GREATER LOS ANGELES COUNTY 2013 IRWM PLAN
2017 AMENDMENTS

1. CHAPTER 1 GOVERNANCE AND PARTICIPATION

a. **Section 1.1 Background (page 1-2)** – Revised to reference California Water Plan Update 2013.

As noted in the California Water Plan Update 2009 (Bulletin No. 160-09) and Update 2013:

"The watersheds of the Metropolitan Los Angeles Planning Area have been subjected to some of the densest urbanization in California and have issues associated with urban runoff, groundwater contamination, and the loss of major historical ecosystems."

This Plan also provides an opportunity to include information on the Region's needs and future at a scale that can contribute to the California Water Plan.

b. **Figure 1-2 Leadership Committee Representation (page 1-6)** – Revised organization chart (attachment) and description of representation for the Lower San Gabriel and Los Angeles Rivers Subregion.

Lower San Gabriel and Los Angeles Rivers Subregion

Gateway Water Management Authority (GWMA). GWMA is the Chair of the Lower SG & LA SC. GWMA formed a joint powers authority (JPA) in 2007 in response to the State's requirement to integrate regional watershed activities such as water supply, recycled water, stormwater, conservation measures, wastewater, etc. GWMA currently has 29 cities and water agencies responsible for coordinating the regional watershed needs of 2 million people in the Gateway Region located in Southeastern Los Angeles County.

Water Replenishment District of Southern California (WRD)

WRD is the Vice-Chair of the Lower SG & LA SC. WRD manages groundwater for nearly four million residents in 43 cities of Southern Los Angeles County and is the official Groundwater Level Monitoring Entity for the Central Basin and West Coast Basin.

~~**Watershed Conservation Authority (WCA).** The WCA is the Vice-Chair of the Lower SG & LA SC. WCA is a joint powers entity between the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) and LACFCD whose focus is to provide multiple benefits such as open space, habitat restoration, and recreational opportunities in the San Gabriel and Lower Los Angeles Watersheds.~~

c. **1.5 Stakeholder Involvement**

i. *Regional Stakeholder and Public Outreach (page 1-11)* – Inserted new language describing the involvement of land use planning entities in information and collaboration activities with the Steering Committees.

Regional Stakeholder and Public Outreach

The majority of stakeholder input to the IRWMP is conducted at the Subregional level which is then reported to the LC through the Subregional representatives during a

standing LC meeting agenda items called "Subregional Reports." Since Subregional SC meetings are held locally, they increase the ability and time allowed for individual stakeholder participation. Land Use planning entities are invited to SC meetings. Information sharing and collaboration with regional land use planning entities as described in Section 2.11 takes place primarily through the steering committee meetings. All GLAC stakeholders and general public are also invited to attend the monthly LC meetings and can speak during the public comment period.

ii. *Table 1-1. Subregional Steering Committee Membership (page 1-14)* – Revised to reflect current list of membership (attachment).

iii. *Disadvantaged Community Involvement Program (page 1-19)* – Inserted a new subsection and description for the Disadvantaged Community Involvement Program above the subsection on "Tribal Outreach."

Disadvantaged Community Involvement Program

In 2016, a Disadvantaged Community Involvement Program (DACIP) Task Force for the Los Angeles-Ventura Funding Area was established to facilitate a consensus-based approach to implement a Funding Area-wide DACIP that meets the objectives of the Proposition 1 DACIP IRWM Grant Program. All three IRWM Regions (GLAC, Upper Santa Clara River, and Watersheds Coalition of Ventura County) have identified the need for resources to support a more comprehensive assessment and education process as a critical step forward in further understanding the water management needs within their disadvantaged communities, economically distressed areas, and underrepresented communities (collectively referred to as DACs) including Native American tribes, migrant and resident farmworkers, and homeless people (Map 1-4, Los Angeles-Funding Area DACIP Disadvantaged Communities). Results and lessons learned from each Region's planning efforts over the past eight years have helped frame the Funding Area's water management needs and engagement strategies to assist in addressing those needs.

For the GLAC Region DAC Committee outreach surveys and workshops were conducted. While these showed a desire from the community for Outreach and Education, as well as Project Site Assessment, Project Development and Coordination, and Technical Assistance, these surveys and workshops also showed that there are missing resources needed to fully connect and involve the community in the IRWM process. Funding of the DACIP to carry out local outreach, partnering, and local capacity building through technical assistance will ensure the opportunity for involvement in IRWM planning efforts. of DACs including Native American tribes and homeless people. The results of the DACIP efforts will be fully described in a report after its completion in early 2021.

iv. *Tribal Outreach (pages 1-19 to 1-20)* – Inserted new language to reference tribes as sovereign nations and as such the government-to-government coordination that takes place with them. The recent participation of the Mission Band of Gabrielino Indians and Tongva was also included.

Tribal Outreach

A specialized task was conducted as part of the Plan Update to determine tribal stakeholders and interests in the Region and then conduct outreach to these interests ~~in an effort~~ to encourage participation in ongoing IRWM activities including the Plan Update. It should be noted that Tribes are sovereign nations, and as such coordination with Tribes is on a government-to-government basis.

The GLAC Region contacted the Native American Heritage Commission (NAHC) to determine if the Region was home to any federally-recognized tribes or tribal interests. The response from the NAHC indicated that the Region is not home to any current tribes or tribal lands but provided the contact name and information of several individuals listed as having tribal interests that reside within the GLAC Region. A letter was sent by the LC to each of the individuals on the listing to explain the IRWM Plan Update process, provide contact and Website information and encourage participation. Since then, the GLAC Mission Band of Gabrielino Indians and Tongva expressed interest in the GLAC IRWM process.

d. 1.8 Future Plan Updates or Amendments (page 1-25) – Inserted new language as a second paragraph and revised the third paragraph.

1.8 Future Plan Updates or Amendments

To incorporate other planning documents into the GLAC IRWMP, the Subregional Steering Committees will review and upon approval, recommend incorporation of these plans to the Leadership Committee. The Leadership Committee takes a vote to incorporate the plan. Planning documents that have been approved by the Leadership Committee through this process are included as appendices.

There are, however, on-going IRWM processes that are described in this Plan Update that could result in constant changes - such as new and modified Plan projects and prioritization and progress on Plan performance and meeting objectives and targets. Because of the dynamic nature of these IRWM processes, this Plan Update documents the process used to allow for these changes. These project development and review processes and information on how to access current project listings and prioritizations are detailed in Chapter 5. The GLAC IRWM process for documenting plan performance and data management are included as part of Chapter 7. As part of the normal plan management activities, the benefits and impacts will be reviewed with each IRWM Plan Update.

Given the amount of resources and time necessary for full Plan updates ~~(such as this 2013 Update)~~ future updates will be dependent upon the need to meet changing DWR requirements and the funding available but will occur ~~no less frequent than every five years~~as often as necessary. Plan amendments to incorporate planning documents or additional information in response to new State IRWM Program Guidelines and eligibility requirements to qualify for funding would not automatically trigger re-adoption of the IRWMP.

2. CHAPTER 2 REGIONAL DESCRIPTION

a. 2.2 Overview

i. *North Santa Monica Bay Subregion (page 2-4)* – Revised to add relevant information regarding the Subregion.

North Santa Monica Bay Subregion

The North SM Bay differs substantially from the other Subregions with respect to land use, water supply, groundwater and surface water quality, aquatic resources, open space and recreation. Over 85 percent of the North SM Bay is still undeveloped open space; remaining land uses in the area are primarily residential and concentrated along the coastline and interior valleys where its 107,000 residents reside. There is little heavy industry. The northern headwaters of the subegion are dominated by the geologic Modelo Formation that is part of the Monterey Formation, California's primary petroleum source rock, which is a known source of natural contaminants. As a result, ~~The~~the North SM Bay depends almost entirely on imported water due to naturally-poor groundwater quality and low-yielding wells ~~limited surface storage opportunities~~. Per capita recycled water use is among the highest in the nation, but further expansion is limited to areas that are difficult to reach due to steep mountain slopes. Aquatic habitat protection and restoration is a special priority, as the North SM Bay includes the Santa Monica Mountains National Recreation Area, several State Parks, a state designated ASBS, and Malibu Lagoon, all heavily used for recreation. The North SM Bay is also home to over a dozen endangered and threatened species, including the southernmost Steelhead Trout population in the state.

b. 2.7 Water Quality

i. *Ground Water Quality (page 2-42 – 2-43)* – Minor revision to the second paragraph. The third paragraph was also revised to state that additional information regarding AB 1249 requirements are found in the subregional plans. The list of water quality issues in each of the Region's groundwater basins was also updated.

Groundwater Quality

Groundwater quality varies throughout the Region, based on naturally occurring conditions, historical land use patterns, and groundwater extraction patterns.

Naturally occurring soil and geologic conditions in the Region often result in elevated levels of dissolved solids in groundwater (measured in terms of TDS). Commonly referred to as "hard" water, these dissolved solids include inorganic salts (including calcium, magnesium, potassium,sodium bicarbonates, chlorides and sulfates) and small amounts of organic matter. Increases in groundwater TDS concentrations are a function of the recharge of storm and urban runoff, imported water, recycled water, and incidental recharge. Naturally hard water precludes the use of groundwater throughout one of the GLAC IRWMP Subregions, the North Santa Monica Bay Subregion. They are also attributed in part to the legacy of salt contamination from past agricultural and land uses, including fertilizer use and waste disposal.

Groundwater quality in some portions of the Region has been degraded by elevated levels of nitrates primarily from past agricultural land use practices and plumes of volatile organic compounds (VOCs) from the past disposal of industrial solvents. These include trichloroethylene (TCE), a common degreaser and cleaning product, and perchloroethylene (PCE), commonly used in dry cleaning of clothing. In addition,

perchlorate contamination, associated with the manufacturing and testing of solid rocket propellants, is another major concern. The solid salts of ammonium perchlorate, potassium perchlorate, or sodium perchlorate are soluble in water and can persist for decades. Groundwater contamination has also occurred in some locations from the use of methyl tertiary butyl ether (MTBE) a gasoline additive used to increase octane ratings and reduce emissions. Although the use of MTBE was discontinued in 2003 (following the discovery of MTBE in groundwater wells in the City of Santa Monica), many underground gasoline storage tanks leaked and created the potential for contamination. The location and extent of groundwater contamination in the Region, and the potential resulting impacts to the communities within the Region are described in the subregional plans. Groundwater cleanup efforts are being coordinated by various agencies and cities, including the San Gabriel Basin WQA and WRD.

The following is a summary of water quality issues in each of the Region's groundwater basins:

- **Main San Gabriel Basin:** VOCs, NDMA, nitrate, perchlorate, hexavalent chromium, and TDS
- **Puente Basin:** TDS, nitrate, hexavalent chromium, VOCs
- **Six Basins:** nitrate, perchlorate, VOCs, arsenic, radon
- **Raymond Basin:** TDS, nitrate, perchlorate, VOCs
- **San Fernando Basin:** TCE, PCE, hexavalent chromium, nitrate, sulfate, TDS
- **Verdugo Basin:** MTBE, nitrate
- **Sylmar Basin:** nitrate
- **Central Basin:** TDS, VOCs, perchlorate, nitrate, iron, manganese, chromium, arsenic
- **West Coast Basin:** TDS, VOCs, manganese
- **Santa Monica Basin:** TCE, PCE, perchlorate, MTBE
- **Hollywood Basin:** TDS

c. **2.11 Land Use** (page 2-56) – Revised to describe the role of local land use agencies and regional planning departments in "Land Use" IRWM planning efforts.

2.11 Land Use

Land Use within the Region is recognized as the responsibility of the cities and counties. This reflects the historic pattern of urbanization, as most of the coastal plain and interior valleys are occupied with residential, industrial, commercial, and institutional uses, and most of the foothills and mountains are principally open space. Increasingly, the local land use agencies and regional planning departments are collaborating with water purveyors to more effectively manage the Region's water demand and infrastructure with respect to climate change impacts. A breakdown of land use in the Region is provided in Table 2-6, and depicted on Maps 2-14(a) through 2-14(e).

d. **2.14 Climate Change** (pages 2-67 through 2-71) – Revised to include additional information required for "Climate Change".

