 Local

In the past, local entities have planned, implemented, and funded construction and operation of water-related projects. These funds may be available to fund Plan Projects or to provide the local match.

9.2.1 Capital Improvements Program Funding (Revenue Bonds, Certificates of Participation)

Government entities (e.g., water districts, counties and cities) can raise funds by issuing municipal bonds or certificates of participation. Bonds and certificates of participation are governed by an extensive system of laws and regulations. Under these systems, investors provide immediate funding for the promise of later repayment. Generally, bonds and certificates of participation are used for capital improvement projects. In the case of a water district, bonds and certificates are secured by revenues from the water system and by property taxes received by the agency.

TABLE 9.1-2
IRWMP FINANCING

Activity Description	Approximate Total Cost	Funding Source and % Total Cost	Funding Certainty/Longevity	O&M Finance Source	O&M Finance Certainty
IRWMP Planning Efforts	$62,000	RWMG– 25% Planning Grant – 75%	Secure through Fall 2013	NA	NA
Special Studies Climate Change	$103,000	RWMG– 25% Planning Grant – 75%	Secure through Fall 2013	NA	NA
Special Studies Salt and Nutrient Management Plan	$165,000	RWMG– 25% Planning Grant – 75%	Secure through Fall 2013	NA	NA
Special Studies Recycled Water Masterplan Update and CEQA Document	$707,000	RWMG– 25% Planning Grant – 75%	In draft Planning Grant Round 2 funding recommendation.	NA	NA
Special Studies Santa Clarita Valley Water Use Efficiency Plan Update	$240,400	RWMG – 25% Planning Grant – 75%	In draft Planning Grant Round 2 funding recommendation.	NA	NA
Implementation Project – Santa Clarita Valley Water Use Efficiency Programs	$1,958,000	Retail Agencies, CLWA – 50% Implementation grant – 50%	Grant funds included in Proposition 84 grant award, local funds contributed by project sponsors	NA	NA
Implementation Project – Removal of Sewer Trunk Line Phase 1	$240,000	Implementation Grant – 100%	Grant funds included in Proposition 84 grant award	NCWD operation budget	Secured by NCWD rates
Southern End Recycled Water Phase 2C	$11,053,500	Implementation Grant – 41% CLWA – 59%	Grant funds included in Proposition 84 grant award, local funds in CIP budget	CLWA operation budget, recycled water sales	Secured by CLWA rates
Santa Clara River and San Francisquito Creek Arundo and Tamarisk Removal	$726,449	Implementation Grant – 92% City of Santa Clarita – 8%	Grant funds included in Proposition 84 grant award, local funds in CIP budget	NA	NA

9.2.2 Property Tax Assessment (Assessed Valuation)

Property taxes are a large source of revenue for water-related projects and agencies in the Region. The Los Angeles County Tax Assessor collects the charges on behalf of various districts. This funding is used for general expenditures, capital improvements, and to service bond and certificate debt. While this is a large and important source of funding for local agencies, in some cases, the State of California can divert these funds.

For the 2012/2013 fiscal year, it is not anticipated that the State will divert property tax revenue away from CLWA. However, future diversions of property tax revenues may hinder the ability to fund water-related projects, so that CLWA continues to monitor the State's activities (CLWA 2012).

9.2.3 User Fees

For water agencies, funding for operation and maintenance of water-related projects often comes from user fees, which are charges for water delivered to a home or charges for wholesale water supplies. In addition to these fees, many water agencies also charge "hook-

up" or "connection" fees – charges for providing facilities to provide water services to a new development. These fees are also known as "facility capacity fees." Facility capacity fee revenue is difficult to forecast due to the unpredictable timing of development activity. Development activity depends on real estate demands, the regional economy, and land use planning activity.

Starting in 1981, a connection fee program was implemented across the sanitation districts throughout Los Angeles County. These fees are imposed on all new users of the sewerage system, as well as existing users who expand their wastewater discharge and apply to residential, commercial and industrial dischargers. Revenue from this program provides funds for capital expenditures necessary to accommodate additional wastewater contributions within the sewer system.

9.2.4 Stormwater Pollution Prevention Fee

Property owners in the City of Santa Clarita currently pay a yearly fee to fund the Stormwater Pollution Prevention Program. Fees are based on the estimated amount of stormwater runoff a property generates, based on the impervious surface area. Fees are used to fund activities, such as the maintenance, improvement and replacement of the City's storm drainage facilities, monitoring, inspection and enforcement, as well as other requirements set forth in the NPDES permit. This fee is anticipated to bring in between $2.8 to $2.9 million a year.

9.2.5 Clean Water Fee

As part of Los Angeles County Flood District's Water Quality Improvement Program and the Clean Water, Clean Beaches Measure, the County is proposing to establish a Clean Water Fee, also known as a Water Quality Fee, on all properties within the County. Fees will be based on the amount of stormwater runoff generated by a property. Revenue collected from this fee would fund local and regional projects to protect water quality with a focus on stormwater pollution prevention and stormwater capture in Los Angeles County. Funds collected within the Santa Clara River watershed would be specifically used for projects within that watershed. An initial public hearing on this fee will be held on January 15, 2013.

9.3 State

Potential funding for IRWMP implementation may be available through various State programs, including Propositions 84, 1E, and 50. The discussion below and Table 9.1-1 provide information on State funding opportunities.

Potential State Funding Sources for IRWMP Implementation:

- Proposition 84
- Proposition 1E
- Proposition 50
- Other (Pending Legislation, State Revolving Fund)

9.3.1 Proposition 84

The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act of 2006 (Public Resources Code § 75001, et seq.), was passed by California voters in the November 2006 general election. Proposition 84 will be implemented by DPH,

DWR, and the SWRCB. Specific grant funding programs available under Proposition 84 are highlighted below:

9.3.1.1 Integrated Regional Water Management Planning

DWR offers grants for projects that assist local public agencies to meet the long-term water needs of the State including the delivery of safe drinking water and the protection of water quality and the environment. Proposition 84 allocated $1 billion to integrated regional water management planning and implementation grants; of this amount, $215 million is earmarked for the Los Angeles-Ventura area. As part of Proposition 84 DWR has offered two different IRWMP related grants. One grant program has focused on planning activities (e.g., development of an IRWMP, special studies such as climate change and salt and nutrient management plans); one grant program has focused on implementation of activities (e.g., construction projects, water conservation projects, habitat restoration projects). Under Proposition 84 there have been two different planning grant opportunities (referred to as Round 1 and Round 2). Planning Grant Round 1 awards occurred in February 2011. Planning Grant Round 2 awards were announced in November 2012. At the current time no additional planning grants rounds are proposed. Three rounds of implementation grants are anticipated. Round 1 implementation grant awards were made in May 2011. Round 2 implementation grant applications were due in March 2013 with awards anticipated sometime later that year. The third, and probable last round of implementation grants is anticipated in 2014. Eligible implementation grant projects must be part of integrated regional water management plans. Under current Guidelines, projects eligible for integrated regional water management plan funding include:

- Programs for water supply reliability, water conservation, and water use efficiency
- Storm water capture, storage, treatment, and management
- Removal of invasive non-native plants, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands
- Non-point source pollution reduction, management, and monitoring
- Groundwater recharge and management projects
- Contaminant and salt removal through reclamation, desalting, and other treatment technologies
- Water banking, water exchange, water reclamation, and improvement of water quality
- Planning and implementation of multipurpose flood control programs that: protect property; improve water quality, storm water capture and percolation; and protect or improve wildlife habitat
- Watershed management planning and implementation
- Demonstration projects to develop new drinking water treatment and distribution methods

Pending legislation may alter the types of projects eligible for funding as part of an integrated regional water management plan. After awards of the first round of planning and implementation grants, the remaining balance for the Los Angeles-Ventura area is approximately $145 million (or 68 percent of the initial bond allocation).

9.3.1.2 Department of Water Resources – Local Groundwater Assistance Program

The Local Groundwater Management Assistance Act of 2000 (CWC § 10795 et seq., Assembly Bill 303) was enacted to provide grants to local public agencies to conduct groundwater studies or to carry out groundwater monitoring and management activities. Priority for grant funding is given to local public agencies that have adopted a groundwater management plan and demonstrate collaboration with other agencies in the management of the affected groundwater basin. Eligible applicants are public agencies with groundwater management authority. Grants up to $250,000 were available for the last solicitation in 2012, after which Program funds ran out. While funding could possibly become available in the future, DWR currently has no immediate plans for another proposal solicitation round. This program is funded with Proposition 84, Chapter 2 funds.

9.3.1.3 Department of Public Health - Emergency and Urgent Water Protection

DPH offers grants for projects that address emergency and urgent situations related to drinking water supplies. Eligible projects include, but are not limited to, provision of alternate water supplies, improvements to existing water systems to avoid contamination, establishment of new connections, and purchase and installation of water treatment equipment. The program is open to local water suppliers.

9.3.1.4 State Water Resources Control Board – Storm Water Grant Program

The SWRCB provides grant funds for projects designed to reduce and prevent storm water contamination of rivers, lakes, and streams. The initial budget was $90 million, with $32 million remaining for Round 2 implementation grants. Up to $3 million per project is available. These grants are available to local public agencies. Preference is given to projects consistent with an integrated regional water management plan and projects that promote long-term water quality.

9.3.1.5 Local Levee Assistance Program

DWR provides grants for projects that evaluate levees or other flood control structures (not part of the State Plan of Flood Control) through geotechnical studies and for the design, repair and improvement of damaged levees or other unstable flood control structures. These grants are available to local public agencies. Up to $2 million are available per levee evaluation project and up to $5 million are available per urgent repair project.

9.3.1.6 Flood Protection Corridor Program

DWR awards grant funds to public agencies and non-profit organizations for flood risk reduction projects in floodplains through primarily non-structural flood management methods (e.g., detention basins, levee removal). All projects must include wildlife habitat enhancement and/or agricultural land preservation. The maximum grant amount per eligible project is $5 million.

9.3.1.7 Flood Control Subventions Program

DWR provides financial assistance to local agencies implementing federally authorized flood control projects and watershed protection flood prevention projects authorized by the Natural Resources Conservation Service. The percentage of the state cost share for reimbursable costs ranges from 50 to 70 percent.

9.3.1.8 Urban Streams Restoration Program

DWR awards grant funds to public agencies and non-profit organizations to help local communities reduce urban flooding and erosion, restore environmental values and promote community stewardship of urban streams. Examples include creek cleanups, eradication of exotic or invasive plants, bioengineering bank stabilization projects, acquisition of parcels critical for flood management and coordination of community involvement in projects. Up to $1 million is available per project.

9.3.2 Proposition 1E

Proposition 1E, the Disaster Preparedness and Flood Protection Bond Act, encourages new investments for flood protection and stormwater management programs.

9.3.2.1 Stormwater Flood Management Program

Within the Stormwater Flood Management Program, $30 million in grants are available from DWR to local entities for stormwater runoff projects. These projects must be outside of the State Plan of Flood Control and be consistent with an integrated regional water management plan. In addition, local match must be at least 50 percent of project costs. Preference is given to projects that use stormwater management to improve groundwater supplies, improve water quality, and to restore ecosystems.

9.3.3 Proposition 50

The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Water Code §79500, et seq., was passed by California voters in the November 2002 general election. Proposition 50 authorized $3,440,000,000 in general obligation bonds, to be repaid from the State's General Fund, to fund a variety of water projects including: specified CALFED Bay-Delta Program projects including urban and agricultural water use efficiency projects; grants and loans to reduce Colorado River water use; purchasing, protecting and restoring coastal wetlands near urban areas; competitive grants for water management and water quality improvement projects; development of river parkways; improved security for state, local and regional water systems; and grants for desalination and drinking water disinfecting projects. Many grant programs funded by Proposition 50 have concluded, but those funding programs still accepting applications are summarized below.

9.3.3.1 Department of Water Resources – Water Use Efficiency Grants

This grant program is intended to fund agricultural and urban water use efficiency projects. The program focuses on funding projects that are not locally cost effective, and that provide water savings or in-stream flows that are beneficial to the Bay-Delta or the rest of the State.