2.14 Climate Change (third paragraph)

On a state-wide level, these impacts are expected to impact local water resources as follows (California Water Plan Update 2013, Volume II, South Coast Region, 2014; Safeguarding California: Reducing Climate Risk, 2014; DWR, 2011):

Effects of Climate Change on the GLAC Region (second paragraph)

The need for and interest in more refined geographic and temporal scale climate change models has precipitated two recent climate change analysis efforts that were recently completed within the GLAC Region. These two studies inform the latest vulnerability assessments.

Climate Change in the Los Angeles Region: A modeling effort being led by UCLA for a partnership of the Los Angeles Regional Collaborative for Climate Action and Sustainability and the City of Los Angeles to refine climate modeling for the Greater Los Angeles area between 2041 to 2060. The results of the temperature and precipitation modeling ~~have already been released and~~ have been incorporated into the climate change effects described here. ~~The modeling effort will also produce precipitation, hydrology, cloud cover, wind and sea level rise impacts – however the results of these analyses were not yet available for this section.~~

Los Angeles Basin Stormwater Conservation Study: A partnership between the US Bureau of Reclamation and the LACFCD to refine climate change projections influenced by localized geographic differences between coastal and inland areas, as well as changes in topography. The Los Angeles Basin Study assessed the Region's major water conservation and flood risk management infrastructure to prepare for future drivers that may impact water supply, such as changes to climate and population. The study is a long-range planning effort that evaluated the potential of existing facilities and additional new stormwater capture concepts to increase the resiliency and sustainability of local water supplies under an uncertain future. ~~Resulting climate projections will be simulated in existing LACFCD facilities and hydrologic models to identify potential flooding and supply effects and vulnerabilities. Since the effort was begun in February 2013, the results were not yet available for use in this 2013 Plan Update.~~

Regional Climate Change Impacts

Climate change impacts and effects are based on different climate change assumptions and analysis approaches. Table 2-7 summarizes the impacts and effects of climate change on the GLAC Region by 2100 (unless otherwise indicated), which are typically based on an average of various climate change analyses. ~~However only temperature projections are available at a refined scale for the GLAC Region as shown in Table 2.7.~~ Climate change is expected to increase average temperature by at least 3.5 degrees Fahrenheit by mid-century with the number of hot days (with temperatures greater than 95° F) tripling at the coast. This effect is further exacerbated in the inland areas. ~~Precipitation is expected to decrease by at 2 to 5 inches throughout the South Coast of~~

~~California with the most extreme reductions taking place in the higher elevations.~~ These temperature effects are presented in Figures 2-2 and 2-3 from the UCLA climate change modeling effort. Interestingly, climate change is projected to have minor impacts on average annual rainfall within the Region. Annual precipitation totals are anticipated to undergo little to no change. Rainfall intensity is projected to increase over the higher elevation portions of the Region while little change in intensity is expected over the central and coastal areas.

Recent sea level rise studies have estimated a range of 17-66 inch ~~average 11 inch~~ rise along coastal areas in Southern California by the year 2100. The Region uses a system of seawater barriers to prevent saltwater intrusion into the coastal groundwater aquifers and safeguard this water supply source. As sea level rises, the Region will need to be vigilant in the monitoring of its coastal aquifers and use adaptive management techniques as necessary to ensure the health of this supply.

The three major imported water supplies feeding the Region – State Water Project, Colorado River Aqueduct, and Los Angeles Aqueduct – are also anticipating delivery decreases as a result of climate change.

e. **Table 2.7: Impacts and Effects of Climate Change on Region** (page 2-69) – Revised to update information using the Los Angeles Basin Study Summary Report. See attachment.

Identification of Vulnerabilities (page 2-71)

The Climate Change Subcommittee conducted an exercise to answer vulnerability questions taken from Box 4-1 of the Climate Change Handbook and associated the answers with potential water management issues/vulnerabilities. See Appendix O for an updated summary of the analysis. Included in this analysis are qualitative vulnerability questions framed to help assess resource sensitivity to climate change and prioritization of climate change vulnerabilities within a region. Answers to vulnerability questions are given for the GLAC Region with local examples provided as justification for the answer. Vulnerability issues are prioritized in the next section.

Prioritization of Vulnerabilities

The justification as to why the following vulnerability issues were classified as high priority is provided below:

- **Decreased ability to meet and/or maintain conservation goals:** There is concern that it ~~will~~ may be ~~very~~ difficult for the Region to ~~reach~~maintain levels of conservation consistent with the state goal of a 20 percent reduction in per capita potable water use by 2020 and achieve the efficiency targets contemplated under the Governor's proposed framework for "Making Water Conservation a California Way of Life". In addition, demand hardening will reduce the water use efficiency options available to make further reductions in use beyond the current goal of 20 percent. Although conservation programs reduce the amount of water needed by customers, not all long-term conservation programs have ~~not~~ generated overall cost savings to ~~those~~ the customers. Water supply agencies must still maintain and operate supply facilities so decreased revenues as a result of conservation must be balanced through rate adjustments. Increased costs to customers could discourage ~~them~~ some from continuing water conservation.

3. CHAPTER 3 OBJECTIVES AND PRIORITIES

a. 3.2 Objectives: Improve Water Supply (pages 3-3) – Revised to include additional information required for "Climate Change".

Improve Water Supply

Optimize local water resources to reduce the Region's reliance on imported water

Most years, the San Gabriel Mountains receive substantial rainfall and existing dams and natural storage slowly release runoff, providing an important source of high-quality and low-cost water that can be treated for direct use or recharged into groundwater basins for later use. At several locations, recharge is limited by the capacity of existing recharge facilities. Rehabilitation and expansion of recharge facilities, modified operation of existing storage facilities, rehabilitation and enlargement of upstream storage capacity, and optimization of operational practices could improve the utilization of this local water source. Further, diversifying the water supply portfolio equips the Region to continually adapt to climate change.

The Region's concern about water shortages has increased the local interest in graywater reuse as a source of non-potable water supply. The California Plumbing Code was amended in August 2009 when Chapter 16A was adopted to allow the use of graywater from clothes washers without a permit from local government subject to some environmental protection conditions. Local governments are reviewing options for expanding the graywater reuse opportunities for more fixtures while addressing potential impacts on a case-by-case basis. Total graywater within a residence may account for as much as 60 percent of the total indoor water consumption. The LADWP estimates that the residential graywater reuse capacity may range from 50 to 165 million gallons per day.

~~Lastly, diversifying the water supply portfolio helps the Region to better adapt to climate change.~~

b. 3.2 Objectives: Reduce Flood Risk (page 3-5) - Revised to include additional information required for "Climate Change."

Reduce Flood Risk

Reduce flood risk in flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches

Although, abundant sunshine is one of the Region's main attractions, occasional storm events have the potential to generate substantial amounts of runoff which can create significant flood risks. The Region's extensive flood management system must be operated, maintained, and enhanced where needed to protect lives and property. Additionally, climate change is projected to create more intense storm events and in some cases, may warrant modifications to flood control infrastructure or expansions. As elements of the flood protection system warrant significant repair or replacement, consideration should be given to the implementation of more integrated flood management systems. Projects that propose to: 1) reduce runoff via onsite best

management practices (BMPs); 2) capture and treat urban and storm water runoff for treatment; 3) expand groundwater recharge; or 4) restore habitat, must also preserve or enhance existing flood protection levels.

c. **3.2 Objectives: Address Climate Change** (page 3-5) - Revised to include additional information required for "Climate Change."

Address Climate Change

Adapt to and mitigate against climate change vulnerabilities

The potential effects~~,~~ and impacts ~~and vulnerabilities of~~ climate change ~~impacts~~ were assessed in the context of the vulnerabilities of ~~on~~ the GLAC Region were assessed as part of the 2013 Plan Update and described in Chapter 2. In general, the Region can expect to have significant temperature increases, ~~and~~ little to no change in annual precipitation, and more intense storm events ~~decreases~~ (by ~~2010~~2100) that will impact local water demands, supplies, water quality and habitat. The resulting runoff from these storm events is projected to have higher flows, yet the overall seasonality of the runoff is not expected to change much. Sea level rise and the more intense storm events are ~~also~~ expected to impact the Region causing flooding, water quality and other water management and land use issues. With the three major imported water supplies feeding the Region are also anticipating delivery decreases as a result of climate change, the Region recognizes that it must be ready to adapt to these impacts.

d. **3.3 Planning Targets** (page 3-7) - Revised to include additional information required for "Climate Change."

Increase capture and direct use of stormwater runoff by 26,000 AFY

Stormwater runoff is a largely underutilized resource within the Region and seen as a key resource to help adapt to climate change. The Region's highly urbanized areas generate a large amount of runoff during winter storms that is only partially captured for direct use or to recharge local aquifers. However, this supply is very seasonal and so it is often infeasible to construct and operate facilities to store larger amounts of surface water supplies, so much of the winter storm flows are lost to the ocean. It is possible to capture urban runoff for direct use through the implementation of both small, decentralized projects as well as storage reservoirs.

e. **3.3 Planning Targets (page 3-12)** - Revised to include additional information required for "Climate Change."

Implement mitigation strategies that decrease emissions of GHGs

Decreasing the amount of energy required to produce water supply is one of the greatest ways that the Region can mitigate against further climate change impacts. By optimizing facilities and using less energy intensive water resource strategies to meet needs, the Region and its stakeholders can reduce GHG emissions and ~~contribute to~~ lessen~~ing the~~ future climate impacts. The Region can also consider implementing green infrastructure projects that use natural solutions such as carbon sequestration and/or projects that use renewable energy to reduce GHG emissions. Additionally, ~~S~~some "no regret" strategies, like water use efficiency, will directly reduce GHG emissions by not requiring water to be produced to meet the same need. The GLAC Region is supportive of strategies that both

help adapt to mitigate against climate change, such as considering the strategies in CARB's A B 32 Scoping Plan. The strategies that can be used to meet these targets are provided in Chapter 4.

4. CHAPTER 4 REGIONAL WATER MANAGEMENT

a. 4.1 Introduction (page 4-1) – Revised to include reference to California Water Plan Update 2013 Resource Management Strategies.

4.1 Introduction

As part of the 2017 amendment process for the GLAC IRWM Plan, ~~2013 Plan Update process,~~ the ~~GLAC~~ Region reviewed ~~the management strategies called out in the 2006 Plan relative to the new IRWM Plan 2013~~the Plan objectives and the Resource Management Strategies (RMS) listed in the California Water Plan Update ~~2009~~2013 (DWR, ~~2009~~2013)~~.~~, including the new additions. The purpose of reviewing these Management Strategies in this context is to identify which ones will help achieve the Plan objectives through project or program implementation within the GLAC Region~~. In order~~ to determine which strategies are suitable for the Region~~,~~. Subregional SC meetings and a public review process were held to solicit feedback and input from the Region's stakeholders. Section 4.3 describes each of the Resource Management Strategies that ~~the stakeholders~~were determined ~~were~~ to be relevant to the GLAC Region. Those RMS's not discussed in Section 4.3 were considered not applicable. This chapter presents the strategies considered by the SC stakeholders ~~for the 2013 Plan Update~~, and ~~updates~~amends the ~~2006~~ 2013 Plan language accordingly. This chapter also specifically includes an evaluation of the adaptability of water management systems in the Region to climate change.

b. 4.2 California Water Plan Resource Management Strategies (page 4-1) – Revised to include reference to California Water Plan Update 2013 Resource Management Strategies

4.2 California Water Plan Resource Management Strategies

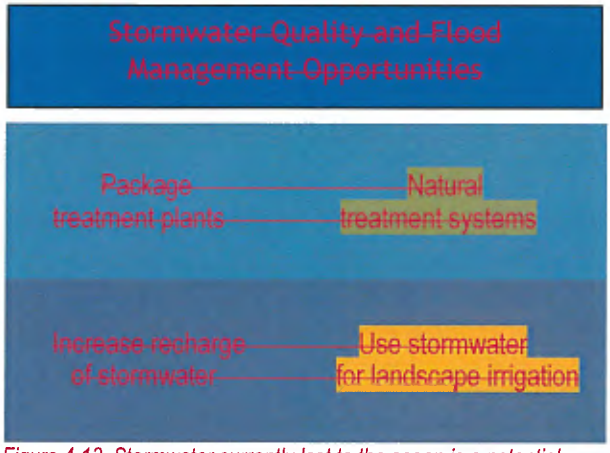
~~Division 43,~~Proposition 1, Chapter ~~2~~7 Regional Water Security Climate and Drought Preparedness (California Water Code, Section 79740-79748)~~75206(a) of the California Water Code~~ authorizes funding ~~(pursuant to Proposition 84)~~ to improve regional water self-reliance security and adapt to the effects on water supply arising out of climate change ~~for long-term water needs of the state~~, and requires that eligible projects implement IRWM Plans that address the water management strategies identified within the *California Water Plan Update ~~2009~~2013:*

c. Table 4-1 DWR California Water Plan Update 2013 Management Strategies (pages 4-2 through *4-3)* – Revised Table 4-1 to reflect the California Water Plan Update 2013 Management Strategies, replacing the 2009 Management Strategies. See attachment.

d. 4.3 2017 GLAC Region Water Management Strategies

i. *Stormwater Quality, Flood, and Sedimentation Management* (pages 4-17 and 4-18) – Minor revision on paragraph 9 and inserted information on sedimentation management before and after paragraph 9.