Consideration is also given to projects that address water quality and energy efficiency. Specific types of projects that can be funded include: water use efficiency implementation projects providing benefits to the State; research and development projects; feasibility studies, pilot or demonstration projects; training, education or public outreach programs; and technical assistance programs related to water use efficiency. Cities, counties, joint power authorities, public water districts, tribes, non-profit organizations (including watershed management groups), other political subdivisions of the State, regulated investor-owned utilities, incorporated mutual water companies, universities and colleges, and State and Federal agencies are eligible applicants. Grants to urban water suppliers are conditioned on implementation of the Demand Management Measures described in CWC §10631. Funding has been made available through SB 23, Proposition 13 and Proposition 50. Since inception of the Program in 2001 through 2012, $132.5 million has been allocated to fund water use efficiency grants.

Currently, upcoming funding opportunities are only applicable to agricultural water use efficiency projects and there are no planned opportunities for urban water use efficiency at this time.

9.3.3.2 Department of Water Resources – Contaminant Removal

DWR (previously funded through DPH) provides funds for contaminant treatment or removal technology pilot and demonstration studies for specific categories of contaminants including petroleum, perchlorate, heavy metals, pesticides, and herbicides. Grants are a minimum of $50,000, up to a maximum of $5,000,000. A 50 percent match is required, but this requirement is waived in part or in full for Disadvantaged Communities and small water systems. Public water systems and public entities are eligible for this funding program.

9.3.3.3 Department of Water Resources – UV and Ozone Disinfection

Grants to support projects using ultraviolet or ozone for disinfection of drinking water are also offered by DWR (previously funded through DPH). A funded project must address a drinking water compliance violation, surface water treatment requirements, or other mandatory disinfection requirement. Public water systems are eligible for this funding program.

9.3.4 Other State Funding

9.3.4.1 State Revolving Fund

The Federal Safe Drinking Water Act Amendments of 1996 authorized the creation of a revolving fund program for public water system infrastructure needs specific to drinking water. There is similar State legislation and the Safe Drinking Water State Revolving Fund reflects the intent of Federal and State laws to provide grant funding or low-interest loans to correct deficiencies in public water systems based on a prioritized system. There are three different entities that provide loans and/or grants under the state revolving fund (SRF).

9.3.4.1.1 Safe Drinking Water SRF

Under this SRF program, DPH provides loans to assist public water systems in achieving and maintaining compliance with the Safe Drinking Water Act. Up to $20 million is available per project. Disadvantaged community systems can obtain a zero interest loan and may be eligible

for partial grant funding. All applications to this program are initially made for loans, however financial review may determine if grant funds apply.

9.3.4.1.2 Infrastructure SRF

The California Infrastructure and Economic Development Bank, also known as I-Bank, provides financing to local municipal entities for construction and/or repair of publicly owned water supply, treatment and distribution systems, and drainage, and flood control facilities. In addition to water-related projects, loans are available for public infrastructure projects that include parks and recreational facilities and environmental mitigation.

9.3.4.1.3 Clean Water SRF

SWRCB also provides financing for wastewater treatment facility construction projects and expanded use projects such as nonpoint source and estuary projects. Funding options are available to public agencies, as well as non-profit organizations and Native American tribes, for up to $50 million per year.

9.3.4.2 State Water Resources Control Board – Federal 319 Program

This program, administered by the SWRCB, is a nonpoint source pollution control program that is focused on controlling activities that impair beneficial uses and on limiting pollutant effects caused by those activities. The program is federally funded on an annual basis. Project proposals that address TMDL implementation and those that address problems in impaired waters are favored in the selection process. There is also a focus on implementing management activities that reduce and/or prevent release of pollutants that impair surface and ground waters. Nonprofit organizations, local government agencies including special districts, tribes, and educational institutions qualify. State or federal agencies may qualify if they are collaborating with local entities and are involved in watershed management or proposing a statewide project.

9.3.4.3 State Water Resources Control Board – Water Recycling Funding Program

This is a long-term program operated by the SWRCB that offers grants and low-interest loans for the planning, design and construction of water recycling facilities. Grants are provided for facilities planning studies to determine the feasibility of using recycled water to offset the use of fresh/potable water from state and/or local supplies. Pollution control studies, in which water recycling is an alternative, are not eligible. Planning grants are limited to 50 percent of eligible costs, up to $75,000. Construction grants are limited to 25 percent of project costs or $5,000,000, whichever is less. Only public agencies are eligible. The Water Recycling Funding Program receives funding from various sources, including Proposition 50 and the State Revolving Fund. Due to the varying funding sources, preferences for funding can vary. For example, funding from Proposition 50 gives preference to those recycling projects that result in benefits to the Delta.

9.3.4.4 State Water Resources Control Board – Supplemental Environmental Projects

The State Water Board or Regional Water Board may allow part of a monetary assessment made in an administrative civil liability order to be satisfied in part by completing or funding one

or more Supplemental Environmental Projects. These projects may either be performed by the discharger or by third parties paid by the discharger and must directly benefit or study groundwater or surface water quality or quantity in the area impacted by the violation. Generally, projects with a value of at least $50,000 will be considered under this program. Sign up forms for the project proponent list are available on the SWRCB website.

9.3.4.5 State Water Resources Control Board – Cleanup and Abatement Account

This account generally provides public agencies with grants for emergency cleanup or abatement of conditions of pollution where no viable responsible parties are available to undertake the work. Funds can be used for, among other things, waste cleanup and abatement of effects of a waste, and remedying a significant water pollution problem. Requests for funding can be made on a continuous basis for projects up to $100,000 and may be approved for projects exceeding $100,000 on a case by case basis.

9.3.4.6 State Water Resources Control Board – Agricultural Drainage Loan Program

The Water Conservation and Water Quality Bond Law of 1986 provides funds for this program with the intent to address treatment, storage, conveyance, or disposal of agricultural drainage water that threatens water of the State. Loans are available for implementation projects and feasibility studies with a funding cap of $20 million and $100,000, respectively. As of the beginning of 2012, less than $7 million was available for funding under this program.

9.3.4.7 State Water Resources Control Board – Agricultural Drainage Management Loan Program

Similar to the Agricultural Drainage Loan Program, this program provides loans for addressing treatment, storage, conveyance, or disposal of agricultural drainage water that threatens waters of the State. Funds for this program come from Proposition 204, and are available in amounts up to $5 million for implementation projects and $100,000 for feasibility studies. Approximately $10 million in funds are still available.

9.3.4.8 State Water Resources Control Board – Underground Storage Tank Cleanup Fund

Funds provided through the Barry Keene Underground Storage Tank Cleanup Fund Act of 1989 provide means for petroleum underground storage tank owners and operators to meet federal and state requirements, in addition to assisting in covering unexpected and catastrophic expenses associated with the cleanup of leaking petroleum underground storage tanks. Special programs include, among others, the Orphan Site Cleanup Fund, which provides loans up to $1.5 million per occurrence in the case of no viable financially responsible party, and the Replacing, Removing or Upgrading Underground Storage Tanks Program, which provides loans of up to $750,000 for complying with continuing regulatory requirements.

9.3.4.9 Department of Water Resources – New Local Water Supply Construction Loans

Under this program, DWR provides loans to local public agencies for projects. Eligible projects include canals, dams, reservoirs, desalination facilities, groundwater extraction facilities, or

other construction or improvements which will remedy existing water supply problems. Loans for construction projects can be provided for up to $5 million, with an interest rate equal to those of the general obligation bonds sold to finance the program.

9.3.4.10 Department of Housing and Community Development – Community Development Block Grant

The California Department of Housing and Community Development provides grants to cities and counties with a program emphasis on creating or retaining jobs for low-income workers in rural communities. Activities may include housing rehabilitation and public improvements, which may involve among other things, water, wastewater and other infrastructure projects as well as feasibility studies.

9.3.4.11 California Energy Commission (CEC) – Energy Financing Program

The California Energy Commission provides loan financing for water and wastewater utilities for energy efficiency projects, feasibility studies, and implementing energy-saving and renewable energy measures. Eligible uses include, but are not limited to, lighting, motors or variable frequency drives, pumps, insulation, HVAC, energy generation and cogeneration.

9.4 Federal

This section includes a discussion of funds available through various federal programs and specifies eligibility requirements. A summary of potential federal funding sources is provided in Table 9.1-1.

9.4.1 Environmental Protection Agency, Source Reduction Assistance

The purpose of this program is to prevent the generation of pollutants at the source and ultimately provide an overall benefit to the environment. This program seeks projects that support source reduction, pollution prevention, and/or source conservation practices. Source reduction activities include: modifying equipment or technology; modifying processes or procedures; reformulating or redesigning products; substituting raw materials; and generating improvements in housekeeping, maintenance, training, or inventory control. Pollution prevention activities reduce or eliminate the creation of pollutants via such procedures as: using raw materials, energy, water or other resources more efficiently; protecting natural resources through conservation; preventing pollution; and promoting the re-use of materials and/or conservation of energy and materials. Eligible organizations include units of State, local, and tribal government; independent school district governments; private or public colleges and universities; nonprofit organizations; and community-based grassroots organizations.

9.4.2 Environmental Protection Agency, Wetlands Program Development Grants

This program seeks projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. The US EPA

has identified three priority areas: (1) the development of a comprehensive monitoring and assessment program; (2) the improvement of the effectiveness of compensatory mitigation; and (3) the refinement of the protection of vulnerable wetlands and aquatic resources. Awards for 2012 were anticipated to range from $50,000 to $350,000. A 25 percent match is required. Eligible entities include States, tribes, local governments, interstate associations, intertribal consortia, and national non-profit, non-governmental organizations.

9.4.3 Environmental Protection Agency, Five Star Restoration Program

This program is a partnership among various entities, including the EPA, National Association of Counties and National Fish and Wildlife Foundation. This program provides challenge grants, technical support and opportunities for information exchange to facilitate community-based wetland, riparian and coastal habitat restoration projects. In addition to on the ground restoration, key elements of project funded by this program include meaningful environmental education, diverse partnerships, and measurable ecological and educational/social benefits. Funding may range between $5,000 to $40,000 and is awarded on an annual basis.

9.4.4 National Park Service, Rivers, Trails, and Conservation Assistance (RTCA) Program

The purpose of this program is to conserve rivers, preserve open space, and develop trails and greenways. The program provides staff assistance, but not funding, to meet this intent. Projects will be evaluated on how successfully they meet the following criteria: (1) a clear anticipated outcome leading to on-the-ground success; (2) commitment, cooperation, and cost-sharing by interested public agencies and non-profit organizations; (3) opportunity for significant public involvement; (4) protection of significant natural and/or cultural resources and enhancement of outdoor recreational opportunities; and (5) consistency with the National Park Service mission. Eligible organizations include non-profits, community groups, tribes or tribal governments, and state or local government agencies.

9.4.5 Natural Resources Conservation Service, Watershed Protection and Flood Prevention Grant

The purpose of the program is to support activities that promote soil conservation and that promote the preservation of the watersheds of rivers and streams throughout the US. This program seeks to preserve and improve land and water resources via the prevention of erosion, floodwater, and sediment damages. The program supports improvement of: (1) flood prevention including structural and land treatment measures; (2) conservation, development, utilization, and disposal of water; or (3) conservation and proper utilization of land. Successful applicants under this program receive support for watershed surveys and planning, as well as watershed protection and flood prevention operations. Funding for watershed surveys and planning is intended to assist in the development of watershed plans to identify solutions that use conservation practices, including nonstructural measures, to ultimately solve problems.

Matching funds are not required; however, applicants must generally provide matches ranging from 0 percent to 50 percent in cash or in-kind resources depending on such factors as project type and the kinds of structural measures which a project proposes.

Eligible entities include: states, local governments, and other political subdivisions; soil or water conservation districts; flood prevention or control districts; and tribes. Potential applicants must be able to obtain all appropriate land and water rights and permits to successfully implement proposed projects.

9.4.6 US Department of Agriculture – Rural Development, Water and Waste Disposal Program

The Water and Waste Disposal Program provides financial assistance in the form of grants and loans for the development and rehabilitation of water, wastewater, and storm drain systems within rural communities. Funds may be used for costs associated with planning, design, and construction of new or existing water, wastewater, and storm drain systems. Eligible projects include storage, distribution systems, and water source development. There are no funding limits, but the average project size is between $3 and $5 million. Projects must benefit cities, towns, public bodies, and census-designated places with a population less than 10,000 persons. The intent of the program is to improve rural economic development and improve public health and safety.

9.4.7 US Bureau of Reclamation, WaterSMART Grant Programs

This grant program is intended to fund collaborative local projects that improve water conservation and management through advanced technology and conservation markets. Through this program, federal funding is provided to irrigation and water districts for up to 50 percent of the cost of projects involving conservation, efficiency and water marketing. Eligible applicants include irrigation and water districts and state governmental entities with water management authority. Applicants must be located in the western US (California is an eligible area). Applicants do not have to be part of a Reclamation project but proposals with a connection to Reclamation will receive more weight in the evaluation process. Past and proposed programs have included Water and Energy Efficiency Grants, Advanced Water Treatment Pilot and Demonstration Projects, and Grants to Develop Climate Analysis Tools. Funding opportunities vary depending on available program funding.

9.4.8 US Fish and Wildlife Service, North American Wetlands Conservation Act Grant

This grant program provides funds for projects that provide long-term protection of wetlands, and the fish and wildlife that depend upon wetlands. Applicants must provide local match equal to that requested. The Small Grants Program provides up to $75,000 in funding and the Standard Grants Programs averages $40 million annually for the whole U.S. and is applicable to projects exceeding $75,000. Entities that are eligible include organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the US, Canada, and Mexico. Small Grants only apply to the U.S. Applications are continuously accepted by the US FWS for this grant.

9.4.9 Federal Legislation

Specific congressional authorizations and funding may be obtained to study, build, and construct specific projects in the Region. Potential sources include legislation and funding associated with renewal of the CWA, SDWA, and appropriations for specific agencies, such as the US ACOE and the US EPA.

The Water Resources Development Act (WRDA) authorizes projects and policies of the Civil Works program of the US ACOE. The US ACOE is a federal agency in the Department of Defense with military and civilian responsibilities. At the direction of Congress, US ACOE plans, builds, operates, and maintains a wide range of water resources facilities in US states and territories. The agency's traditional civil responsibilities have been creating and maintaining navigable channels and controlling floods. However, in the last two decades, Congress has increased US ACOE's responsibilities in ecosystem restoration, municipal water and wastewater infrastructure, disaster relief, and other activities. WRDA often includes specific authorizations for federal, regional, and local projects. Inclusion in WRDA authorizes a given project but does not guarantee funding for a specific project.

Local projects can also receive authorization and federal funding as part of appropriations for the US EPA. The US EPA will enter into assistance agreements with local agencies to fund studies and projects associated with: (1) various environmental requirements (e.g., wastewater treatment); (2) identifying, developing, and/or demonstrating necessary pollution control techniques to prevent, reduce, and eliminate pollution; and/or (3) evaluating the economic and social consequences of alternative strategies and mechanisms for use by those in economic, social, governmental, and environmental management positions.

9.5 Funding Sources

With numerous funding opportunities available from state and federal sources, the RWMG and Stakeholders of the IRWM recognize the importance of identifying and developing local sources for securing project funding.

9.6 Selected Plan Project Cost Estimates

Estimated costs, matching funds, and potential funding sources for Plan Projects will be identified after project selection has taken place.

9.7 Grant Funding Package

Securing funding for the selected Plan Projects is a significant issue for IRWMP implementation. For each funding source identified, suitable projects on the Plan Projects list will be put forward in an application. A summary of funding needs and the funding status for each Plan Project will be prepared after project selection has taken place. This summary will include estimates of outside funding assistance, amount of matching funds, type of matching funds, and whether the matching funds have been secured.

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TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

LOCAL							
Local funding opportunities include revenue bonds, certificates of participation, property taxes, existing capital improvement budgets, and user fees.							
STATE							
Funding Objective	**Agency**	**Program**	**Brief Description**	**Key Points**	**Eligibility**	**Submit Grant Application**	**Contact**
Proposition 84 (by chapter)							
Water Quality, Water Supply, Resource Stewardship	DWR	Integrated Regional Water Management (Round 2 and Round 3)	Grants for development and revisions of IRWM plans and implementation of projects in IRWM plans.	$1B budget, $215M allocated to the Ventura-Los Angeles Funding Area (After Round 1 of Implementation and Planning Grant Awards, approximately $145M remains)	Public agencies and non-profit organizations (other groups may also receive funding if teamed with public agency or non-profit organization)	Applications submitted via the DWR Bond Management System. Current applications for the R2 Implementation are due March 2013 and final awards will be announced in Mid 2013.	Joe Yun (916) 653-9222 jyun@water.ca.gov
Water Quality	DWR	Local Groundwater Assistance	Grants for conducting groundwater studies or carrying out groundwater monitoring and management activities.	Up to $250,000 per eligible applicant	Public agencies	Applications accepted in periodic application cycles, but currently no funding available for future awards.	Tom Lutterman (916) 651-9263
Water Quality	DPH	Emergency/urgent water supply protection	Emergency/urgent water supply protection. For projects that address emergency and urgent situations related to drinking water supplies.	$10M budget; max grant $250,000	Local water suppliers	Request for funds based on as needed basis.	DPH (916) 449-5600 dwpfunds@cdph.ca.gov; Brian Kinney (916) 449-5630
Water Quality	SWRCB	Storm Water Grant Program	This grant program is intended for projects that manage stormwater runoff to reduce flood damages that are ready or nearly ready to be implemented.	$90M budget; ~$32M for Implementation Round 2; $3M per project	Local public agencies	Final Guidelines November 2007;Round 2 process anticipated to begin in 2013.	Laura McLean (916) 341-5877
Flood Management	DWR	Local Levee Assistance Program	DWR provides grants for projects that evaluate levees or other flood control structures including through geotechnical studies (not part of the State Plan of Flood Control) and for the design, repair and improvement of damaged levees or other flood control structures.	$60M budget. $2M for Levee Evaluation; $5 max for Urgent Repair	Local public agencies	Applications accepted in periodic application cycles.	David Wright (916) 574-1191
Flood Management	DWR	Flood Protection Corridor Program	Grant for projects that reduce flood risk reduction using non-structural means and that include wildlife habitat enhancement and/or agricultural land preservation components.	Max $5M per project	Local public agencies and non-profit organizations	Application via the DWR Bond Management System. Applications accepted in periodic application cycles.	Earl Nelson (916) 574-1481
Flood Management	DWR	Flood Control Subventions Program	Claims reimbursement grants for implementation of federally-authorized flood control projects and watershed protection flood prevention projects.	State cost-share between 50%-70%	Local public agencies	Applications accepted in periodic application cycles.	Nahideh Madankar (916) 574-1459
Resource Stewardship	DWR	Urban Streams Restoration Program	Grants for projects that reduce urban flooding and erosion, restore environmental values, and promote stewardship of urban streams.	Max $1M per project	Local public agencies and non-profit organizations	Applications accepted in periodic application cycles.	Jerry Snow (916) 651-9626

TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Agency	Program	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
Proposition 1E							
Flood Management	DWR	FloodSAFE California	Grants for stormwater flood management projects with non-state cost share of not less than 50%; projects must not be part of State Plan for Flood control, must have multiple benefits, comply with Basin Plans, and be consistent with an IRWMP.	Max $30 million per eligible project; 50% cost-share	Local agency or nonprofit representing an IRWM effort	Applications accepted in periodic application cycles.	floodSAFE@water.ca.gov Joe Yun (916) 651-9222
Flood Management	DWR	Early Implementation Program	Funds to rehabilitate, reconstruct or replace levees, weirs, bypasses and facilities of the State Plan of Flood Control.	$3B budget; Max state funding allowed $200M per project	Local Agencies	Applications accepted in periodic application cycles.	Kelly Fucciolo (916) 574-2640
Proposition 50							
Water Supply	DWR	Water Use Efficiency Grants	Program primarily funds projects not locally cost effective, and that provide water savings, or in-stream flows that are beneficial to the Bay-Delta or the rest of the state. Consideration also for water quality and energy efficiency	Two step on-line process application process: first step is concept proposal and second step is detailed on-line submittal.	Cities, counties, districts, tribes, non-profits; utilities and mutual water companies, universities, colleges, state and federal agencies	Applications accepted in periodic application cycles. There are currently no anticipated funding opportunities for urban WUE. Upcoming opportunities will only apply to agricultural WUE.	Fethi Benjemma (916) 651-7026
Water Quality	DWR	Demonstration Projects and Studies for Contaminant Removal	Treatment or removal technology for the following contaminants: Petroleum products, such as MTBE and BTEX, N-Nitrosodimethylamine (NDMA), Perchlorate, Radionuclides, such as radon, uranium, and radium, Pesticides and herbicides, Heavy metals, such as arsenic, mercury, and chromium, Pharmaceuticals and endocrine disrupters	Project Funding: $50,000-$5 million No more than 30% of the funds can address a single contaminant. 50% match that can be waived for Disadvantaged Communities or small water systems.	Public water systems under DPH regulation	Applications accepted in periodic application cycles.	Steve Giambrone (916) 653-9722
Water Quality	DWR	Ultraviolet (UV) and Ozone Disinfection	Must address an Maximum Contaminant Level (MCL) compliance violation, surface water treatment microbial requirements, or other mandatory disinfection that can only be met by UV/ or ozone; the water system must demonstrate that it can operate and maintain the treatment facilities; ozone treatment projects shall be designed and operated to minimize residual disinfection byproduct formation from the ozone treatment	Project Funding: $50,000-$5 million; 50% match that can be waived for Disadvantaged Communities or small water systems.	Public water systems under DPH regulation	Applications accepted in periodic application cycles.	Steve Giambrone (916) 653-9722

TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Agency	Program	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
Other							
Water Supply	HUD	Community Development Block Grant Program	Grants are available with a program emphasis on creating or retaining jobs for low income workers in rural communities.	Grants of up to $2.5M are available, whereby award limits are typically $1.5M.	City with less than 50,000 residents and County jurisdictions with less than 2,00,000 residents in unincorporated areas.	Notices of funding availability scheduled for release in January each year. Applications are invited by an annually and are continuously received and reviewed throughout the year. Awards are made on an ongoing basis.	Steven Marshall (916) 319-8410
Water Supply	DWR	New Local Water Supply Construction Loans	Eligible projects include a canal, dam reservoir, desalination facility, groundwater extraction facility, or other construction or improvement, including rehabilitation of a dam for water supply purposes by a local public agency for the diversion, storage, or distribution of water which will remedy existing water supply problems.	Loans: $5M max per construction project, $500,000 max per feasibility project. The interest rate is equal to the rate that the State pays on the general obligation bonds sold to finance the program.	Local Public Agencies	Continuously accepting applications.	Jerry Snow (916) 651-9264
Energy Efficiency	CEC	Energy Financing Program	Low interest loan financing for water and wastewater utilities for energy efficiency projects, feasibility studies, and implementing energy-saving and renewable energy measures.	Max loan amount is $3M per application or 12 times the annual energy savings, whichever is less. 3% interest rate.	Publicly owned water and wastewater treatment facilities, cities, counties, special districts, or other non-profit entities.	Applications are available on the CEC website	Shahid Chaudry (916) 654-4858; CEC Special projects office (916) 654-4104
Water Quality	DPH, SWRCB, I-Bank	State Revolving Fund (SRF)	Provides low-interest loans and/or grants to assist public agencies in correcting deficiencies in water infrastructure	Grants and loans can be combined with other funding sources.	Publicly owned treatment works, local public agencies, non-profit organizations, and private parties	Applications vary depending on type of project and agency from which funds requested. Applications are accepted on a continuing basis.	Steve Woods (DPH) (916) 449-5624 Dave Kirn (SWRCB) dkirn@waterboards.ca.gov
Water Quality	CDPH	Safe Drinking Water State Revolving Fund	Provides low interest loans or grants to assist public water systems in achieving or maintaining compliance with the Safe Drinking Water Act. Project include water treatment facilities, replace aging infrastructure, planning studies, consolidation of water systems, source water protection, etc. Projects must be needed to comply with Safe Drinking Water Act.	Up to $500,000 per planning study; $20M per project and a max of $30M per entity	Public Water System	Pre-application invitations annually. Disadvantaged system can obtain a zero interest loan. Applications are for loans; financial review determines if grant funds apply.	Dat Tran (916) 449-5644
Water Quality	I-Bank	Infrastructure State Revolving Fund Program	The California Infrastructure and Economic Development Bank provides loans for construction and/or repair of publicly owned water supply, treatment and distribution systems, and drainage, and flood control facilities. Loans are also available for public infrastructure, such as solid waste collection and disposal, environmental mitigation, as well as projects such as parks and recreational facilities and public safety facilities.	Loan: $10M per project ($2M max per environmental mitigation project per year, $2M max per project for parks and recreation facilities) and $20M per jurisdiction per fiscal year.	Local Municipal Entity	Preliminary applications are at ibank.ca.gov	Diane Cummings (916) 324-4805

TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Agency	Program	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
Water Quality	SWRCB	Clean Water State Revolving Fund	Low-interest loans and other financing mechanisms are available for wastewater treatment facility construction projects and expanded use projects that include nonpoint source and estuary projects.	Max $50M per agency per year, with a max financing term of 20 years.	Public Agencies, non-profit organizations, Native American tribes	Applications are accepted on a continuing basis.	CleanWaterSRF@waterboards.ca.gov, (916) 327-9978
Water Quality	SWRCB	Federal CWA 319(h) Program (Nonpoint source grant program)	Funding to support projects throughout the State to restore impaired surface waters through the control of nonpoint source pollution	Project Funding: $250,000-$1 million. 25% local match required, but waived for Disadvantaged Communities and small water systems. For 2012, funding for planning/assessment projects ranges between $75,000 and $125,000 and funding for implementation projects ranges between $250,000 and $750,000.	Public agencies, public colleges, 501(c)(3) non-profit organizations, tribes, state and federal entities	Applications accepted in periodic application cycles. During the project solicitation process, applicants submit a brief concept proposal via FAAST. Applicants with the highest-ranking CPs will be invited to submit a full proposal.	Patricia Leary (916) 341-5167; Matthew Freese (916) 341-5485
Water Supply	SWRCB	Water Recycling Funding Program	Grants are provided for facilities planning studies to determine the feasibility of using recycled water to offset the use of fresh/potable water from state and/or local supplies. Water recycling construction projects that meet objectives of the CALFED Bay-Delta Program are eligible to compete for	Grants for planning studies will cover 50% of eligible costs, up to $75,000. Grants for construction will cover up to 25% of costs or $5M (whichever is less). Construction projects not eligible for grants may also apply for loans are under the SRF loan	Public agencies	Applications accepted on continuous basis.	Dan Newton (916) 324-8404
Water Quality	SWRCB	Cleanup and Abatement Account	This account generally provides public agencies with grants for emergency cleanup or abatement of conditions of pollution where no viable responsible parties are available to undertake the work.	Use of funds are limited to activities specified by the State Water Board and include among other things, waste cleanup and abatement of effects of a waste, and remedying a significant water pollution problem.	Public agencies with authority to cleanup or abate a waste.	Requestors must first contact the State Water Board or submit an online application using FAAST. Requests can be made on an ongoig basis.	Ruben Mora or Mark Fong (916) 341-5387
Water Quality	SWRCB	Agricultural Drainage Loan Program	This programs provides loans, from the Water Conservation and Water Quality Bond Law of 1986, to fund treatment, storage, conveyance, or disposal of agricultural drainage water.	Funding cap is $20 million for implementation projects and $100,000 for feasibility studies. Rates are set at 1/2 of the State's General Obligation bond rate	City, county, district, joint powers authority or other political subdivision of the State involved with water management	Applications are accepted on a continuous basis.	Conny Mitterhofer (916) 341-5720
Water Quality	SWRCB	Agricultural Drainage Management Loan Program	This programs provides loans, from Proposition 204, to fund treatment, storage, conveyance, or disposal of agricultural drainage water.	Funding cap is $5 million for implementation projects and $100,000 for feasibility studies. Rates are set at 1/2 of the State's General Obligation bond rate	City, county, district, joint powers authority or other political subdivision of the State involved with water management	Applications are accepted on a continuous basis.	Conny Mitterhofer (916) 341-5720
Water Quality	SWRCB	Underground Storage Tank Cleanup Fund	Funds are available to provide a means for petroleum UST owners and operators to meet the federal and state requirements. The Fund also assists a large number of small businesses and individuals by providing reimbursement for unexpected and catastrophic expenses associated with the	Loans are available in amounts up to $1.5 million, depending on project and special program.	Various entities depending on special program.	Applications are accepted on a continuous basis.	Judy Reid (916) 341-5760

TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Agency	Program	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
Water Quality, Water Supply	SWRCB	Supplemental Environmental Projects	The SWRCB or Regional Boards may allow Supplemental Environmental Projects to be implemented or funded to partially satisfy a monetary assessment made ina n adminstrative civil liability order. Projects must directly benefit or study groundwater or surface water quality or quantity	Generally, projects with a value of at least $50,000 will be considered under this program.	Projects may eithe rbe performed by the discharger or thir parties paid by the discharger.	Sign up forms for the project proponent list are available on the SWRCB website.	Kristie Kao kkao@waterboards.ca.gov
FEDERAL							
Funding Category	**Agency**	**Program**	**Brief Description**	**Key Points**	**Eligibility**	**Submit Grant Application**	**Contact**
Water Quality and Resource Stewardship	EPA	EPA Wetlands Program Development Grants	Projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution	Three priority areas identified by the EPA: Developing a comprehensive monitoring and assessment program; improving the effectiveness of compensatory mitigation; and refining the protection of vulnerable wetlands and aquatic resources. Awards for 2012 were anticipated to range from $50,000 to $350,000. 25% match required.	States, tribes, local governments, interstate associations, intertribal consortia, and national non-profit, non-governmental organizations are eligible to apply.	Applications accepted in periodic application cycles.	Suzanne Marr US EPA Region 9 (415) 972-3468
Resource Stewardship	EPA and other partners	Five Star Restoration Program	This program provides challenge grants, technical support and opportunities for information exchange to facilitate community-based wetland, riparian and coastal habitat restoration projects. Project sites may be public or private land.	Key project elements include on the ground restoration, environmental education, partnerships and measurable results.	Schools, youth groups, public, private or corporate landowners, local, state and federal government agencies, local non-profit organizations, etc.	Applications generally open in late fall, with award notification in late spring.	Carrie Clingan National Association of Counties (202)942-4246 Cclingan@naco.org; Lacy Alison National Fish and Wildlife Foundation (202) 857-0166 Lacy.Alison@nfwf.org
Resource Stewardship	National Park Service	Rivers, Trails, and Conservation Assistance Program	The program provides technical and staff assistance to conserve rivers, preserve open space, and develop trails and greenways. Note: RTCA does not provide monetary grants or loans.	Projects will be evaluated on how they meet the following criteria: 1) A clear outcome leading to on the ground success; 2) Commitment, cooperation, and cost-sharing by applicant; 3) Opportunity for significant public involvement; 4) Protection of significant natural and/or cultural resources and enhancement of outdoor recreational opportunities; and 5) Consistency with the National Park Service mission.	Nonprofits, community groups, tribes, or tribal governments; and state or local government agencies.	Applications are due August 1st for assistance during the next fiscal year. http://www.nps.gov/rtca/	Anne Dove (323) 441-9307, Patrick Johnston (323) 441-2117, MaLisa Martin (323) 276-0968

TABLE 9.1-1
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Agency	Program	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
Resource Stewardship	Natural Resources Conservation Service	Watershed Protection and Flood Prevention	Funding for activities that promote soil conservation and the preservation of the watersheds of rivers and streams throughout the US.	Matching funds are not required: applicants must generally provide matching ranging from 0%-50% in cash or in-kind resources depending on such factors as project type and the kinds of structural measures a project proposes.	States, local governments, and other political subdivisions; soil or water conservation districts; flood prevention or control districts and tribes. Potential applicants must be able to obtain all appropriate land and water rights and permits to successfully implement proposed projects.	Not currently soliciting applications.	Luana Kiger, Acting Director Watershed Planning Services (530) 792-5661
Water Quality	United States Department of Agriculture (USDA) Rural Development	Water and Waste Disposal Program	Program that provides financial assistance (loans and grants) for community water, wastewater, and drainage systems in rural areas	Funds may be used for planning, design, and construction of new or existing systems; eligible projects include storage, distribution, source development; no funding limits, but average project size is $3-5 million. Greater funding share provided for low-income communities. Grants may be made for up to 75% of eligible project costs.	Cities, towns, public bodies, and census designated places with populations less than 10,000. Must demonstrate financial need.	Applications accepted on a continuous basis.	Dave Hartwell USDA State Office (530) 792-5818
Water Supply	United States Bureau of Reclamation (Reclamation)	WaterSMART Challenge Grant Programs	Reclamation provides 50/50 cost share funding to irrigation and water districts and states for projects focused on water conservation, efficiency, and water marketing. Past and proposed programs have included Water and Energy Efficiency Grants, Advanced Water Treatment Pilot and Demonstration Projects, Grants to Develop Climate Analysis Tools.	Matching funds are required. Applicants must provide a minimum 50% of project costs in non-Federal cash or in-kind resources.	Eligible applicants include irrigation and water districts, state governmental entities with water management authority. Projects must be located in Western United States.	Funding opportunities vary depending on available program funding.	Dean Marrone (303) 445-3577
Resource Stewardship	US Fish and Wildlife Service (USFWS)	North American Wetlands Conservation Act	The Small Grants Program provides funding, up to $75,000, for projects that provide long-term protection of wetlands and wetlands dependent fish and wildlife. Funding available under the Standard Grants Program averages $40M annually for the whole U.S. and is provided to projects exceeding $75,000 per proposal.	Partners must match the grant request at a 1 to 1 ratio.	Organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the US, Canada, and Mexico. Small Grants only apply to the U.S.	Applications accepted on continuous basis. Proposals may be submitted at any time during before the fiscal year deadline.	Division of Bird Habitat Conservation, (703) 358-1784; Joint Venture Coordinator: Robert Mesta robert_mesta@fws.gov; Small Grants Program Coordinator: Rodecia McKnight (703) 358-2266

Section 10: Data Management, Technical Analyses, and Plan Performance

This section is organized into two parts to summarize the data management, technical analyses, and performance of the Upper Santa Clara River IRWMP. Section 10.1 describes the data management efforts and technical analyses conducted during preparation of the IRWMP. Section 10.2 examines monitoring, ongoing data management, and plan performance during implementation, and describes how performance data will be used to improve future versions of the IRWMP.

In general, the success of the IRWMP will depend on how well the individual plan objectives are accomplished. Achievement of all of these objectives will, in large part, determine the success of local integrated regional water management planning processes.

The following objectives, discussed in Section 6, were developed to allow progress of the overall IRWMP to be measured:

- ***Reduce Potable Water Demand*:** Implement technological, legislative and behavioral changes that will reduce user demands for water.
- ***Increase Water Supply:*** Understand future regional demands and obtain necessary water supply sources.
- ***Improve Water Quality:*** Supply drinking water with appropriate quality; improve groundwater quality; and attain water quality standards.
- ***Promote Resource Stewardship*:** Preserve and improve ecosystem health; and preserve and enhance water-dependent recreation.
- ***Flooding/Hydromodification:*** Reduce flood damage and/or the negative effects on waterways and watershed health caused by hydromodification and flooding outside the natural erosion and deposition process endemic to the Santa Clara River.
- ***Take actions within the watershed to adapt to climate change***
- ***Promote projects and actions that reduce greenhouse gas emissions***

10.1 Data Management and Technical Analyses for Plan Preparation

The Upper Santa Clara River IRWMP documents the results of a collaborative effort of over 10 public agencies with varying water, resource management and flood management responsibilities, as well as numerous other interested entities. The IRWMP was prepared using information and guidance provided by the RWMG and Stakeholder group. The IRWMP in turn, will be used by these same entities to guide and support their future water management efforts.

Extensive information and data on the Region have been prepared by various agencies and groups. That information was reviewed and evaluated as part of this IRWMP and served as the foundation for the development of this plan, as described below.

10.1.1 Existing Information and Reports

The following documents contain the baseline information used in the development of the IRWMP. A brief summary of the reports, how often they are updated, identification of who participates in their preparation and identification of the type of information generated by the document is provided for each report listed.

10.1.1.1 Water Resource Management Reports

These reports document the reliability and availability of the Region's water supplies to meet current and projected demands. These reports include both urban water management plans and groundwater management plans.

The California Urban Water Management Planning Act applies to public and private municipal water suppliers with more than 3,000 connections or supplying more than 3,000 AFY. The act requires suppliers to describe and evaluate sources of water supply, efficient uses of water, certain demand management measures (DMMs), implementation strategy and schedule, and other relevant information and programs. This information is used by the urban water supplier to develop an UWMP which is submitted to DWR in years ending in five and zero (e.g., 2000, 2005, 2010).

AB 3030, the Groundwater Management Act, authorized local agencies to prepare groundwater management plans for groundwater basins not subject to adjudication or other form of regulation. AB 3030 lays out a procedure for development of a groundwater management plan. The act also specifies twelve technical components which can be included in a groundwater management plan, including replenishment strategy, mitigation of overdraft, mitigation of contaminated groundwater, and avoidance of saline intrusion.