Stormwater Quality, ~~and~~ Flood, and Sedimentation Management (RMS # ~~15, 17, 19, 27, & 28~~4, 16, 18, 20, & 27)



~~*Figure 4-13. Stormwater currently lost to the ocean is a potential candidate for capture treatment, recharge, and reuse.*~~

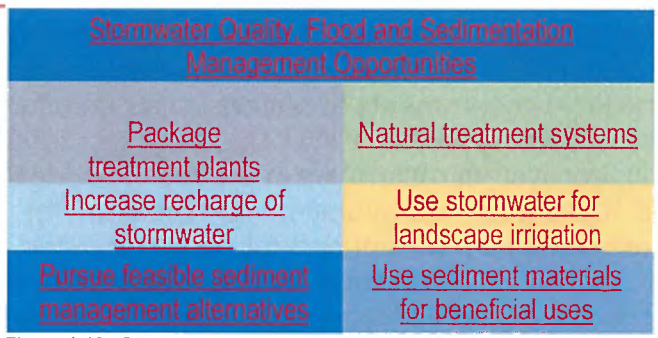


Figure 4-13. Stormwater currently lost to the ocean is a potential candidate for capture treatment, recharge, and reuse. Sediment materials currently captured which have beneficial uses can assist in reducing flood risks.

In recent years, new sediment management challenges have been identified. In particular, recent wildfires have led to an increased inflow of sediment and debris within flood management structures. This has put pressure on the remaining capacity of existing sediment placement sites. The Los Angeles County Flood Control District's Sediment Management Strategic Plan (SMS Plan) was developed to consider new alternatives that can reduce the environmental and social impacts of sediment management. The SMS Plan provides a balanced approach to ensure the flood management and water conservation system remains operational well into the future and able to provide flood control and water conservation purposes by proactively addressing key issues affecting sediment management.

Opportunities to enhance flood management include projects such as the Sun Valley Watershed Plan, which addresses an area of chronic flooding with alternative approaches

to construction of a flood conveyance channel ~~through the use of~~using gravel pits and underground drains below parkland to infiltrate runoff and thereby enhance groundwater recharge. If successful, the Sun Valley Plan can serve as a model for future localized flood management improvements. Flood attenuation to reduce peak flood flows, via expanded on-site infiltration and increased upstream storage, represents an opportunity to enhance the potential for river channel modifications, such as those proposed in the Los Angeles River Revitalization Master Plan.

Opportunities to facilitate sediment management alternatives for reservoirs and debris basins in the Region include a combination of removal, transportation, beneficial uses and placement. Sediment removal includes excavation, sluicing, dredging, and sediment flushing. Transport of sediment can be by way of conveyor belts, slurry pipes, and trucks. Beneficial uses and placement include daily cover at solid waste landfills, fill at pits, or sediment placement sites.

The San Gabriel Reservoir Sedimentation Management Project is an example of a potential project using a combination of the above alternatives. The San Gabriel Reservoir has 23.8 MCY of sediment removal planned over the next 20 years and another 3.4 MCY that could potentially be sluiced or delivered by slurry pipeline from the upstream Cogswell Reservoir.

ii. *Ecosystem Restoration RMS # 22,28* (page 4-20) – Deleted reference to CWP Update 2009 and inserted 2013 on the second paragraph.

Ecosystem Restoration (RMS # 22, 28)

In recent decades, technologies have emerged to restore function and productivity to degraded or destroyed ecosystems. Scientists, engineers, and community groups have begun working with federal, state, and local governments to restore ecosystem function to the Region's native ecosystems. According to the ~~CWP Update~~DWR ~~2009~~2013 (Ecosystem Restoration, Chapter 22), ecosystem restoration improves the condition of modified natural landscapes and biological communities to provide for their sustainability and for their use and enjoyment by current and future generations. Few, if any, of California's ecosystems can be fully restored to their condition before development. Instead, efforts must focus on rehabilitation of important elements of ecosystem structure and function. Successful restoration increases the diversity of native species and biological communities, and the abundance and connectivity of habitats.

iii. *Open Space and Recreation* (page 4-23) – Revised title from "Open Space, Recreation" to "Open Space and Water-Dependent Recreation and added new RMS # 31.

Open Space, Recreation

Recreation and Public Access (RMS # 23, 24 24 & 26, 31)

iv. *Watershed Planning RMS #27* (page 4-28) – Deleted reference to CWP 2009 and replaced it with CWP 2013 in paragraph 4.

v. *Outreach and Engagement RMS #29* (page 4-28) – Inserted description for new RMS.

Outreach and Engagement (RMS #29)

The California Water Plan describes outreach and engagement for water management as the "use of tools and practices by water agencies to facilitate contributions by public individuals and groups toward good water management outcomes." Improved education, outreach and engagement has increased the public's awareness of critical water issues and their understanding of benefits, costs and impacts of water resources management alternatives leading to better engagement and contributing towards good water management.

The 2013 Plan Update includes several discussions within the Stakeholder Involvement section (1.5) which describes outreach and recruitment of stakeholders, the public, disadvantaged communities, local planning entities, and other IRWM Regions.

In 2013, DWR sponsored two local studies to evaluate and recommend strategies for future DAC engagement processes. Council for Watershed Health carried out the DAC Outreach Evaluation Study on effective outreach strategies to DACs within the Region, and the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy published the Alcanza Project, engaging disadvantaged communities in the planning process of developing projects. These efforts show that the most effective engagement strategies are based on highly localized efforts where "links" in the form of partnerships between water management agencies, municipalities, nonprofits, and community-based groups are supported, and that the community values outreach and education, project site assessment, project development, and technical assistance. The DACIP effort is intended to support collaborative work involving DACs, community-based organizations, and stakeholders in IRWM planning efforts, increase understanding, and where necessary, identify water arrangement needs of DACs, and develop strategies and long-term solutions that appropriately address the identified DAC water management needs.

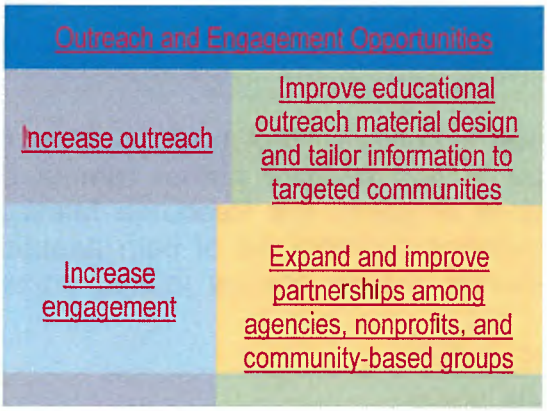


Figure 4-21. The Region is continually expanding and improving its Outreach and Engagement activities.

vi. *Water and Culture RMS #30* (page 4-28) – Inserted description for new RMS.

Water and Culture RMS # 30

Reaching out across our cultural divides is one necessary factor to achieve successful water management planning. Thus, this RMS is included in the IRWM Plan based on the important principles it conveys to "link cultural considerations to water management." Although the RMS acknowledges it represents more of an annotated outline than a fully developed strategy and that is often difficult to define culture or cultural groups, the GLAC Region has actively incorporated practices and processes to be inclusive of all stakeholders. The GLAC Region is truly multi-cultural with a myriad of ethnicities, Native American tribes presence and practices, surfing and beach culture, and a strong environmental movement, to list a few.

The GLAC Region aims to increase involvement with the diverse communities in the Region through the DAC Involvement Program (DACIP). The DACIP began in 2017 and aims to increase engagement by underrepresented minorities, economically disadvantaged areas and tribal members. Through these efforts and others, the GLAC IRWM anticipates local communities will become more engaged in the collaborative process and in future water-related planning and projects. Furthermore, project sponsors are responsible for considering and outreaching to stakeholders within project specific boundaries.

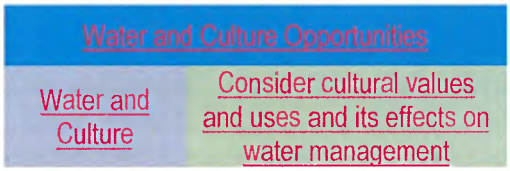


Figure 4-22. The Region is continually expanding and improving its Water and Culture activities.

vii. *Climate Change* (page 4-28) – Updated list of climate change related documents and inserted new text in the last paragraph.

4.4 Climate Change

The strategies discussed above can be used to help the Region adapt to the climate change vulnerabilities identified in Chapter 2, and mitigate further climate change impacts. The Climate Change Subcommittee reviewed the Resource Management Strategies discussed above, and also developed an initial list of both adaption and mitigation strategies through review of relevant climate change related documents. These documents include:

- Managing an Uncertain Future (DWR, 2008)
- Climate Change Scoping Plan (CARB, 2006)
- Climate Action Team Biennial Report (CalEPA, 2010)
- Resolution on Sea Level Rise (OPC, 2010)
- Coastal Regional Sediment Management Plan for Los Angeles County Coast (USACE, 2012)
- Los Angeles Basin Study (LACFCD/USBR, 2015)
- Regional Adapt LA: Coast Impacts Planning in the Los Angeles Region (USC, 2017)

- Safeguarding California: Implementation Action Plans (CNRA, 2014)

IRWM Plan projects that implement any of these climate change and/or GHG mitigation strategies would therefore be helping the Region meet the specific targets identified that support the objective.

CHAPTER 5 INTEGRATED REGIONAL PROJECTS

a. **5.2 Project Review and Selection Process** (page 5-2) – Revised last bullet under "What types of projects are encouraged". to address new "Climate Change" requirements.

- Adapt to and mitigate against climate change vulnerabilities, and reduce energy consumption and overall GHG emissions

b. **5.5 Selecting Projects Integration** (page 5-5) – Revised paragraph 3 to address new "Climate Change" requirements.

Finally, and perhaps most importantly, the Region wants to maintain flexibility to prioritize projects as needed, based on issues the Region is facing at the time, such as severe drought, flooding conditions, emerging climate change effects or other unforeseen circumstances. Not prioritizing projects also gives the Region more flexibility to select projects for funding from various grant programs that may not be at/near the top of a prioritized list, but may be well supported by a deserving community. For all these reasons, the Region's decision was to maintain a list of projects, but without prioritizing them. The process occurs at the direction of the LC and the most recent project selection is posted on the project database webpage. The general process and criteria to be used to determine the priority level of projects are provided in the box below. These could be superseded by specific grant criteria

c. **5.3 Project Integration** (page 5-6) – Revised first paragraph to address new "Climate Change: requirements

5.3 Project Integration

As DWR notes in the Guidelines, IRWM planning decisions can lead to existing or "off the shelf" projects being combined or replaced by new and/ or different projects. Part of the advantage of regional planning is addressing similar objectives of local interests with a regional project. Resources of personnel, finance, and equipment to implement multiple smaller efforts may benefit from economies of scale when similar local interests can be met with a regional project. IRWM plans must contain provisions for reviewing project objectives and considering new, expanded, or even different solutions that meet multiple local needs. The decisions made in the IRWM Plan should consider the interconnected needs of the Region and not just the needs of specific entities in the RWMG. The RWMG should also consider integrating solutions that adapt to climate change and help to mitigate GHG emissions. Opportunities for project integration are regular topics of

discussion at GLAC Subregional SCs' monthly meetings and during quarterly project review workshops.

d. **Table 5.3 Glace IRWMP Approved Projects as of August 2017** (pages 5-21 to 5-2) – Replaced with a list of approved projects as of August 2017. See attachment.