2010 Antelope Valley-East Kern Water Agency UWMP

A small amount of SWP water is available to a portion of the eastern part of the Region through deliveries from AVEK, a wholesale SWP provider. The *2010 AVEK UWMP* assesses current and projected (through 2030) water supplies for AVEK's service area. AVEK's UWMP will be updated in 2015.

2010 Santa Clarita Valley UWMP

The *2010 Santa Clarita Valley UWMP* was prepared for CLWA and three of the purveyors: NCWD, SCWD, and VWC. The fourth purveyor, LACWWD No. 36, was not included because it does not meet the Urban Water Management Plan Act's threshold requirements for preparation of UWMPs. However, LACWWD No. 36 participated in the development of the plan. The 2010 UWMP contains information on water use, water resources, recycled water, water quality, reliability planning, DMMs, and water shortage contingency planning within the CLWA service area. The 2010 UWMP will be updated in 2015.

Castaic Lake Water Agency GWMP

CLWA has prepared a GWMP, pursuant to AB 3030 for the Santa Clara River Valley Groundwater Basin, East Subbasin. The East Subbasin is comprised of two aquifer systems, the Alluvium generally underlying the Santa Clara River and its several tributaries, and the Saugus Formation which underlies much of the entire Upper Santa Clara River area. The GWMP provides background information on the East Subbasin. The GMWP has also led to on-going data monitoring and reporting, detailed in section 10.1.3.

Annual Santa Clarita Valley Water Reports

Publication of the *Annual Santa Clarita Valley Water Report* began in 1998. These reports provide current information about local groundwater resources, SWP water supplies, water conservation, and recycled water in the Valley on an annual basis. The reports review the sufficiency and reliability of supplies in the context of existing water demand, with focus on actual conditions in the year prior to publication, and provide a short-term outlook of water supply and demand for the upcoming year. The reports are prepared by CLWA and the four water purveyors: LACWWD No. 36, NCWD, SCWD, and VWC.

10.1.1.2 Facilities Plans and Master Plans

A facilities plan and/or master plan is a physical development plan that provides the framework by which future planning decisions are made. It is an action plan for a particular resource or service such as recycled water, flood control, and wastewater facilities.

2015 Santa Clarita Valley Joint Sewerage System Facilities Plan

The 2015 Santa Clarita Valley Joint Sewerage System Facilities Plan (2015 Plan), was prepared in 1998 by the LACSD Nos. 26 and 32. LACSD No. 26 and 32 provide sewerage services to the Valley including the City of Santa Clarita and unincorporated County areas. The objective of the 2015 Plan is to provide for the necessary wastewater conveyance, treatment, and disposal facilities to meet the needs of the projected service area for LACSD Nos. 26 and 32 through the year 2015 in a cost-effective and environmentally sound manner. Since preparation of the 2015 Plan, LACSD No. 26 and 32 have merged to form the Santa Clarita Valley Sanitation District (SCVSD).

Santa Clarita Valley Sanitation District FinalChloride Compliance Facilities Plan

This plan examines a wide range of options to remove chloride from wastewater and the associated costs. An assessment of potential environmental impacts was prepared concurrent with the Chloride Compliance Facilities Plan. The Facilities Plan and EIR were approved by the SCVSD Board of Directors on October 28, 2013.

Acton-Agua Dulce Conceptual Master Plan for Water Facilities

Acton and Agua Dulce are communities located in the unincorporated areas of the County in the upper parts of the Watershed. The 2004 *Acton-Agua Dulce Conceptual Master Plan for Water Facilities* was prepared for LACWWD No. 37 for the purpose of developing a conceptual plan for providing water service to Agua Dulce and portions of Acton in order to assess the feasibility

and interest in connecting these areas into the District's existing distribution system. The report provides the current and forecasted water demands for Acton and Agua Dulce private users, and for the Agua Dulce Winery and Vineyard.

CLWA Draft Recycled Water Master Plan

CLWA's 2002 *Draft Recycled Water Master Plan* (2002 Master Plan) is a planning document that updates the 1993 *Draft Reclaimed Water Master Plan*. The 2002 Master Plan was prepared to provide the information necessary to allow CLWA to develop a cost-effective recycled water system within its service area. The document considers significant issues affecting recycled water sources, supplies, users, and demands. CLWA is currently in the process of preparing its *Recycled Water Master Plan Update*, which updates sources of recycled water in the CLWA service area, their potential constraints, and potential recycled water users.

10.1.1.3 City, County, and Federal Land Use Plans

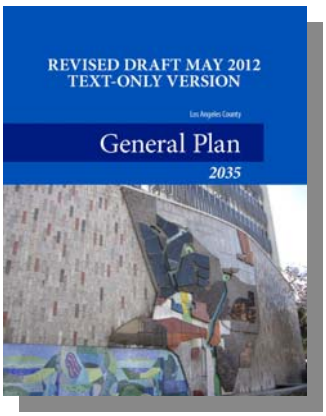
Land use plans provide for the scientific, aesthetic, and orderly disposition of land, resources, facilities and services of urban and rural communities. General plans are a compendium of city or county policies regarding long-term development, in the form of maps and accompanying text. In California, general plans have seven mandatory elements (circulation, conservation, housing, land use, noise, open space, safety and seismic safety) and may include any number of optional elements (such as water, air quality, economic development, hazardous waste, and parks and recreation). Most local general planning documents generally have identified water management resource strategies that integrate with land use planning efforts. By law, each city and county is required to update the Housing Element of its general plan every five years and the Governor's Office of Planning and Research recommends that the remaining elements be reviewed every eight to ten years.

City of Santa Clarita General Plan

The *City of Santa Clarita General Plan* was prepared in 2011. The General Plan is comprised of 7 elements, which encompass the seven elements mandated by the State and one additional element: Land Use, Economic Development, Circulation, Noise, Conservation and Open Space, Safety, and Housing.

Los Angeles County General Plan

The *Los Angeles County General Plan*, originally published in 1980, is currently being updated as the *Los Angeles County General Plan 2035*, with adoption anticipated to occur in 2013. This document is the outline for growth and development in the unincorporated areas of the County. The Plan provides for the management and preservation of existing land uses and community character, including agricultural, residential, open space, etc. within the County, while providing for new recreational opportunities and infrastructure to support the population's needs. The General Plan is designed to guide the



The most recent draft of the Los Angeles County General Plan 2035 was released in 2012.

long-term physical development and conservation of the County's land and environment through a framework of goals, policies and implementation programs. The General Plan also provides a foundation for more detailed plans and implementation programs, such as Area or Community Plans, zoning ordinances, and Specific Plans.

Newhall Ranch Specific Plan

The *Newhall Ranch Specific Plan*, prepared for the County and adopted in 2003, guides future development of the Newhall Ranch property. The document sets forth a comprehensive set of plans, development regulations, design guidelines, and implementation programs designed to produce a project consistent with the goals, objectives, and policies of the *Los Angeles County General Plan* and *Santa Clarita Valley Area Plan*, as proposed for amendment according to General Plan Amendment No. 94-087. This Specific Plan is regulatory in nature and serves as zoning for the Newhall Ranch community. Subsequent development plans and subdivision maps must be consistent with both this Specific Plan and the *Los Angeles County General Plan*.

Los Angeles County, One Valley One Vision Santa Clarita Valley Area Plan

In 2011, the *One Valley One Vision (OVOV) Santa Clarita Valley Area Plan* was adopted by Los Angeles County for use in making public policy decisions relating to the future of the entire Santa Clarita Valley planning area through the year 2035. OVOV is a joint effort between the County, the City of Santa Clarita, and many regional stakeholders to define guidelines for future growth of the Valley and the preservation of natural resources. The Area Plan provides population forecasts for the communities within the Valley, as well as policies relating to the specific needs and characteristics of the Valley. OVOV is consistent with both the County's and the City of Santa Clarita's General Plans, but does not include all the mandatory General Plan elements that are already covered in the County's General Plan. Day-to-day implementation of this General Plan, based on the Guiding Principles, is administered by both the City of Santa Clarita and County for lands within their respective jurisdictions.

National Forests Land Management Plans (Forest Plans)

The Forest Plans for the southern California national forests, which cover a large portion of the Region's open space, were developed by the US Forest Service as a strategic guidance for managing the land and its resources and were last revised in 2005. The Forest Plans define the parameters for management, while promoting adaptive management for flexibility in the face of rapidly changing resource conditions. The Forest Plans outline goals and objectives to manage the forests and their water resources, including desired forest conditions, and list place-specific standards and possible strategies to implement management activities. In addition, the Forest Plans list the various laws regulations, and policies applicable to natural resource management. Under the National Forest Management Act, these documents are required to be revised every 10 to 15 years.

10.1.1.4 Resource Conservation Plans

Santa Clara River Enhancement and Management Plan

The purpose of the SCREMP is to provide a guidance document for the preservation, enhancement, and sustainability of the physical, biological, and economic resources that occur

within the 500-year floodplain limits of the Santa Clara River, one which will be of benefit to Stakeholders when planning and implementing projects and activities. The plan was prepared by the Ventura County Watershed Protection District (VCWPD) and the LACDPW. The final SCREMP document summarizes reports that were prepared in 1995 and 1996, characterizing biological and water resources, cultural resources, aggregate, flooding, and access and recreation. More recent products include wetland plant and environmental permitting guides for stakeholders, a workstation at the County that will allow the public to use available information to develop their environmental permit application materials, and a water quality monitoring station at the Los Angeles/Ventura County line to improve the existing river water quality database.

South Coast Missing Linkages Project

In 2006, South Coast Wildlands, an environmental non-profit (501c3) organization dedicated to protecting and restoring connected wildland systems and the ecosystems upon which these systems rely, completed the South Coast Missing Linkages Project, aimed at maintaining and restoring highest priority connections between wild lands in the South Coast Region. The steering committee for the report included staff from the US Forest Service, CDFW, and US FWS. The report, "South Coast Missing Linkages," examines 15 specific geographic connections in Southern California that conserve essential biological and ecological processes. More than 125,000 acres of open space between Los Padres National Forest and the Santa Monica Mountains National Recreation Area are named as areas that need protection to create wildlife corridors. The report is intended to be a guide for cities, counties, Caltrans and land protection groups such as The Nature Conservancy looking to mitigate the effects of development on wildlife. There are three identified linkages in the Region: Santa Susana Mountains to the Sierra Madre Range, Sierra Madre Range to Castaic Range, and San Gabriel Mountains to Castaic Range.

Upper Santa Clara River Upper Watershed Conservation Plan

This plan was developed by the Nature Conservancy to guide conservation activities in the Upper Santa Clara River Watershed, with particular emphasis on protecting the wildlife corridor known as the San Gabriel-Castaic Linkage. Using input from over a dozen different entities, natural communities and species to be conserved were identified, threats to the viability of natural communities were documented, and opportunities for protection and enhancement were charted. Based on this information conservation targets are developed. The plan identifies strategies that can be undertaken to enhance the viability of the conservation targets. Benchmarks are described against which plan success can be measured.

Upper Santa Clara River Watershed Arundo and Tamarisk Removal Program Long-Term Implementation Plan

The Ventura County Resource Conservation District (VCRCD), as lead agency for the Ventura County Arundo Task Force, in conjunction with its partners, are developing and implementing a regional Arundo and Tamarisk eradication program in the Upper Santa Clara River Watershed. The *Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan* (SCARP), developed in

Invasive tamarisk plant

2006, provides guidance to stakeholders for implementing arundo and tamarisk removal projects of any size within the Upper Santa Clara River watershed. The project benefits the Upper Santa Clara River Watershed, and helps restoration efforts downstream in Ventura County as it will reduce the amount of Arundo that annually washes out of the river channel and is deposited on downstream beaches. The long-term goal of the Ventura County Arundo Task Force is the eradication of Arundo from all portions of the Santa Clara River, both in Los Angeles and Ventura counties. The SCARP is intended to be a living document that will be updated periodically to incorporate new technologies, changes in regulations or newly identified issues.

10.1.1.5 Water Quality Plans

Los Angeles Regional Water Quality Control Board Basin Plan and Amendments

The *Los Angeles RWQCB Basin Plan*, prepared in 1994, is designed to preserve and enhance water quality and protect the beneficial uses of water within the Los Angeles region. Specifically, the Basin Plan designates beneficial uses for surface and ground waters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy, and describes implementation programs to protect all waters in the Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. As conditions change, such as the identification of new TMDLs or water quality standards, the Basin Plan is amended. Following adoption by the RWQCB, the Basin Plan and subsequent amendments are subject to approval by the SWRCB, the State Office of Administrative Law, and the US EPA.

10.1.2 Data Needs

During the course of the preparation of this IRWMP, stakeholders were queried about data needs and data needs were identified by resource specialists working on the plan. Table 10.1-1 documents data needs identified for the Region.

TABLE 10.1-1
DATA NEEDS

Current data on water consumption patterns	Long-term water quality data correlated to air temperature
Market saturation of water conservation fixtures	Long-term annual and seasonal agricultural water demand
Sediment transport factors on the Santa Clara River	Inventory of critical infrastructure in floodplain
Correlation between precipitation reduction and effects on groundwater supply	Greenhouse gas baselines for water agencies
Monthly and seasonal weather data (precipitation, air temperature)	

10.2 Data Collection and Sharing

The USCR Region is comprised of multiple stakeholders with resource management duties. As such these agencies regularly collect and disseminate data as part of their normal operation. The USCR will take advantage of these resource activities to collect data and disseminate data to Stakeholders, the public, and the State. Table 10.2-1 documents how data is collected and shared in the Region.

TABLE 10.2-1
DATA COLLECTION AND SHARING

Data Management Activity	Protocol
Typical Data Collection Techniques	**Water Supply and Demand.** Water data related to supply and demand is collected by the water agencies consistent with the California Urban Water Management Plan Act, the Groundwater Management Act, and the Public Water Systems Production Survey. These activities insure monthly and annual data on water demand and production are collected. **Population and Land Use Trends**. Land use jurisdictions in the Region collect data consistent with California Government Code (Sections 65000 et seq.) and use this data to prepare "a comprehensive, long-term general plan for physical development." **Water Quality**. Under Health & Safety Code §116470, water agencies must collect data on the raw water and provide annual reports on the quality of the water supplied to customers. Under §303 of the Clean Water Act, dischargers to waterways must collect and report data on the water quality of their discharges. Besides data collected by agencies in their resource management roles, as part of the IRWMP, stakeholders are invited to provide data, reports, or studies to benefit information contained in the IRWMP.
Responsibility for Maintaining Data	Resource agencies providing water supplies, sanitary services, or regulating land use have the responsibility to maintain this data consistent with the laws described above (Water Code, California Government Code, Clean Water Act). Castaic Lake Water Agency, or current chair of the RWMG, will require project proponents implementing grant-funded projects as part of the IRWM Program, to collect and maintain data generated as part of their project (ambient groundwater quality, treated water quality, amount of invasive species removal, volume of water treated, amount of pipeline improved or replaced) during project implementation.
Data Validation/Quality Assurance	Data collected by resource management agencies is done based on specific protocols established by regulatory agencies such as the Department of Water Resources, the California Department of Public Health, and the Regional Water Quality Control Board. These protocols and submittal of data to these agencies provides quality assurance and quality control. In addition, water supply data, land use data, and water quality data is regularly published and becomes part of planning documents vetted in public hearings (e.g., urban water management plans).

Table 10.1-2 cont.

Data Sharing	The USCR Region has undertaken four planning studies and four implementation projects. Two of the planning studies (climate change and the Salt and Nutrient Management Plan for the Upper Santa Clara River Valley East Subbasin) will be included as part of this IRWM Plan update. The data associated with these studies will be transferred and shared in the IRWM Plan update. Two other planning studies are underway, one to update the Recycled Water Master Plan for CLWA and the other is the Santa Clarita Valley Water Use Efficiency Strategic Plan. Preparation of these studies will require a great deal of coordination between water agencies and land use agencies in the Region. The plans themselves will be provided on the IRWMP website (www.scrwaterplan.org). In addition, as is tradition in the Region, an update on the studies will be made at the beginning of each Stakeholder meeting. Several actions will be taken to keep the RWMG, Stakeholders, and other interested parties informed about these implementation projects: • Posting of implementation project description, map, and contact information on IRWMP website. • Quarterly posting (during project implementation) of project progress reports on IRWMP website • Upon project completion, posting of a summary of project evaluation measures, targets, and performance of the project compared to the target. • Regular progress reports during Stakeholder meetings These actions will make the RWMG, Stakeholders, and other interested parties aware of the types of projects and types of data being collected in the Region and will make it possible for interested persons to acquire Regional data. The IRWMP website will provide links to further facilitate data sharing. Links will direct visitors to the relevant water agency website, relevant land use agency websites, and State database websites (CEDEN, CASGEM, SWAMP, GAMA).
Data Consistency with State Databases	To make data from the Region accessible and compatible with State databases, the RWMG will require implementation projects clearly delineate the nature of the data being collected (parameters, units), the timeframe associated with the data, and the location associated with the data. Within the Region, CLWA is the local monitoring entity for the California Statewide Groundwater Elevation Monitoring Program (CASGEM). CLWA reports available groundwater level data to the CASGEM program bi-annually. CLWA will continue in this role and provide data consistent with the CASGEM program. USCR IRWMP implementation projects affecting surface water will be required to report ambient surface water conditions to the Surface Water Ambient Monitoring Program (or its successor program) before taking actions that could affect ambient water quality.

10.2.1 Monitoring and Data Management

Within the Region there is an existing system in place for collecting data on groundwater and surface water supplies and water quality. Collection of data can be used to help quickly identify data gaps, assess project and program performance, support statewide data needs, and integrate with other regional and statewide programs.

Data is vitally important to agencies trying to maximize operating efficiency and design projects with limited budgets. The types of data available, current relevance and trends, and knowledgeable people that can interpret the data are all important. Equally important is the opportunity for Federal and State agencies to view local data for their own monitoring needs and to better understand local conditions.

10.2.2 Monitoring

10.2.2.1 Groundwater Monitoring

MOU and GWMP between the Santa Clarita Valley Purveyors and the United Water Conservation District

United Water Conservation District (UWCD) is a water district in Ventura County that encompasses 214,000 acres of the Santa Clara River Valley and the Oxnard Plain. In 2001, Upper Basin Water Purveyors (CLWA, LACWWD No. 36, NCWD, SCWD, and VWC) and UWCD prepared and executed a MOU to cooperatively manage local groundwater supplies. As a result of the MOU, the cooperating agencies have undertaken the following measures: integrated their database management efforts; developed and utilized a numerical groundwater flow model for analysis of groundwater basin yield and containment of groundwater contamination; and continued to monitor and report on the status of Basin conditions, as well as on geologic and hydrologic aspects of the overall stream-aquifer system. This information is now embodied in the Region's GWMP.

Regional Groundwater Flow Model for the Santa Clarita Valley

The development and calibration of a numerical groundwater flow model of the entire basin was initiated in 2003, subsequent the adoption of the GWMP among the Upper Basin Water Purveyors (CLWA, LACWWD No. 36, NCWD, SCWD, and VWC) and UWCD. The groundwater model was initially intended for use to predict aquifer response to the planned operating ranges of pumping. However, the groundwater flow model has also been used to analyze the control of perchlorate contaminant migration under selected pumping conditions. In 2004, the DTSC reviewed and approved the construction and calibration of the regional model as described in the final model report, *Regional Groundwater Flow Model for the Santa Clarita Valley, Model Development and Calibration* (CH_2M Hill 2004a). After DTSC approval, the model was used to simulate the capture and control of perchlorate by restoring impacted wells, with treatment. The results of that work are summarized in a second report, *Analysis of Perchlorate*

Groundwater Observation Well

Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California (CH_2M Hill 2004b).

Application of the groundwater model for analysis of basin yield was documented in the 2005 *Analysis of Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin.* The analysis was updated in 2009 in order to further assess groundwater development potential and possible augmentation of the groundwater operating plan under consideration of potential global warming impacts, reduced state water reliability, and planned recharge projects.

Groundwater Operating Plan (from 2005 UWMP)

The groundwater component of overall water supply in the Region derives from a groundwater operating plan developed over the last 20 years to meet water requirements (municipal, agricultural, small domestic) while maintaining groundwater in a sustainable condition (i.e., no long-term depletion of groundwater or interrelated surface water). This operating plan also addresses groundwater contamination issues, consistent with both the MOU and the GWMP described above. The groundwater operating plan is based on the concept that pumping can vary from year to year to allow increased groundwater use in dry periods and increased recharge during wet periods and to collectively ensure that groundwater is adequately replenished through various wet/dry cycles. As described in the MOU, and subsequently formalized in the GWMP, the operating yield concept has been quantified as ranges of annual pumping volumes.

The current purveyors' groundwater operating plan has been in the 2008 basin yield report and is summarized in the *2010 Santa Clarita Valley UWMP*, as described in Section 3.1.1.6. Ultimately, the intent of the operating plan is to maintain sustainable groundwater conditions to support the combination of municipal (purveyor), agricultural, and small private groundwater use on an ongoing basis.

10.2.2.2 Water Quality Monitoring

Drinking water quality is monitored through the following means.

Safe Drinking Water Act (SDWA) Compliance Monitoring and Reporting

All public water systems are required to produce water that complies with the SDWA. To this end, specific monitoring information is required and conducted routinely. Results of the monitoring are reported to DPH. In addition, monitoring information is required to be published in an annual Consumer Confidence Report (described below).

Unregulated Contaminant Monitoring Rule Results

The 1996 SDWA Amendments mandate that the US EPA publish a list of unregulated contaminants that may pose a potential public health risk in drinking water. This list is called the Contaminant Candidate List. The initial 1998 accounting listed 60 contaminants. US EPA uses this list to prioritize research and data collection efforts for future rulemaking purposes. The 1996 SDWA Amendments incorporated a tiered monitoring approach. The rule required all large public water systems and a nationally representative sample of small public water systems

serving less than 10,000 people to monitor the contaminants. The information from the monitoring program for the Region are compiled and submitted to the State.

Monitoring Done as Part of TMDL Implementation

As discussed in Section 10.1.1.5, as conditions change in the Region, such as the identification of new TMDLs or water quality standards, the Los Angeles RWQCB Basin Plan is amended. Compliance monitoring is required by the Los Angeles RWQCB, and performed on an ongoing basis in order to determine if a watershed is in compliance with an identified TMDL. A compliance monitoring program for implementing a TMDL would generally include the anticipated compliance points for the monitoring program, parameters to be measured, analytical methods and their sensitivity for reliably detecting the regulated chemicals, frequency of measurements, etc. With such information it will be possible to evaluate whether the proposed compliance monitoring could be expected to be adequate for detecting significant violations of the requirements set forth in the TMDL.

10.2.2.3 Surface Water Flow Monitoring

LACDPW operates and maintains six automatic rain gauges and two stream flow gauges in the Region. Rain gauges continuously record information for precipitation in durations ranging from 5 minutes to 24 hours. Rain gauges are located in Newhall, Aliso Canyon, Bouquet Canyon, Mint Canyon, Acton Camp, and at the Santa Clara River headwaters. The two stream flow gauges are located near the Lang railroad bridge and near the Interstate-5 crossing of the Santa Clara River. The records for these gauges go back for many years. For example, the Lang stream flow gauge record goes back to April 1970 and the Old Road Bridge (Interstate-5) gauge goes back to September 1981.

10.2.3 Data Reporting

10.2.3.1 Data Reporting as Part of the City of Santa Clarita Municipal National Pollutant Discharge Elimination System Permit

The City of Santa Clarita's Municipal National Pollutant Discharge Elimination System (NPDES) Permit requires developers of certain developments/redevelopments to prepare engineering documents to prevent potential pollutants from entering the storm drain system, such as an Urban Storm Water Mitigation Plan (USMP) and/or Storm Water Pollution Prevention Plan (SWPPP). The municipal NPDES requires that the City of Santa Clarita submit an Annual Storm Water Permit Report and Assessment to the Los Angeles RWQCB. The Annual Reports include the information necessary to assess compliance relative to the permit, and the effectiveness of implementation of permit requirements on storm water quality. Further, a new Los Angeles County NPDES Permit was adopted in 2012. The permit regulates discharges into storm drains and requires permittees to prohibit or severely restrict non storm water discharges (flows when it's not raining), including overflowing landscape irrigation, from getting into the storm drain. Specifically, the NPDES permit requires the City and Los Angeles County to develop and implement procedures that minimize discharge of landscape irrigation to the storm drain by promoting conservation programs. This will result in enhanced data collection and reporting.