6. **CHAPTER 7 PLAN IMPLEMENTATION**

a. **7.5 Adaptive Management and Planning Needs** (page 7-12) – Revised to provide additional information to address "Adaptive Management" requirement.

An adaptive management process will be used to analyze project and plan performance and identify the need for modification of projects and the need for additional Region planning through the GLAC IRWM Program.

Adaptive management and monitoring is critical to ensure that the IRWM Plan remains relevant and projects function properly in light of different stressors. The following strategies are especially helpful for adapting to and mitigating climate change. These are also useful for other emerging factors that require action as well.

7. **LIST OF ACRONYMS** – Attached is a revised list of acronyms.

8. **APPENDIX I. LOWER SAN GABRIEL & LOWER LOS ANGELES RIVERS SUBREGIONAL PLAN** – Attached are revised pages in compliance with providing information to address AB 1249 requirements.

9. **APPENDIX J. NORTH SANTA MONICA BAY SUBREGIONAL PLAN** – Attached is a revised page in compliance with providing information to address AB 1249 requirements.

10. **APPENDIX K. SOUTH BAY SUBREGIONAL PLAN** – Attached are revised pages and three maps in compliance with providing information to address AB 1249 requirements.

11. **APPENDIX L. UPPER LOS ANGELES RIVER SUBREGIONAL PLAN** – Attached are revised pages and three maps in compliance with providing information to address AB 1249 requirements.

12 **APPENDIX M. UPPER SAN GABRIEL & RIO HONDO SUBREGIONAL PLAN** – Attached is a revised page in compliance with providing information to address AB 1249 requirements.

13. **APPENDIX O CLIMATE CHANGE VULNERABILITY EXERCISE**

a. **The description was revised to provide additional information to "Climate Change Vulnerability" requirements.**

The GLAC IRWM Climate Change Subcommittee conducted an exercise to answer a vulnerability ~~questions~~assessment aligned with ~~taken from~~ Box 4-1 of the *Climate Change Handbook and ~~associated the answers with~~* concerning potential water management issues/vulnerabilities. Table 1 summarizes the analysis and was updated based upon the latest local climate research within the Los Angeles Region. Qualitative vulnerability questions are framed to help assess resource sensitivity to climate change and ~~prioritization~~ prioritize~~of~~ climate change vulnerabilities within a Region. Answers to vulnerability questions are given for the GLAC Region with local examples provided as justification for the answer.

b. **Table: 1 Region's "Climate Change Vulnerability Indicator Questions"** – Minor revisions. See attachment.

14. Appendix P (New)- List of "Other Planning Documents" that have been incorporated by reference to the IRWM Plan, such as Gateway IRWM Plan, Stormwater Resources Plans, and others. See attachment. Additional information specific to each planning document can be accessed at: http://www.ladpw.org/wmd/irwmp/index.cfm?fuseaction=swrp

IRWM PLAN REVIEW FORM

INTRODUCTION

IRWM planning regions must have an IRWM Plan that has been reviewed and deemed consistent with the IRWM Plan Standards by DWR for eligibility to receiving Proposition 1 IRWM Implementation Grant funding. DWR will use this IRWM Plan Standards Review Form, which can be found at the link in Volume 1, Appendix A of the 2016 Guidelines and represented in Table 7 of the Guidelines, to ensure a consistent assessment of whether the 2016 IRWM Guidelines are being addressed in the IRWM Plan. The form contains a checklist for each of the 16 Plan Standards and narrative evaluations where required. The evaluation is pass/fail; there is no numeric scoring. Each Plan Standard is either sufficient or not, based on its associated requirements. Each Standard consists of between one and fifteen requirements. A Yes or No is automatically calculated in each Plan Standard header based on the individual requirement evaluations. In general, a passing score of "C" (i.e. 70% of the requirements for a given Plan Standard) is required for a Standard to pass. Standards with only one or 2 requirements will need one or both of those requirements to pass. Standards with 3 requirements will need at least 2 of the requirements to pass. Standards with 4 or 5 requirements will need at least 3 to pass. Some plan elements are legislated requirements. Such plan elements must be met in order to be considered consistent with plan standards. A summary of the sufficiency of each Standard is automatically calculated on the Standards Summary worksheet. A "No" evaluation indicates that a Standard was not met due to insufficient requirements comprising the Standard. The evaluation for each Plan Standard and any associated insufficiencies is summarized on the Standards Summary page. Additional reviewer comments may be added at the bottom of each standards work sheet.

Note: This review form is meant to be a tool used in conjunction with the 2016 IRWM Guidelines document to assist in the evaluation of IRWM plans. It is not designed to be a substitute for the Guidelines document itself. Reviewers must use the Guidelines in determining plan consistency.

DEFINITION OF TABLE HEADINGS

IRWM Plan Standard: As named in the 2016 IRWM Guidelines.

Overall Standard Sufficient: This field is either "YES" or "NO" and is automatically calculated based on the "Sufficient" column described below. If all fields are "y", the overall standard is deemed sufficient. Any entry other than a "y" in the Sufficient column (i.e. "n", ?, not sure, more detail needed, etc.) results in a NO.

Plan Standard Requirements Which Must Be Addressed: **Fields with a footnote (_) are required by legislation to be included in an IRWM Plan.**

Requirement	Requirements are taken directly from the 2016 IRWM Guidelines.
2016 IRWM Guidelines Source Page(s)	Page(s) in the 2016 IRWM Guidelines which pertain to the Requirement and include the regulatory or other citations where applicable.
Included	Is the Guideline Requirement included in the IRWM Plan? The options are: y = yes, requirement is included in the IRWMP; or n = no, requirement is not included in the IRWMP. If only y or n then presence/absence of the requirement is sufficient for evaluation. If there is a "q" (qualitative) then add a brief narrative, similar to a Grant Application Review public evaluation or supporting information.
Evidence of Plan Sufficiency	
Location of Standard in Grantee IRWM Plan	The page(s) or sections in the IRWM Plan where information on the Requirement can be found. This can be specific paragraphs or entire chapters for more general requirements.
Brief Qualitative Evaluation Narrative	Supporting information for the Requirement if a "q" is in the Included column. This can be just a few sentences or a paragraph and can be taken directly from the IRWM Plan. Comments or supporting information may be entered regardless of whether required.
Sufficient	Is the Guidelines requirement sufficiently represented in the IRWM Plan (y/n).

IRWM Plan Review Form

IRWM Planning Region: Greater Los Angeles County
Regional Water Management Group: Greater Los Angeles County Leadership Committee
IRWM Plan Title: The Greater Los Angeles County Integrated Regional Water
DWR Reviewer:

RESULT: ONE OR MORE PLAN STANDARDS NOT SUFFICIENT

IRWM Plan Standard	2012 Overall Standard Sufficient (yes/no)	One or More Requirement(s) Insufficient
Governance	0	
Region Description	Yes	
Objectives	Yes	
Resource Management Strategies	Yes	
Integration *	0	
Project Review Process	Yes	X
Impact and Benefit	Yes	
Plan Performance and Monitoring	Yes	X
Data Management	Yes	
Finance	Yes	
Technical Analysis	Yes	
Relation to Local Water Planning	Yes	
Relation to Local Land Use Planning	Yes	
Stakeholder Involvement	Yes	
Coordination	Yes	
Climate Change	Yes	

* If not included as an individual section use Governance, Project Review Process, and Data Management Standards per 2016 Guidelines, p. 52.

Additional Comments:

IRWM Plan Standard: Governance					Overall Standard Sufficient	
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWMP. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
The name of the RWMG responsible for the development and implementation of the IRWMP.	37/38	y/n	y	Chapter 1		y
A description of the IRWM governance structure including a discussion of whether or how Native American tribes will participate in the RWMG.	37/38	y/n	y	Chapter 1	Minor revision, updated the LC representation chart (Figure 1-2) and added description for GWMA (p.1-6).	y
A description of how the chosen form of governance **addresses** and **insures**:						
Public outreach and involvement processes	37	y/n/q	y	Chapter 1	Minor revisions, updated *Table 1-1. Subregional Steering CommitteeMembership* , and added a subsection on the *Disadvantaged Community Involvement Program* (pages 1-11, 1-14, and 1-17 through 1-19)	y
Effective decision making	37	y/n/q	y	Chapter 1		y
Balanced access and opportunity for participation in the IRWM process	37	y/n/q	y	Chapter 1		y
Effective communication – both internal and external to the IRWM region	37	y/n/q	y	Chapter 1 (external comm: pg. 1-20 - 1-22)		y
Long term implementation of the IRWM Plan	37	y/n/q	y	Chapter 1		y
Coordination with neighboring IRWM efforts and State and federal agencies	37	y/n/q	y	Chapter 1		y
The collaborative process(es) used to establish plan objectives	38	y/n/q	y	Chapter 1 (pg. 1-11, 1-23, 1-24); Chapter 3		y
How interim changes and formal changes to the IRWM Plan will be performed	38	y/n/q	y	Chapter 1		y
Updating or amending the IRWM Plan	38	y/n/q	y	Chapter 1 (pg. 1-25)	Added statement to clarify that amendments don't require readoption per the RWMG governance structure (Subsection 1.8, page 1-25).	y

IRWM Plan Standard: Region Description				Overall Standard Sufficient		
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
If applicable, describe and explain how the plan will help reduce dependence on the Delta supply regionally.	38	y/n	y	Chapter 3 (pg. 3-2); Chapter 4 (pg. 4-13); Chapter 6 (pg. 6-3 through 6-5)		y
Describe watersheds and water systems	38	y/n	y	Chapter 2 (2.5) Appendicies I/J/K/L/M (Subregional IRWMPs)		y
Describe internal boundaries	38	y/n	y	Chapter 2 (2.4)		y
Describe water supplies and demands for minimum 20 year planning horizon	38	y/n	y	Chapter 2 (2.6); App. E; App. N (demand projections)		y
Describe water quality conditions. If the IRWM region has areas of nitrate, arsenic, perchlorate, or hexavalent chromium contamination, the Plan must include a description of location, extent, and impacts of the contamination; actions undertaken to address the contamination, and a description of any additional actions needed to address the contamination **(2)**.	38	y/n	y	Chapter 2 (2.7); page 35 & Appendix F	Minor changes on Subsections 2.2 and 2.7 and Subregional Plans were updated to include additional information prescribed by AB 1249. (pages 2-4, 2-42, 2-43, and Apendices I through M).	
Describe social and cultural makeup,including specific information on DACs and tribal communities in the region and their water challenges.	38	y/n/q	y	Chapter 1 (tribal info.); Chapter 2(2.12, 2.13)	Minor revisions on tribal information (pages 1-18 and 1-19).	Y
Describe major water related objectives and conflicts **(1)**.	38	y/n/q	y	Chapter 2 (2.2); Chapter 3 (3.3)		y
Explain how IRWM regional boundary was determined and why region is an appropriate area for IRWM planning.	38	y/n/q	y	Chapter 2 (pg. 2-1, 2-2)		y
Describe neighboring and/or overlapping IRWM efforts	38	y/n	y	Chapter 1; Chapter 2 (pg. 2-5)		y
Explain how opportunities are maximized (e.g. people at the table, natural features, infrastructure)for integration of water management activities	38	y/n	y	Chapter 1 (1.4, 1.5)		y
Describe likely Climate Change impacts on their region as determined from the vulnerability assessment.	38/39	y/n	n	Chapter 2 (pgs. 2-67-71); Appendix O	Revised Subsection 2.14 on Climate Change, *Table 2-7. Impacts and Effects of Climate Change on Region,* and *Appendix O* (pages 2-67 through 2-71 and Appendix O).	

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10541 (e)(3).

(2) Requirement must be addressed per CWC §10541 (e)(14).