10.2.3.2 Data Reporting as Part of County of Los Angeles Municipal Storm Water Permit

The County of Los Angeles Municipal Storm Water Permit provides the waste discharge requirements for the discharge or contributions to discharges of storm water and urban runoff from municipal separate storm sewer systems (storm drain systems). The countywide permit covers the LACFCD, the County, and the 84 incorporated cities within the LACFCD, including the City of Santa Clarita. Each entity permitted under the countywide permit must implement a storm water quality management program (SQMP). The data that is collected as part of the SQMP is submitted annually to the Los Angeles RWQCB, which is then compiled in the unified Annual Storm Water Program Report. Data will be collected related to receiving water quality, at stormwater outfalls, and at established TMDL monitoring points. Each unified report documents the Permittees' progress in implementing the SQMP and the requirements of the countywide permit. Data that is collected, including the annual reports, are available for public review on the Los Angeles RWQCB's website.

Annual Santa Clarita Valley Consumer Confidence Reports

The preparation of Consumer Confidence Reports is required by the California Health and Safety Code §116470, as well as the SDWA and US EPA. This code requires every public water system, as a condition of its operating permit, to annually prepare a report and provide a copy of that report to each customer. It also requires public water systems with more than 10,000 service connections that detect contaminants above their public health goals (PHGs) to provide PHG exceedance reports every three years and to hold public hearings regarding their reports. The Consumer Confidence Report includes information on a system's source water, the levels of any detected contaminants, and compliance with drinking water regulations, plus some educational material. Contaminants typically reported include turbidity, coliform, lead/copper, unregulated contaminants, and those contaminants of concern specific to a particular location.

The annual Consumer Confidence Report for the Valley (titled the Santa Clarita Valley Water Quality Report) is provided by CLWA and the local water purveyors. The goal of the report is to provide customers with the most current information about the quality of their water. Each report contains a summary of thousands of water quality tests performed in the Valley, as well as discussions of noteworthy contaminants, updates on regulatory news, and tips on saving indoor and outdoor water use.

10.2.3.3 Data Reporting as Part of the Memorandum of Understanding Regarding Urban Water Conservation in California

The *Memorandum of Understanding Regarding Urban Water Conservation in California* was originally executed in 1991. The MOU includes several water conservation BMPs intended to reduce California's long-term urban water demands, and signatory agencies report progress on their implementation to the CUWCC. The BMPs are currently implemented by MOU signatories on a voluntary basis, but existing legislation also institutes requirements for demonstration of water conservation measure implementation in order to qualify for State grant funding.

The County signed the MOU in 1996 on behalf of all its Waterworks Districts. CLWA signed the MOU in 2001 on its own behalf as a water wholesaler, and on behalf of the local retail water

purveyors. NCWD signed the MOU separately on its own behalf in 2002. VWC signed the MOU separately on its own behalf in 2006. Each of these agencies now files BMP implementation reports with the CUWCC.

10.2.4 Plan Performance

Generally, the success of the IRWMP will depend on how well the individual plan objectives are accomplished. Achievement of all of these objectives will, in large part, determine the success of local integrated regional water management planning processes.

As described in Section 1, IRWMP updates are a defined task within the USCR Regional Water Management Group Memorandum of Understanding. This IRWMP is a dynamic document and is part of an ongoing local effort to achieve integrated local water management. The process, through Stakeholder participation and plan revisions, will continue for many years and will be an effective mechanism for addressing the water management issues facing the Region. As a consequence, IRWMP objectives, regional priorities, and statewide priorities will continue to be reviewed for relevance and modified as needed to ensure the overall IRWMP reflects regional changing needs and continues to be effective. Additionally, Candidate Projects will be reviewed and evaluated on a regular (every five years) basis to ensure that current plan objectives will be met and that the resulting Plan Projects offer the greatest benefit possible. Periodically, a new set of Plan Projects will be selected to address revised IRWMP objectives and State and regional priorities.

This ongoing review and update allows the plan to undergo “adaptive management”, e.g., allow the IRWMP to evolve in response to changing conditions and as better data is developed. IRWMP revisions will result in:

(1) An updated evaluation of information and data related to watershed conditions

(2) An evaluation of projects/actions and their contribution to meeting IRWMP objectives

(3) Revised objectives, strategies, and projects based on new conditions and past project successes

As projects are implemented in the Region as part of this IRWMP, project performance will be assessed and outcomes will be monitored, and the results from this monitoring will be used to guide future project implementation. If monitoring reveals, for example, that a project is progressing as planned and regional changes do not necessitate revisiting project implementation, then changes to project prioritization would not be anticipated. However, if monitoring reveals that a project, or suite of projects, are not producing the anticipated result, corrective actions (whether it be improving a specific project, changing the project prioritization, strengthening the measures by which those projects are being monitored, etc.) can be implemented. This information will feed into future updates of the plan, and keeps it a living document.

10.2.5 Evaluation of Plan Performance

Table 10.2-2 lists the process that will be used to evaluate plan performance.

TABLE 10.2-2
PROCESS FOR MEASURING PLAN PERFORMANCE

Responsibility for IRWMP Implementation Evaluation	The RWMG, led by the Chair, will be responsible for evaluating IRWMP implementation performance
Frequency of Evaluation	The RWMG will annually evaluate success at implementing projects in the IRWMP
Tracking Implementation	Data, project descriptions, maps, and contact information for implementation projects will be posted on the IRWMP website. Upon project completion, there will be a posting of a summary of project evaluation measures, targets, and performance of the project compared to the target. This data will make it possible to determine how projects are advancing IRWMP objectives. The RWMG, lead by the Chair, will be responsible for tracking IRWMP implementation and ensuring implementation project data is available to the RWMG, Stakeholders, and other interested parties.
Improving Implementation of Future Projects	"Lessons Learned" will be incorporated during each update of the IRWMP. A Plan update has the benefit of input from the RWMG and the broader Stakeholder group. During Plan updates objectives and measures are reviewed, refined, and revised if necessary to reflect regional conditions and needs and to incorporate new data. Applicable Resource Management Strategies, to meet objectives, are also re-evaluated during each update.
Responsibility for Project Specific Monitoring Plans	The project proponent will have the responsibility for development of project-specific monitoring plans and will be responsible for project-specific monitoring activities.
Timing of Project Specific Monitoring Plans	Project specific monitoring plans shall be prepared prior to the start of project construction or implementation.

Table 10.2-1 cont.

Contents of Project-Specific Monitoring Plans	Project specific monitoring plans shall include, at the minimum, the following: A description of what is being monitored. Examples include: • The amount of recycled water production • Number of customers connecting to recycled water system • Change in invasive species cover • Change in dissolved oxygen, pH, temperature, turbidity, salinity • Change in average number of different species occurring within a given area (habitat diversity) A description of measures to remedy problems encountered during monitoring. A description of the location of monitoring and monitoring frequency. A description of monitoring protocols and methodologies, and assignment of the responsibility for monitoring. A description of what data will be shared with the IRWMP Stakeholders and with what frequency. Identification of what State databases information will be provided to, and requirements for data submittal. Resources and procedures to ensure the monitoring schedule will be maintained (e.g., identify responsible parties and alternates and funding for monitoring).

10.2.6 Plan Performance to Date

Since the inception of the IRWMP progress has been made to meet the stated objectives of reducing water demand, increase water supply, improve water quality, and promote resource stewardship (objectives of the 2008 IRWMP). Table 10.2-3 provides a summary of plan performance to date.

Since 2008 the Upper Santa Clara River Region has aggressively implemented water conservation actions to reduce potable water demand. This includes actions undertaken as part of the Santa Clarita Valley Water Use Efficiency Strategic Plan, a plan to identify programs and projects that will most effectively reduce per capita water use in the Santa Clarita Valley. The goal of the Plan is to achieve a long-term reduction in water demand of at least 10 percent over the next 20 years. Activities include audits for large landscape areas, audits for commercial and industrial customers, and installation of weather based irrigation controllers. These programs have already demonstrated savings of 986 AF. Full implementation is expected to reduce water demand by 6,580 AF (over the lifetime of the various devices and programs). Other projects in the Region to reduce potable water demand include the CLWA Recycled Water Master Plan.

TABLE 10.2-3
PLAN PERFORMANCE TO DATE

Plan Projects	*Objectives*			
	Reduce Potable Water Demand	**Increase Water Supply**	**Improve Water Quality**	**Promote Resource Stewardship**
Santa Clarita Valley Water Use Efficiency Plan Programs	X	X	X	X
Removal of Sewer Trunk Line from Santa Clara Riverbed			X	X
Santa Clarita Valley Southern End Recycled Water Project Phase 2C	X	X	X	X
San Francisquito Creek Arundo and Tamarisk Removal Project		X	X	X
Upper Santa Clara River Salt and Nutrient Management Plan				X
Climate Change Technical Study				X

The Region has seen actions to enhance water supply. This includes the Santa Clarita Valley Southern End Recycled Water Project. This project will make it possible to deliver reclaimed water to 69 additional customers. When fully complete, this project will offset 910 AFY potable water demand. Also providing water supply benefits is the San Francisquito Creek Arundo and Tamarisk Removal Project undertaken by the City of Santa Clarita and US Forest Service. This project will remove approximately 20 acres of the invasive species (arundo and tamarisk) within a 150-acre area. Both arundo and tamarisk consume large amounts of water, which negatively affects both surface water and groundwater availability. Dudley (personal communication 2010) estimates that every acre of arundo removal by the project will result in a water savings of approximately 10 AFY. Hendrickson and McGaugh (2005) estimate that savings associated with an acre of tamarisk removal amount to about 4 AFY. Native vegetation that replaces the arundo and tamarisk once it is removed uses about 2 AFY per acre. Thus, every acre of arundo removed will result in 8 AFY of water savings. Every acre of tamarisk removed will result in a savings of 2 AFY.

Many projects implemented in the Region contribute to improved water quality. This includes the Santa Clarita Valley Water Use Efficiency Strategic Plan, which reduces urban water runoff and associated pollution. The San Franciscquito Creek Arundo and Tamarisk Removal Project improves water quality by promoting the restoration of native plants and the associated benefits of stream shading (reduced algae blooms) and by reducing the river bank erosion.

NCWD, a Stakeholder in the IRWMP Region is in the process of removing a sewer trunk line from the Santa Clara Riverbed. Large flows on the Santa Clara River are known to erode the dirt around the sewer line and propel debris that could cause a line break. A line break would cause an unauthorized release of raw sewage in the Santa Clara River. Not only would a line break be detrimental to the ecosystems in and around the river, but also could affect domestic

groundwater wells within the Region. Removal of the truck line will avoid negative flooding impacts, protect water quality, and protect environmental quality.

Projects implemented in the Region generally have multi-benefits. Many of the projects described for their water supply, water quality, and flood benefits also promote resource stewardship. Reduced urban runoff from the Santa Clarita Valley Water Use Efficiency Strategic Plan reduces pollution in Region's streams and creeks. The Santa Clarita Valley Southern End Recycled Water Project reduces demand for imported water and reduces stress on the Sacrament-San Joaquin Bay Delta. The San Franciscquito Creek Arundo and Tamarisk Removal Project promotes restoration of native species and biodiversity in the Region. The removal of the sewer trunk line from the Santa Clara River avoids risk of untreated sewage entering the river and thereby impacting its varied environmental resources.

In addition to the ongoing projects described above, a set of six projects prioritized during this 2014 IRWMP update are seeking funding under the Proposition 84 IRWM Round 2 Implementation Grant. These projects will significantly contribute to meeting IRWMP objectives by adding to the benefits being accrued by the ongoing projects, including water conservation, water quality improvement, and resource stewardship enhancement. Projects include (1) Upper Santa Clara River Arundo/Tamarisk Removal Program Implementation, (2) Automatic Water Softener Rebate and Public Outreach Program, (3) Pellet Water Softening Treatment Plant, (4) Santa Clarita Water Division Water Use Efficiency Strategic Plan Water Use Efficiency Programs, (5) Santa Clarita Valley Water Use Efficiency Strategic Plan (additional projects), and (6) Foothill Feeder Connection.

Section 11: Coordination and Outreach

This section provides information on outreach and coordination with local agencies and the broader public, undertaken as part of IRWMP development.

11.1 Coordination with Local Land Use Planning

The RWMG includes the City of Santa Clarita, CLWA, LACFCD, NCWD, RMC, SCWD, SCVSD, and VWC. The City of Santa Clarita is the land use planning agency responsible for land use decisions within City borders. Los Angeles County is the land use agency for the unincorporated areas of the Region. Most projects envisioned within this IRWMP in some way are affected by land use planning.