IRWM Plan Standard: Plan Objectives					Overall Standard Sufficient	
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Through the objectives or other areas of the plan, the 7 items on pg 49 of GL are addressed **(1)**.	38-39/48-50	**y/n**	y	Chapter 3		y
Describe the collaborative process and tools used to establish objectives: - How the objectives were developed - What information was considered (i.e., water management or local land use plans, etc.) - What groups were involved in the process - How the final decision was made and accepted by the IRWM effort	48-50	**y/n**	y	pg. 1-11, 1-22, 1-23, and 1-24. Chapter 3 (3.2)		y
Identify quantitative or qualitative metrics and measureable objectives: Objectives must be measurable - there must be some metric the IRWM region can use to determine if the objective is being met as the IRWM Plan is implemented. Neither quantitative nor qualitative metrics are considered inherently better **(2)**.	49	**y/n/q**	y	Chapter 3 (3.2, 3.3)		y
Explain how objectives are prioritized or reason why the objectives are not prioritized	50	**y/n/q**	y	Chapter 3		y
Reference specific overall goals for the region: RWMGs may choose to use goals as an additional layer for organizing and prioritizing objectives, or they may choose to not use the term at all.	50	**y/n**	y	Chapter 3		y
Address adapting to changes in the amount, intensity, timing, quality and variability of runoff and recharge.	39	**y/n**	y	Chapter 3 (pages 3-3, 3-5, 3-7and 3-12).	Minor revisions (pages 3-3, 3-5, 3-7, and 3-12)	y
Consider the effects of sea level rise (SLR) on water supply conditions and identify suitable adaptation measures.	39	**y/n**	y	"	"	y
Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions.	39	**y/n**	y	"	"	y
In evaluating different ways to meet IRWM plan objectives, where practical, consider the strategies adopted by CARB in its AB 32 Scoping Plan1.	39	**y/n**	y	"	"	y
Consider options for carbon sequestration and using renewable energy where such options are integrally tied to supporting IRWM Plan objectives.	39	**y/n**	y	"	"	y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10540 (c).

(2) Requirement must be addressed per CWC §10541 (e).

IRWM Plan Standard: Resource Management Strategies (RMS)					Overall Standard Sufficient	
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Identify RMS incorporated in the IRWM Plan: Consider all California Water Plan (CWP)RMS criteria (29) listed in Table 3 from the CWP Update 2013	39	y/n	y	Chapter 4 (pages 4-1, 4-17, 4-18,4-20, 4-23, and 4-28)	Revised Table 4-1 to reflect CWP Update2013 and added new RMSs (pages 4-1, 4-17, 4-18,4-20, 4-23, and 4-28).	y
Consideration of climate change effects on the IRWM region must be factored into RMS. Identify and implement, using vulnerability assessments and tools such as those provided in the Climate Change Handbook, RMS and adaptation strategies that address region-specific climate change impacts. •Demonstrate how the effects of climate change on its region are factored into its RMS. •Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions. • An evaluation of RMS and other adaptation strategies and ability of such strategies to eliminate or minimize those vulnerabilities, especially those impacting water infrastructure systems **(2)**.	39	y/n	y	Chapter 4 (4.4); Table 4.3, Pg 28-30	Updated climate change related documents (pages 4-28).	y
Address which RMS will be implemented in achieving IRWM Plan Objectives **(1)**.	39	y/n	y	Chapter 4 (pages 4-17, 18,	Sedimentation Management, Outreach and Engagement, Water and Culture. Outreach and Engagement is fully described as well in Chapter 1, Stakeholder Involvement.	

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10540 (e)(1).

(2) Requirement must be addressed per CWC §10540 (e)(10).

IRWM Plan Standard:Integration					Overall Standard Sufficient	
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Contains structure and processes for developing and fostering integration[1]: - Stakeholder/institutional - Resource - Project implementation	39	y/n/q	y	Chapter 1, Chapter 5		y

1. If not included as an individual section use Governance, Project Review Process, and Data Management Standards per 2016 IRWM Guidelines, p. 52.

IRWM Plan Standard: Project Review Process					Overall Standard Sufficient	
Requirement		Included		Evidence of Plan Sufficiency		
From IRWM 2016 Guidelines	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Process for projects included in IRWM plan must address 3 components: - procedures for submitting projects - procedures for reviewing projects - procedures for communicating lists of selected projects	39-40	y/n	y	Chapter 5 (5.2)		y
Does the project review process in the plan incorporate the following factors:						
How a project contributes to plan objectives	40	y/n	y	Chapter 5 (5.2)		y
How a project is related to Resource Management Strategies identified in the plan.	40	y/n	y	Chapter 5 (5.2)		y
The technical feasibility of a project.	40	y/n	y	Chapter 5 (5.2) Appendix B, Page 3		y
A projects specific benefits to a DAC water issue.	40	y/n	y	Chapter 1; Chapter 5 (5.2), (5.4)		y
Environmental Justice considerations.	40	y/n	y	Chapter 5 (5.2)		y
Project costs and financing	40	y/n	y	Chapter 5 (5.2)		y
Address economic feasibility	40	y/n	y	Chapter 5		y
Project status	40	y/n	y	Chapter 5 (5.2)		y
Strategic implementation of plan and project merit	40	y/n	y	Chapter 5		y
Project's contribution to chlimate change adaptation				Chapter 5 (5.2)		
Contribution of project in reducing GHGs compared to project alternatives. •Consider the contribution of the project in reducing GHG emissions as compared to project alternatives •Consider a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over the 20-year planning horizon. •Reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions.	40	y/n	y	Chapter 5 (5.2)	Minor revisions to Subsection 5.2.	y
Status of the Project Proponent's IRWM plan adoption	40	y/n	y	Chapter 5 (5.2)		y
Project's contribution to reducing dependence on Delta supply (for IRWM regions receiving water from the Delta).	40	y/n	y	Chapter 5		y
Project's contribution to climate change adaptation. •Include potential effects of Climate Change on the region and consider if adaptations to the water management system are necessary **(1)**. •Consider the contribution of the project to adapting to identified system vulnerabilities to climate change effects on the region. •Consider changes in the amount, intensity, timing, quality and variability of runoff and recharge. •Consider the effects of SLR on water supply conditions and identify suitable adaptation measures.	40	y/n	y	Chapter 2 (2.14); Chapter 4 (4.4) and Chapter 5 (5.2)	Minor revisions to Subsections 2.14, 4.4, and 5.2.	y
Specific benefits to critical water issues for Native American tribal communities.	53	y/n	y	Chapter 5 (5.2); Appendix B (p.3, criteria #5)		y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10540 (e)(10).

IRWM Plan Standard: Impact and Benefit					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Discuss potential impacts and benefits of plan implementation within IRWM region, between regions, with DAC/EJ concerns and Native American Tribal communities	40	y/n	y	Chapter 6; (see Tables 6-1 through 6-5)		y
State when a more detailed project-specific impact and benefit analysis will occur (prior to any implementation activity)	55	y/n	y	Chapter 6		y
Review and update the impacts and benefits section of the plan as part of the normal plan management activities	55-56	y/n	y	Chapter 6 (6.2)		y

IRWM Plan Standard: Plan Performance and Monitoring					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Contain performance measures and monitoring methods to ensure that IRWM objectives are met **(1)**.	40	**y/n**	y	Chapter 7 (7.3)		y
Contain a methodology that the RWMG will use to oversee and evaluate implementation of projects.	40	**y/n**	y	Chapter 7 (7.3)		y
Contain policies and procedures that promote adaptive management and, as more effects of Climate Change manifest, new tools are developed, and new information becomes available, adjust IRWM plans accordingly.	40	**y/n**	y	Chapter7 (7.3, p. 7-3; 7.5, p. 7-12) Chapter 1 (1.8, p. 1-25) Chapter 2 (2.14; pp. 2-67 through 2-71))	Minor revisions.	y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10541 (e)(7).

IRWM Plan Standard: Data Management				Overall Standard Sufficient		Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Describe data needs within the IRWM region	59-60	y/n	y	Chapter 7 (7.4)		y
Describe typical data collection techniques	59-60	y/n	y	Chapter 7 (7.4)		y
Describe stakeholder contributions of data to a data management system	59-60	y/n	y	Chapter 7 (7.4)		y
Describe the entity responsible for maintaining data in the data management system	59-60	y/n	y	Chapter 7 (7.4)		y
Describe the QA/QC measures for data	59-60	y/n	y	Chapter 7 (7.4)		y
Explain how data collected will be transferred or shared between members of the RWMG and other interested parties throughout the IRWM region, including local, State, and federal agencies **(1)**.	59-60	y/n	y	Chapter 7 (7.4)		y
Explain how the Data Management System supports the RWMG's efforts to share collected data	59-60	y/n	y	Chapter 7 (7.4)		y
Outline how data saved in the data management system will be distributed and remain compatible with State databases including CEDEN, Water Data Library (WDL), CASGEM, California Environmental Information Catalog (CEIC), and the California Environmental Resources Evaluation System (CERES).	59-60	y/n	y	Chapter 7 (7.4)		y

(1) Requirement must be addressed per CWC §10541 (e)(12).

IRWM Plan Standard: Finance					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Include aprogrammatic level (i.e. general) plan for implementation and financing of identified projects and programs **(1)** including the following:	41	**y/n**	y	Chapter 7 (7.6); Table 7-4		y
List known, as well as, possible funding sources, programs, and grant opportunities for the development and ongoing funding of the IRWM Plan.	41	**y/n**	y	Chapter 7 (7.6)		y
List the funding mechanisms, including water enterprise funds, rate structures, and private financing options, for projects that implement the IRWM Plan.	41	**y/n**	y	Chapter 7 (7.6)		y
An explanation of the certainty and longevity of known or potential funding for the IRWM Plan and projects that implement the Plan.	41	**y/n**	y	Chapter 7 (7.6)		y
An explanation of how operation and maintenance (O&M) costs for projects that implement the IRWM Plan would be covered and the certainty of operation and maintenance funding.	41	**y/n**	y	Chapter 7 (7.6)		y

(1) Requirement must be addressed per CWC §10541 (e)(8).

IRWM Plan Standard: Technical Analysis					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Document the data and technical analyses that were used in the development of the plan **(1)**.	41	y/n	y	Chapter 1 (1.7; 1.9)		y

(1) Requirement must be addressed per CWC §10541 (e)(11).

IRWM Plan Standard: Relation to Local Water Planning					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Identify a list of local water plans used in the IRWM plan	41	y/n	y	Chapter 1 (table 1-3)		y
Describe the dynamics between the IRWM plan and other planning documents	41	y/n	y	Chapter 1 (pg. 1-23)		y
Describe how the RWMG will coordinate its water mgmt planning activities	41	y/n	y	Chapter 1		y
Discuss how the plan relates to these other planning documents and programs. Same as 2012 GL with the following addition: "It should be noted that Water Code § 10562 (b)(7) requires the development of a stormwater resource plan and compliance with these provisions to receive grants for stormwater and dry weather runoff capture projects. Upon development of the stormwater resource plan, the RWMG shall incorporate it into IRWM plan. The IRWM Plan should discuss the processes that it will use to incorporate such plans." Minor wording differences - e.g. Groundwater Sustainability Plan example in the 2016 Guidelines instead of Groundwater Managemenbt Plan in the 2012 Guidelines.	63-64	y/n	y	Chapter 1 (p. 1-25); Appendix P	Revised subsection 1.8 that describes the process of incorporating other planning documents such as the Stormwater Resource Plans. Added *Appendix P, Other Planning Documents* .	y
Consider and incorporate water management issues and climate change adaptation and mitigation strategies from local plans into the IRWM Plan.	63-64	y/n	y	Chapter 2 (page 67-69); Appendix O	Minor revisions on Subsection 2.14 and Appendix O.	y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

IRWM Plan Standard: Relation to Local Land Use Planning					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Document current relationship between local land use planning, regional water issues, and water management objectives	41	y/n	y	Chapter 2 (pg. 2-41, 2-48, and series of land use maps provided, beginon pg. 2-57), 2.11 (pg. 2-56)		y
Document future plans to further a collaborative, proactive relationship between land use planners and water managers	41	y/n	y	Chapter 2		y
Demonstrate information sharing and collaboration with regional land use planning in order to manage multiple water demands throughout the state, adapt water management systems to climate change, and potentially offset climate change impacts to water supply in California.	41	y/n	y	Chapter 2 (2.11, p. 2-56)	Minor revisions.	y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

IRWM Plan Standard: Stakeholder Involvement					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Discuss involvement of DACs and tribal communities in the IRWM planning effort	41-42	y/n	y	Chapter 1 (pg. 1-16 to 1-19; 1-20)		y
Describe decision-making process and roles that stakeholders can occupy	41-42	y/n	y	chapter 1		y
Discuss how stakeholders are necessary to address objectives and RMS	41-42	y/n	y	Chapter 1 (pg. 1-23)		y
Discuss how a collaborative process will engage a balance in interest groups	41-42	y/n	y	chapter 1		y
Contain a public process that provides outreach and opportunity to participate in the IRWM plan **(1)**. Per 2016 GL: "Native American tribes – It should be noted that tribes are sovereign nations, and as such coordination with tribes is on a government-to-government basis."	41-42	y/n	y	Chapter 1 (pp. 1-19, 1-20); DACs map	Added description of the "Disadvantaged Community Involvement Program" that includes Native American Tribes and a map of DACs. Minor revision to the "Tribal Outreach" description.	y
Identify process to involve and facilitate stakeholders during development and implementation of IRWM plan regardless of ability to pay; include description of any barriers to involvement **(2)**. "Stakeholder Involvement" in the 2012 GL is referred to "Native American Tribe and Stakeholder Involvement" in the 2016 GL and Tribes are referred to specifically.	41-42	y/n	y	Chapter 1 (pp.1-19, 1-20)	Added language that Tribes are sovereign nations, and as such coordination with Tribes is on a govenrment-to-government basis.	y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 IRWM Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10541 (g).