11.1.1 Linkages Between the IRWMP and Local Planning Documents

This section describes the linkages and dynamics between the IRWMP and local planning. The IRWMP has drawn heavily on existing planning documents and planning programs of local agencies in the following ways:

- Regional Description. The IRWMP has utilized information from the *Los Angeles County General Plan*, the County's *Santa Clarita Valley Area Plan*, the City of Santa Clarita's *General Plan*, and the *Business Plan for the Angeles National Forest*, as well as discussions with City, County, and National Forest planning staff, to describe the Region. The IRWMP relies on these planning documents to describe the existing setting of the Region, including existing and planned land uses (see Section 2). In addition to providing information on the social and cultural makeup of the regional community, these plans also provided information on population projections, economic conditions and trends and special environmental resources and environmental water demands.

  The *Los Angeles County General Plan*, the County's *Santa Clarita Valley Area Plan,* the City of Santa Clarita's *General Plan*, OVOV, and the *Business Plan for the Angeles National Forest* provided a framework from which to further analyze potential regional issues and needs with the Stakeholder group.

- Evaluation of Climate Change. The Climate Action Plan by the City of Santa Clarita informed and enhanced the IRWMP description of potential climate change impact and potential climate change vulnerabilities.

- Regional Issues, Needs, and Objectives. Stakeholders were asked to identify major water issues and problems. Specific consideration of regional water supplies and issues was informed with data from multiple local planning documents, but primarily from UWMPs prepared by the local water agencies. Water quality issues were examined using information contained in the Los Angeles RWQCB *Basin Plan* and its amendments. Habitat, species, and resource stewardship issues were examined based on general plans, the *Business Plan for the Angeles National Forest*, planning documents prepared by the Ventura County Watershed Protection District (VCWPD),

including the *Santa Clara River Enhancement and Management Plan* and documents of, and discussions with, the Ventura County Resource Conservation District (VCRCD).

Based on the issues identified, Stakeholders were then asked to develop IRWMP objectives.

As described in Section 6, in developing objectives for the IRWMP, Stakeholders determined that it was important that objectives not only be measurable, but also that the existing condition of the resources at issue be quantified so that change/progress could be reasonably ascertained at a later date. The existing condition was evaluated and summarized using a variety of reports and studies and provided to the Stakeholders for review and comment. These reports and Stakeholder comments contained valuable insight about how change or progress towards a given objective could be measured. Local planning references used to develop measurable objectives are identified in Section 6.

- Outreach. Because the County and City of Santa Clarita general plans, along with the *Business Plan for the Angeles National Forest,* provide a comprehensive overview of the Region, these plans were reviewed to assist with identifying potential Stakeholders and interests for participation in the IRWMP.

- Project Prioritization Process. One of the criteria used to rank projects is the project's compatibility with other planning documents for the Region (see Section 8).

11.1.2 Participation by Local Planning Entities

Local planning entities, including City of Santa Clarita and County planning staff, local US Forest Service personnel, and Resource Conservation District staff participated in development of the IRWMP and will participate in continuing IRWMP implementation. These local planning entities participated in Stakeholder meetings, provided updated data (as described above), reviewed and commented on IRWMP sections, sponsored Candidate Projects, and participated in the review of Candidate Projects. As described in Section 8.5.1, these planning agencies, along with the general Stakeholder group, will be asked to participate in all updates of the IRWMP, by participating in meetings, providing information and data necessary to revise objectives, by making recommendations regarding project ranking, and by sponsoring projects. Coordination of water management and activities of local agencies is meant to avoid conflicts and take advantage of efficiencies. As described in section 10.1, local land use plans were important sources used in the preparation of this Plan.

11.2 Coordination with State and Federal Agencies

11.2.1 Participation in IRWMP Development

RWMG members have a long history of working with State and Federal agencies to address water management issues. Local agency staff and elected officials have worked closely over the years with the Los Angeles RWQCB, CDFW, DWR, Resource Conservation districts, DPH, the US ACE, the US FWS, and the US Forest Service.

The Los Angeles RWQCB, DWR, and US Forest Service are active participants in development of the IRWMP. These agencies regularly attended Stakeholder meetings and participated in the group discussions. These agencies also provided up-to-date information related to the resources they are tasked with managing and protecting. In general, State and Federal agency Stakeholders:

- Participated in Stakeholder meetings
- Reviewed and commented on IRWMP sections
- Provided guidance on project ranking
- Submitted Candidate Projects

At key milestones in plan development, the RWMG sought input on the plan from DWR. On multiple occasions, DWR participated in Stakeholder meetings.

11.2.2 Participation in IRWMP Implementation

As described in Section 8.5.1, the RWMG intends to continue coordination with State and Federal agencies as the IRWMP is updated through time. It is anticipated that State and Federal agencies will continue to participate in the IRWMP as Stakeholders and Local Project Sponsors. Ongoing participation by these entities will enhance the technical data and knowledge in the IRWMP. These agencies will also be able to identify and recommend funding sources for IRWMP implementation.

In addition, implementation of Plan Projects will require coordination with multiple Federal and State agencies, such as:

- CDFW and US FWS. CDFW and US FWS oversee implementation of the California and Federal Endangered Species Act and regulate activities that may impact endangered species and their habitats (Fish and Game Code, Sections 2050 *et seq*.). Any Plan Projects with potential impacts to sensitive species will require coordination with these agencies. CDFW also oversees any activity that will substantially modify a river, stream, or lake (Fish and Game Code Sections 1600 et seq.). Before undertaking any activity that would result in modification of a river, stream, or lake, it will be necessary to obtain a Lake or Streambed Alteration Agreement from CDFW.

- DPH. DPH regulates public water systems, including allowable treatment technologies for drinking water and the treatment and distribution of recycled water. Any Plan Projects that involve treatment of drinking water or recycled water will require coordination with DPH.

- Los Angeles RWQCB. The Los Angeles RWQCB sets goals for groundwater and surface water quality in Los Angeles and Ventura counties. Based on these goals, the Los Angeles RWQCB regulates discharges to groundwater and surface water, including stormwater runoff. Any Plan Projects that could result in stormwater runoff or which could result in a change in discharges to surface or groundwater may have to coordinate with the Los Angeles RWQCB. Under the federal Clean Water Act Section 401, every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (called a 401 Certification) to ensure that the

proposed project will not violate state water quality standards. Most 401 Certifications are issued in connection with US ACE permits for dredge and fill discharges. The Los Angeles RWQCB reviews projects for 401 Certification.

- US ACE. US ACE has regulatory authority over all discharges of dredge and fill materials within navigable waters and waters (such as intermittent streams and wetlands) with significant connection to navigable waters. The US ACE regulates such projects through the issuance of permits. Any Plan Projects that could result in discharge of dredge and fill material to a water body may have to coordinate with the US ACE.

11.3 Disadvantaged Community Outreach

As defined by the *Integrated Regional Water Management Plan Guidelines*, a disadvantaged community (DAC) is a municipality, including, but not limited to a city, town or county, or a reasonably isolated and divisible segment of a larger municipality, that has an average median household income (MHI) that is less than 80 percent of the statewide annual MHI. In 2010, 80 percent of the State of California's MHI was $48,706. As described in Section 2.5.3, no communities that meet the strict State definition of a DAC were identified within the Region. However, because cost of living varies from place to place, a statewide income measure may not be entirely applicable to a specific area. This fact is illustrated by the City of Santa Clarita housing assistance guidelines. The City of Santa Clarita housing assistance guidelines were used as a proxy measure of what income levels could be characterized as disadvantaged within the Region. By these proxy standards, a household of 4 persons would be considered disadvantaged if household income were less than $59,200.

In the spirit of providing "a safe, clean, affordable, and sufficient water supply to meet the needs of California residents, farms, and businesses" (CWC §79501(b)), an outreach effort directed at DAC members was developed during the 2008 IRWMP process. An initial DAC Outreach Subcommittee was formed, consisting of the City of Santa Clarita, LACDPW, and RMC. During this initial effort, as well as during the IRWMP update with the assistance of DWR's DAC Mapping Tool, no DACs were identified within the Region. As a result, the subcommittee has not actively conducted outreach during the IRWMP update.

11.3.1 Environmental Justice

Concerns for environmental justice will need to be addressed as part of IRWMP implementation. As the Region continues to develop, care will need to be taken to prevent creating environmental justice issues that unfairly affect certain communities. The IRWMP objectives of reducing potable water demand, increasing water supply, improving water quality, promoting resource stewardship, addressing flooding/hydromodification, taking actions within the watershed to adapt to climate change, and promoting projects and actions that reduce greenhouse gas emissions, must be consistently applied to future projects so as to ensure greatest regional benefits without placing an undue burden on a specific community.

11.3.2 Native American Tribes

Open channels of communication and good working relationships are already established between agencies/companies of the Santa Clarita Valley and the Tataviam Band of Mission

Indians due to several development projects involving their lands. Invitations for the IRWMP meetings were extended; a representative from the group attended early stakeholder meetings and communication is maintained with the tribe via email.

11.3.3 Public Outreach

The planning process used during the development of the Upper Santa Clara IRWMP created many opportunities for the public to be both part of, and aware of, regional water management and the IRWMP efforts. Public outreach was, and continues to be, an on-going effort during the IRWMP planning effort. Public outreach is accomplished through a variety of means including:

- Advertisement of the public hearing to initiate the preparation of the IRWMP
- Maintaining a project website to facilitate public and Stakeholder outreach
- Advertising the IRWMP and its development on agency websites, in agency newsletters and local newspapers
- Inclusion of a public comment period on the agenda at each Stakeholder meeting
- Using direct mail and email to inform Stakeholders and possible interested parties about upcoming meetings
- Using email to facilitate distribution, review, and comment on the IRWMP by Stakeholders
- Holding a public workshop to review the draft IRWMP
- Regularly providing information to local media
- Teaching and discussing the material in classes at a local community center
- Discussing the issue with attendees at City of Santa Clarita events
- Brainstorming with stakeholder group regarding ideas to expand the group
- Asking stakeholders what time works best for them to attend meetings
- Soliciting input from stakeholders on IRWMP drafts and other documents

The Upper Santa Clara IRWMP coordinated and participated in multiple events as part of Watershed Awareness Month, providing members of the public an opportunity to learn more about local watersheds. For example, as part of the State of the Watershed Event for the Santa Clara River, more than 60 people attended a workshop and tours were conducted of the habitat restoration project on the Nature Conservancy property, history of agricultural practices at the Santa Paula Agricultural Museum, review of successful riparian plant restoration in the Upper Santa Clara River, and use of recycled water of a commercial nursery operation in the community of Piru.

Efforts have also been undertaken to collaborate with the Lower Santa Clara River watershed group. Four joint Upper Santa Clara and Lower Santa Clara meetings were conducted during the IRWMP update.

To enhance outreach and coordination with the public and the Stakeholder group, a website was established for the IRWMP (www.scrwaterplan.org). This website advertises the time and place of each of the upcoming Stakeholder meetings; the website also provides the handouts, agenda, and minutes for each of the past meetings. A visitor to the website can get maps of the Region, download sections of the draft IRWMP, and get the necessary forms and guidance for submitting a project concept. Links to the IRWMP website are provided on the websites of agencies participating in the RWMG.

Each of the Stakeholder meetings was open to the public and each meeting included a period reserved for public comment. A specific public workshop was held to solicit public input on the draft IRWMP. Meeting materials can be found on the Upper Santa Clara IRWMP website.

The RWMG provided the public with regular updates on the IRWMP. These updates were contained in agency newsletters and local newspaper articles (see Appendix A). Members of the RWMG also made an effort to provide IRWMP updates in other public forums, including the regular WCVC meeting and at the West Ranch Town Council. At the conclusion of the public draft IRWMP review period, public comments were incorporated, with guidance from the RWMG, so as to create the final IRWMP.

The process for stakeholder involvement and communication while implementing the IRWMP, including future activities for updating the Plan, will be similar to those used to develop the Plan.

11.3.4 Public Outreach to Diverse Groups

From the beginning of our IRWM process, the intent has been, and will continue to be, the involvement of all people and agencies that have an interest in water resources. Since the initial mailing efforts, records have been kept of interested groups and email has been used to keep them up to date on the process. The use of the local newspaper and the fact the stakeholder meetings are open to anyone maintains the ongoing ability for continued participation of diverse groups and the potential for new members to join the effort. The implemented outreach efforts as described above encourage involvement of diverse groups and outreach to new interested parties.

Section 12: References

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