(2) Requirement must be addressed per CWC §10541 (h)(2).

IRWM Plan Standard: Coordination				Overall Standard Sufficient		Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	
Identify the process to coordinate water management projects and activities of participating local agencies and stakeholders to avoid conflicts and take advantage of efficiencies **(1)**.	42	y/n	y	Chapter 1; Chapter 2 (pg. 2-5)		y
Identify neighboring IRWM efforts and ways to cooperate or coordinate, and a discussion of any ongoing water management conflicts with adjacent IRWM efforts	42	y/n	y	Chapter 1; Chapter 2 (pg. 2-5); Chapter 5 (pg. 5-8 to 5-19)		y
Identify areas where a state agency or other agencies may be able to assist in communication or cooperation, or implementation of IRWM Plan components, processes, and projects, or where State or federal regulatory decisions are required before implementing the projects.	42	y/n	y	Chapter 1; Chapter 2		y

(1) Requirement must be addressed per CWC §10541 (e)(13).

IRWM Plan Standard: Climate Change					Overall Standard Sufficient	Yes
Requirement		Included		Evidence of Plan Sufficiency		Sufficient
IRWM 2016 Guidelines Requirement	IRWM 2016 Guidelines Page Number	y/n - Present/Not Present in the IRWM Plan. If y/n/q, qualitative evaluation needed.		Location of Standard in Grantee IRWM Plan	Brief Qualitative Evaluation	y/n
Contain a plan, program, or methodology for further data gathering and analysis of prioritized vulnerabilities.	42-44	y/n	y	Page 3-6, 3.3 Planning Targets		y
Include climate change as part of the project review process.	42-44	y/n	y	Chapter 5		y
Evaluate IRWM region's vulnerabilities to climate change and potential adaptation responses based on vulnerabilities assessment in the DWR Climate Change Handbook for Regional Water Planning **(1)**. Addition in 2016 GL - "At a minimum, the vulnerability evaluation must be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning, Section 4 and Appendix B."	42-44	y/n	y	Appendix O	Minor revisions	y
Provide a process that considers GHG emissions when choosing between project alternatives **(1)**. Addition in 2016 GL - "At a minimum, that process must determine a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over a 20-year planning horizon and consider energy efficiency and reduction of GHG emissions when choosing between project alternatives."	42-44	y/n	y	Chapter 2 (pp. 2-67 through 2-71; Chapter 5 (pg. 5-2, 5-3, 5-5, 5-6)	Minor revisions	y
Include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process. Addition in 2016 GL - "A list of prioritized vulnerabilities which includes a determination regarding the feasibility for the RWMG to address the priority vulnerabilities."	42-44	y/n	y	Chapter 2 (Pp. 2-71 and 2-72), Table 2-8	Minor revisions	y
Address adapting to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.	42-44	y/n	Y	Chapter 2 (pp. 2-67 through 2-73))	Minor revisions	Y
Areas of the State that receive water imported from the Sacramento-San Joaquin River Delta, the area within the Delta, and areas served by coastal aquifers must also consider the effects of sea level rise (SLR) on water supply conditions and identify suitable adaptation measures.	42-44	y/n	Y	Chapter 2 (pp. 2-67 through 2-73))		Y

IRWM Plan Standard Requirements for 2016 IRWM Guidelines in Addition to Previously Required 2012 Guideline Requirements. See Appendix H in IRWM 2016 Guidelines.

(1) Requirement must be addressed per CWC §10541 (e)(11).

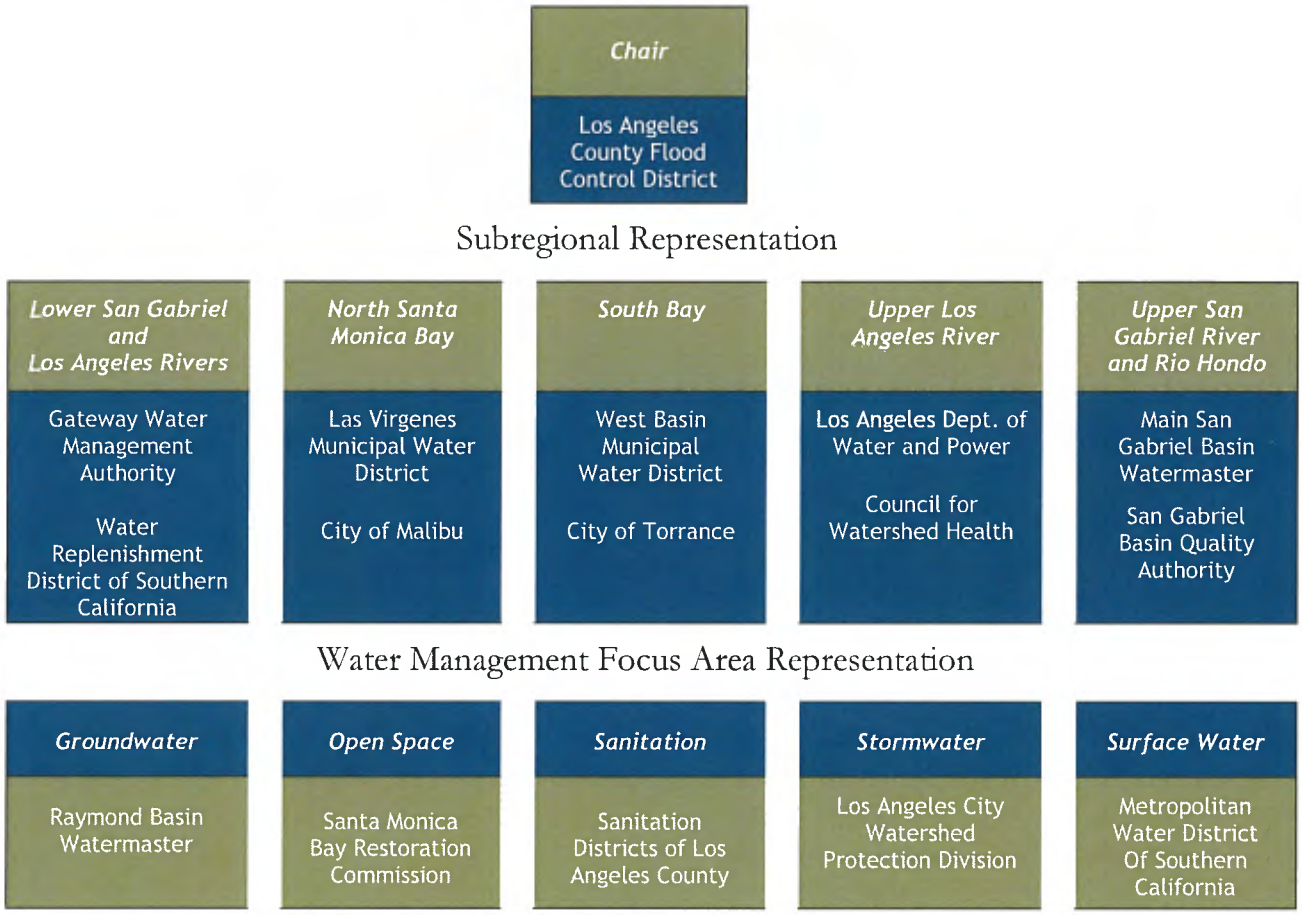
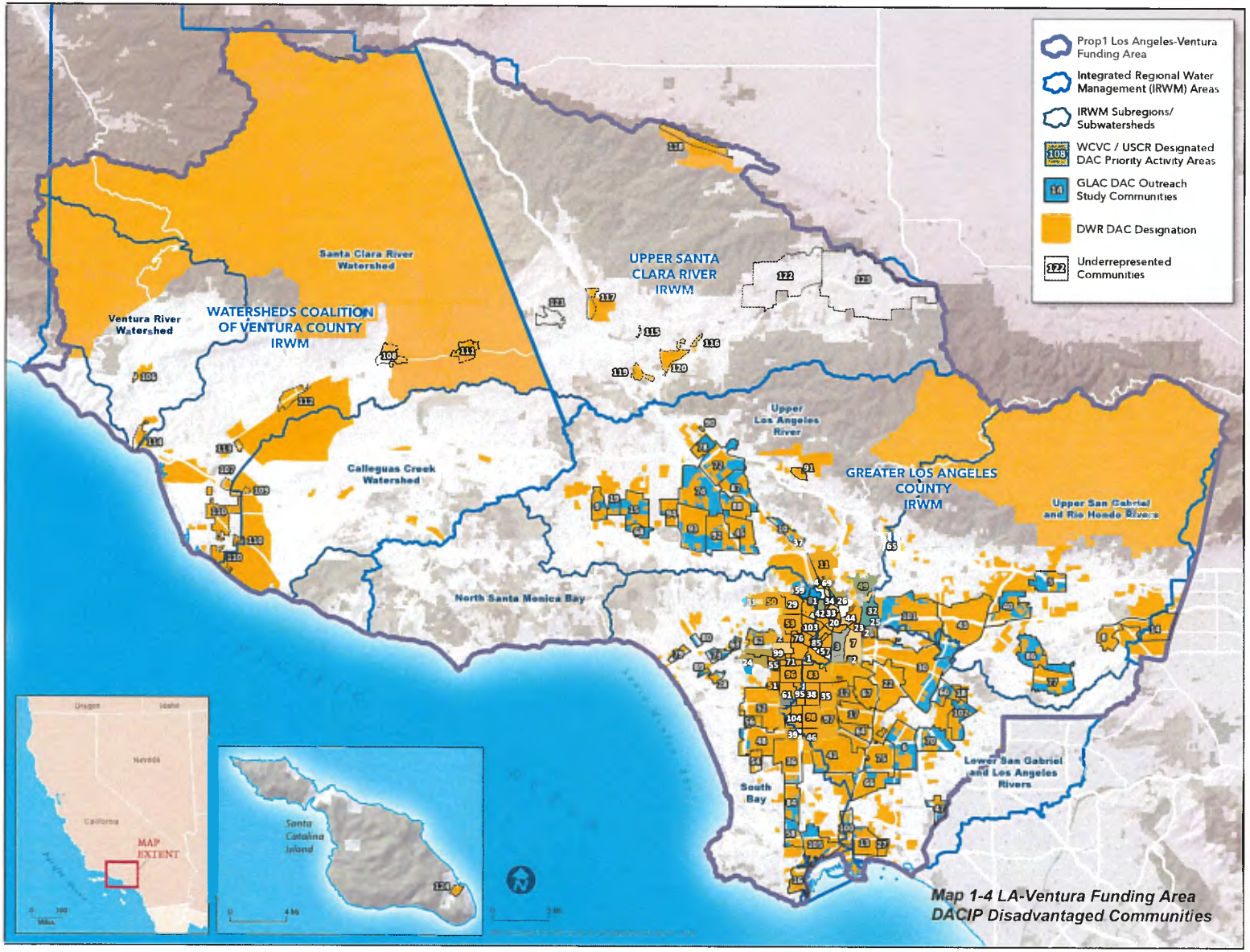


Figure 1-2. Leadership Committee Representation. The Leadership Committee consists of representatives from each Steering Committee and each Water Management Area.

Table 1-1. Subregional Steering Committee Members

Lower San Gabriel and Los Angeles Rivers	North Santa Monica Bay	South Bay	Upper Los Angeles River	Upper San Gabriel and Rio Hondo Rivers
• California Coastal Conservancy • Central Basin Municipal Water District • Council for Watershed Health • Los Angeles County Department of Public Works • Orange County Resources and Development Management Department • County Sanitation Districts of Los Angeles County • Water Replenishment District • Watershed Conservation Authority • Gateway Water Management Authority • From Lot to Spot	• California Department of Transportation • City of Agoura Hills • City of Calabasas • City of Malibu • City of Westlake Village • Los Angeles County Flood Control District • Las Virgenes Municipal Water District • Los Angeles County Board of Supervisors, 3rd District • Malibou Lake Mountain Club • Mountains Restoration Trust • Resource Conservation District of the Santa Monica Mountains • Water District # 29 Los Angeles County Department of Public Works • West Basin Municipal Water District • Westlake Lake Management Association **Non-Voting Members** • California Department of Parks and Recreation • Los Angeles County Beaches & Harbors • Los Angeles County Regional Planning • National Park Service-Santa Monica Mountains NRA • Santa Monica Bay Restoration Commission • Santa Monica Baykeeper • Santa Monica Mountains Conservancy • Triunfo Sanitation District	• City of Los Angeles Bureau of Sanitation • City of Torrance • Heal the Bay • Los Angeles County Flood Control District • Los Angeles Department of Water a Power • County Sanitation Districts of Los Angeles County • Santa Monica Bay Restoration Commission • South Bay Cities COG • Water Replenishment District • West Basin Municipal Water District • Westside Cities COG **Non-Voting Members** • Los Angeles County Beaches and Harbors • Los Angeles Regional Water Quality Control Board	• Arroyo Seco Foundation • Burbank Water and Power • City of Calabasas • City of Los Angeles Department of Water and Power • City of Los Angeles Department of Recreation & Parks • City of Los Angeles Department of Public Works, Bureau of Sanitation • City of Pasadena • City of South Pasadena • Council District 9 • Council for Watershed Health • Foothill Municipal Water District • Glendale Water and Power • Los Angeles County Flood Control District • Metropolitan Water District of Southern California • Mountains Recreation and Conservation Authority • Tree People • Tujunga Watershed Area • The River Project • Pacoima Beautiful	• City of La Verne • City of Monrovia • City of Arcadia • Council for Watershed Health • County Sanitation Districts of Los Angeles County • Los Angeles County Flood Control District • Main San Gabriel Basin Watermaster • Raymond Basin Management Board • Rivers and Mountains Conservancy • San Gabriel Basin Water Quality Authority • San Gabriel Mountains Regional Conservancy • San Gabriel Valley Municipal Water District • San Gabriel Valley Water Association • Three Valleys Municipal Water District • Upper San Gabriel Valley Municipal Water District **Non-Voting Members** • California Department of Water Resources • Los Angeles County Department of Public Works



DESIGNATED DISADVANTAGED COMMUNITIES WITHIN THE PROP 1 LOS ANGELES-VENTURA FUNDING AREA

1 - Adams/Central
2 - Arlington/Harvard Heights
3 - Arts District/West Boyle Heights
4 - Atwater Village
5 - Azusa/Citrus
6 - Bellflower/Southeast Downey
7 - Boyle Heights
8 - CalPoly Pomona
9 - Canoga Corridor
10 - Central Burbank
11 - Central Glendale
12 - Central Huntington Park
13 - Central Long Beach
14 - Central Pomona
15 - Central Reseda/S. Northridge
16 - Central San Pedro
17 - Central South Gate
18 - Central Whittier
19 - Central Winetka
20 - Chinatown/Cornfield
21 - City Terrace
22 - Commerce/Bell Gardens
23 - County Hospital
24 - Crenshaw/Baldwin Hills
25 - CSULA and Neighborhood
26 - Cypress/Glassell Park
27 - East Central Long Beach
28 - East Del Rey
29 - East Hollywood
30 - East LA/Montebello/Pico Rivera
31 - Eastern West Hollywood
32 - El Sereno
33 - Elysan Park
34 - Elysian Valley/Frogtown
35 - Florence Firestone
36 - Gardena/N. Harbor Gateway
37 - Glen-Bank
38 - Goodyear/Van Meter Springs
39 - Greater Athens
40 - Greater Baldwin Park
41 - Greater Compton
42 - Greater Echo Park
43 - Greater El Monte
44 - Greater Lincoln Heights
45 - Greater North Hollywood
46 - Greater Willowbrook
47 - Hawaiian Gardens
48 - Hawthorne
49 - Highland Park
50 - Hollywood
51 - Hyde/Harvard Park
52 - Inglewood
53 - Koreatown
54 - Lawndale
55 - Leimert Park
56 - Lennox
57 - Little Tokyo/Toy District/Skid Row
58 - Lomita/Southwest Carson
59 - Los Feliz
60 - Los Nietos
61 - Manchester/Harvard/Chesterfield
62 - Mid-City
63 - Mid-City West
64 - North Lynwood
65 - Northeast Pasadena
66 - North Long Beach
67 - Northern Lower LAR Cities
68 - Northern Tarzana
69 - Northwest Glassell Park
70 - Northwest Norwalk
71 - Outer Expo Park
72 - Pacoima
73 - Palms
74 - Panorama City
75 - Paramount
76 - Pico Union
77 - Rowland/Industry
78 - San Fernando
79 - Santa Monica I-10 Corridor
80 - Sawtelle
81 - Silverlake
82 - South Boyle Heights
83 - South Central
84 - S. Harbor Gateway/West Carson
85 - South Park/Fashion/Lofts District
86 - South Puente Valley
87 - Sun Valley East
88 - Sun Valley South
89 - Southwest Mar Vista
90 - Sylmar/Foothill Blvd Comm
91 - Tujunga/Foothill Blvd
92 - Valley Glen/Valley Village
93 - Van Nuys
94 - Van Nuys Airport
95 - Vermont Knolls
96 - Vermont Square
97 - Watts Proper
98 - Watts West
99 - West Adams/Jefferson Park
100 - West Long Beach
101 - West SGV 10 Freeway
102 - Western South Whittier
103 - Westlake
104 - Westmont
105 - Wilmington
106 - Casitas Springs
107 - El Rio
108 - Fillmore
109 - Nyeland Acres
110 - Oxnard
111 - Piru
112 - Santa Paula
113 - Saticoy
114 - West Ventura
115 - Boquet Canyon
116 - Canyon Country
117 - Castaic
118 - Lake Hughes
119 - Newhall
120 - Santa Clarita
121 - Val Verde
122 - Agua Dulce
123 - Acton
124 - Avalon

Table 2-7. Impacts and Effects of Climate Change on Region	
Impact to	**Effect**
Temperature Change	**Coastal LA Basin**: Increases of 3.5 to 4°F (2040-2060) **Inland LA Basin**: Increases of 4 to 4.5°F (2040-2060) **Mountains & Desert**: Increases of 4.5 to 5.5°F (2040-2060) Source: *Walton et al 2015* **Extreme Hot Days:** Number will triple in coastal areas and central Los Angeles, quadruple in San Fernando and San Gabriel Valleys (2040-2060) Source: *Sun et al 2015*
Precipitation	**Across the entire LA Basin:** Little to no change (approximately 0%) is expected over the next century (2011-2095) Source: *LA Basin Study Task 3.1*
Demand	Decrease of 1% in gallons per capita per day due to a combination of projected temperature increases and the ranges of precipitation. Source: *LA Basin Study Task 2, Water Supply & Demand Projections*
Imported Supply	**State Water Project:** • Delivery decrease of 7-10% by 2050 • Snowpack decrease of 48-65% (2070-2099) • Delivery decrease of 21-25% by 2100 Source: *DWR 2009* **Colorado River:** • Flows to decrease by 7-9% by 2050 • Shortages to Lower Basin of: ○ 1 MAF over any 2-year window up to 51% of the time ○ 1.5 MAF over any 5-year window up to 59% of the time Source: *Reclamation 2012* **Los Angeles Aqueduct:** • Decrease in "base-of-mountain" runoff of approximately 1.7% (2040-2069) • Decrease in "base-of-mountain" runoff of approximately 5.0% (2070-2099) Source: *LADWP UWMP 2011*
Sea Level Rise (along the LA region coastline)	Rise of 5-24 inches by 2050 Rise of 17-66 inches by 2100 Source: *Grifman et al 2013*
Wildfire Risk	**Non–Santa Ana Fires:** Burned area to increase 77% (±43%) (2040-2060). This type of fire will change the most in the future and start to dominate the summer season. **Santa Ana Fires:** Burned area to increase by 64% (±76%) (2040-2060). Source: *Jin et al 2015*
Local Snowpack	Decreases of between 31-42% (2040-2060) Decreases of between 31-66% (2080-2100) Source: *Sun et al 2013*

Source: LA Basin Study Summary Report

Table 4-1: DWR California Water Plan Update 2013 Resource Management Strategies		
CA Water Plan Update 2013 Volume 3 Chapter Number	Resources Management Strategy within CA Water Plan Update 2013	Strategy Overview
Reduce Water Demand		
2	Agricultural Water Use Efficiency	Increasing water use efficiency and achieving reductions in the amount of water used for agricultural irrigation. Includes incentives, public education, and other efficiency-enhancing programs.
3	Urban Water Use Efficiency	Increasing water use efficiency by achieving reductions in the amount of water used for municipal, commercial, industrial, irrigation, and aesthetic purposes. Includes incentives, public education, and other efficiency-enhancing programs.
Improve Flood Management		
4	Flood Management	Strategies that decreasing the potential for flood-related damage to property or life including control or management of floodplain lands or physical projects to control runoff.
Improve Operational Efficiency and Transfers		
5	Conveyance - Delta	Maintaining, optimizing use of, and increasing the reliability of regional treated and untreated water conveyance facilities. Included within this strategy is maintaining the ability to obtain and convey imported water supplies into the Region.
6	Conveyance – Regional/ Local	Strategies include improvement conveyance systems, upgrading aging distribution systems, promoting development of more extensive interconnections among water resources systems, establishing performance metrics for quantitative and qualitative indicators (e.g., quantity of deliveries, miles of rehabilitated conveyance facilities, and resiliency of conveyance to earthquakes and fewer regulatory conflicts), and assuring adequate resources to maintain the condition and capacity of existing constructed and natural conveyance facilities.
7	System Reoperation	Managing surface storage facilities to optimize the availability and quality of stored water supplies and to protect/enhance beneficial uses. Includes balancing supply and delivery forecasts, coordinating and interconnecting reservoir storage, and optimizing depth and timing of withdrawals.
8	Water Transfers	Contracting to provide additional outside sources of imported water to the Region over and above contracted State Water Project and Colorado River supplies.
Increase Water Supply		
9	Conjunctive Management and Groundwater	Using and managing groundwater supplies to ensure sustainable groundwater yields while maintaining groundwater-dependent beneficial uses, including coordinating management of ground- water and surface water supplies (conjunctive use).
10	Desalination (Brackish and Sea Water)	Developing potable water supplies through desalination of seawater. Includes disposal of waste brine.
11	Precipitation Enhancement	Increasing precipitation yields through cloud seeding or other precipitation enhancing measures.
12	Municipal Recycled Water	Developing usable water supplies from treated municipal wastewater. Includes recycled water treatment, distribution, storage, and retrofitting of existing uses.
13	Surface Storage – CALFEDState	Developing additional CALFED storage capacity or more efficiently using existing CALFED storage capacity.
14	Surface Storage – Regional/Local	Developing additional yield through construction or modification (enlargement) of local or regional surface reservoirs or developing surface storage capabilities in out-of-region reservoirs.
Improve Water Quality		
15	Drinking Water Treatment and Distribution	Includes improving the quality of the potable supply delivered to potable water customers by increasing the degree of potable water treatment. Strategy also may include conveyance system improvements that improve the quality of supply delivered to treatment facilities.
16	Groundwater/Aquifer Remediation	Includes strategies that remove pollutants from contaminated groundwater aquifers through pumping and treatment, in situ treatment, or other means.

Table 4-1: DWR California Water Plan Update 2013 Resource Management Strategies		
CA Water Plan Update 2013 Volume 3 Chapter Number	Resources Management Strategy within CA Water Plan Update 2013	Strategy Overview
Improve Water Quality		
17	Matching Water Quality to Use	Optimizing existing resources by matching the quality of water supplies to the required quality associated with use.
18	Pollution Prevention	Strategies that prevent pollution, including public education, efforts to identify and control pollutant contributing activities, and regulation of pollution-causing activities. Includes identifying, reducing, controlling, and managing pollutant loads from non-point sources.
19	Salt and Salinity Management	Recommendations that encourage stakeholders to proactively seek to identify sources, quantify the threat, prioritize necessary mitigation action and work collaboratively with entities with the authority to take appropriate actions.
20	Urban Stormwater Runoff Management	Includes strategies for managing or controlling urban runoff, including intercepting, diverting, controlling, or managing stormwater runoff or dry season runoff.
Practice Resources Stewardship		
21	Agricultural Land Stewardship	Includes strategies for promoting continued agricultural use of lands (e.g. agricultural preserves), strategies to reduce pollutants from agricultural lands, and strategies to maintain and create wetlands and wildlife habitat within agricultural lands. Stewardship strategies for agricultural lands include wetlands creation, land preserves, erosion reduction measures, invasive species removal, conservation tillage, riparian buffers, and tail water management.
22	Ecosystem Restoration	Strategies that restore impacted or impaired ecosystems, and may include invasive species removal, land acquisition, water quality protection, revegetation, wetlands creation and enhancement, and habitat protection and improvement, habitat management and species monitoring.
23	Forest Management	Strategies that promote forest management include long-term monitoring, multi-party coordination, improvement in communications between downstream water users and communities and upstream forest managers, residents, and workers, and revisions of water-quality management plans between the State Water Board and forest management agencies to address concerns with impaired water bodies.
24	Land Use Planning and Management	Includes land use controls to manage, minimize, or control activities that may negatively affect the quality and availability of groundwater and surface waters, natural resources, or endangered or threatened species.
25	Recharge Area Protection	Includes land use planning, land conservation, and physical strategies to protect areas that are important sources of groundwater recharge.
26	Sediment Management	Includes strategies for source, sediment deposition, and transport management, as well as debris management. It is also a key consideration in flood management.
27	Watershed Management	Comprehensive management, protection, and enhancement of groundwater and surface waters, natural resources, and habitat
People and Water		
28	Economic Incentives	Includes economic incentives (e.g. loans, grants, water pricing) to promote resource preservation or enhancement.
29	Outreach and Engagement	Includes outreach and engagement strategies to reach the broader public, target specific fields or professionals, and increase knowledge and participation in public discussions of water issues.
30	Water and Culture	Increase awareness of how cultural values, uses and practices are affected by water management and how they affect water management.
31	Water-Dependent Recreation	Enhancing and protecting water-dependent recreational opportunities and public access to recreational lands.
Other		
32	Other Strategies	Other Resource Management Strategies include: Crop Idling for Water Transfers Dewvaporation/Atmospheric Pressure Desalination Fog Collection

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
Lower SG & LA	Advanced Water Meter Replacement Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Adventure Park Multi-Benefit Project	Water Supply	County of LA DPW
Lower SG & LA	Broadway Neighborhood Stormwater Greenway Project	Water Supply	City of LA Bureau of Sanitation
Lower SG & LA	Cabrillo Lane Well Improvement Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Central-Jefferson High Green Alley Network Storm Water Capture Project	Water Supply	The Trust for Public Land
Lower SG & LA	Changeover of irrigation at Parks to use of recycled water	Water Supply	Gateway Water Management Authority
Lower SG & LA	City of Bell Water Resources Management Program	Water Supply	Gateway Water Management Authority
Lower SG & LA	City of Signal Hill Recycled Water System Phase 1	Water Supply	Gateway Water Management Authority
Lower SG & LA	Dominguez Gap Spreading Grounds West Basin Percolation Enhancement	Water Supply	LACFCD
Lower SG & LA	Downey Groundwater Well Nos. 27 and 28 Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Feasibility Study of Infiltration Trench Project	Flood/Stormwater	Gateway Water Management Authority
Lower SG & LA	Furman Park/Rio Hondo Elementary School Recycled Water Main Extension and Irrigation System Improvement Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Gateway Cities Regional Recycled Water System Expansion Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Groundwater Reliability Improvement Project (GRIP)	Water Supply	WRD
Lower SG & LA	Jordan Downs Daylighting Study	Environmental	Multi-jurisdictional Agencies-LA City Housing and PW
Lower SG & LA	Los Angeles Forebay Perchlorate and VOC Cleanup - Phase 1 Project	Water Supply	WRD
Lower SG & LA	Manhattan Wells Improvement	Water Supply	LADWP / WRD
Lower SG & LA	Optimization of Current Emergency Interconnections to avert and mitigate drought related water supply emergencies	Water Supply	Gateway Water Management Authority
Lower SG & LA	Paramount Blvd. Turf Replacement Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	PRWA Plant No. 1 Reservoir Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	Reservoir and Booster Pump Station at Well No. 28 and New Well No. 29 at the Santa Fe Tank Site Improvements Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	San Jose Creek Water Reclamation Plant East Process Optimization Project	Water Supply	LACSD
Lower SG & LA	Soto Street Low Impact Development (LID) Street Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	South Los Angeles County Groundwater Pipline Project	Water Supply	WRD
Lower SG & LA	Southeast Water Efficiency Program	Water Supply	Gateway Water Management Authority
Lower SG & LA	Storm Drain Catch Basin Retrofit	Environmental	Gateway Water Management Authority
Lower SG & LA	The Urban Orchard	Water Quality	Gateway Water Management Authority
Lower SG & LA	Treder Park Stormwater Improvement Project	Water Quality	Gateway Water Management Authority
Lower SG & LA	Water Quality Protection Plan Well Facility Retrofit	Water Supply	Gateway Water Management Authority
Lower SG & LA	Well 21 Conversion Project	Water Supply	Gateway Water Management Authority
Lower SG & LA	WRD Eco Gardener Program	Water Supply	WRD
North SM Bay	Agoura Road Gap Recycled Water System Expansion	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Alternative Decker Canyon Recycled Water Extension	Water Supply	Las Virgenes Municipal Water District
North SM Bay	AMR Conversion Project	Water Supply	LACWD No. 29
North SM Bay	Big Rock Bypass	Water Supply	LACWD No. 29
North SM Bay	Citywide Storm Drain Catch Basin Curb Screens	Water Quality	City of Calabasas
North SM Bay	Cold Creek Diamond Acquisition	Environmental	Mountains Restoration Trust
North SM Bay	Comprehensive Water Conservation Project	Water Supply	City of Malibu
North SM Bay	County Yard Treatment Facility and Wetlands	Water Quality	Agoura Hills

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
North SM Bay	Creek Crossings Repairs	Water Supply	LACWD No. 29
North SM Bay	Decker Canyon Recycled Water System Extension	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Encinal Emergency Connection	Water Supply	LACWD No. 29
North SM Bay	Gates Canyon Park Project	Water Quality	County of LA DPW
North SM Bay	Invasive Non-native Crayfish Removal from Las Virgenes Creek	Environmental	Mountains Restoration Trust
North SM Bay	Invasive Non-native Crayfish Removal from Medea Creek	Environmental	Mountains Restoration Trust
North SM Bay	Las Virgenes Creek Restoration Project - Phase II	Flood/Stormwater	City of Calabasas
North SM Bay	Las Virgenes-Calleguas Municipal Water District Interconnection Project	Water Supply	Las Virgenes Municipal Water District
North SM Bay	LVMWD Woodland Hills Golf Course Recycled Water Pipeline Extension	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Malibu Civic Center Area Recyled Water Delivery Project	Water Supply	City of Malibu
North SM Bay	Malibu Rainwater Harvesting	Water Quality	City of Malibu
North SM Bay	Malibu Road/Malibu Colony Stormwater Management	Water Quality	City of Malibu
North SM Bay	Medea Creek Restoration at Chumash Park	Environmental	City of Agoura Hills
North SM Bay	Oak Park Green Streets Urban Retrofit	Water Quality	County of Ventura
North SM Bay	Oak Park Medea Creek Restoration	Environmental	Mountains Restoration Trust
North SM Bay	Raw Wastewater Diversion to the City of Los Angeles	Water Quality	Las Virgenes Municipal Water District
North SM Bay	Recycled Water Storage and Distribution System Expansion	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Thousand Oaks Boulevard and Westlake Elementary Recycled Water System Extension	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Topanga Connection Acquisition	Environmental	Mountains Restoration Trust
North SM Bay	Trancas Flood Control Channel Restoration	Flood/Stormwater	RCD of the Santa Monica Mountains
North SM Bay	Trancas Lagoon Restoration	Environmental	RCD of the Santa Monica Mountains
North SM Bay	Triunfo Community Park and Evanstar Park Recycled Water Extension	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Viewridge Super Green Streets	Water Quality	County of LA DPW
North SM Bay	Water Budget Based Rate Implementation	Water Supply	Las Virgenes Municipal Water District
North SM Bay	Westward Beach Road Bioinfiltration Project	Water Quality	City of Malibu
North SM Bay	Winter Canyon Biofiltation Project	Water Quality	City of Malibu
South Bay	25mgd Seawater Desalination Plant in West Basin	Water Supply	West Basin Municipal Water District
South Bay	Agua Amarga Lunada Canyon Habitat Restoration	Environmental	PV Peninsula Land Conservancy & City of RPV
South Bay	Alondra Regional Park	Water Quality	Successor Agency, City of Compton
South Bay	Andrews Park Subsurface Storage, Use and Infiltration Project	Water Quality	City of Redondo Beach
South Bay	Ballona Creek Water Quality and Beach Improvement & Beneficial Use Project	Water Quality	City of LA Bureau of Sanitation WPD
South Bay	Baseball Field Basin	Water Quality	City of Torrance DPW
South Bay	C Marvin Brewer Desalter Brackish Groundwater Facility Expansion	Water Supply	West Basin Municipal Water District
South Bay	Carson Regional Water Recycling Project	Water Supply	West Basin Municipal Water District
South Bay	City of C ain Barrel Give Away Phase II	Water Quality	City of Carson, DSD Eng. Svcs. Div.
South Bay	Conservation Budget Based Tiered Rate Structure	Water Supply	West Basin Municipal Water District
South Bay	Conversion of 237th Street Sump Tributary to Machado Lakes for Nutrient and Toxics TMDL BMPs	Water Quality	City of Torrance
South Bay	Culver Boulevard Realignment and Stormwater Infiltration/Retention Regional Project	Water Quality	City of Culver City
South Bay	Deauville Distributed Water Reuse Project	Water Supply	City of Santa Monica

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
South Bay	Del Rey Lagoon Water Quality Improvement Proj	Environmental	City of LA Bureau of Sanitation WPD
South Bay	Demonstration Gardens at Los Angeles County Fire Department Stations	Water Supply	West Basin Municipal Water District
South Bay	Dominguez Channel Greenway Phase III	Environmental	LACFCD
South Bay	Dominguez Channel Trash Reduction Via ARS Installation in the City of Carson, CA	Water Quality	City of Carson, DDSD Eng. Svcs. Div.
South Bay	Edward Vincent Jr Park Stormwater Project	Water Quality	City of Inglewood
South Bay	Freeway Runoff Infiltration Demonstration Project	Water Supply	City of Santa Monica
South Bay	Goldsworthy Groundwater Desalter Expansion	Water Supply	City of Torrance
South Bay	Green Streets and Water Effecient Landscape on Burton Way Median	Water Quality	City of Beverly Hills
South Bay	Hermosa Avenue Green Street	Water Quality	City of Hermosa Beach
South Bay	Hermosa Beach Infiltration Facility	Water Quality	City of Hermosa Beach
South Bay	Hermosa Greenbelt Infiltration	Water Quality	City of Hermosa Beach
South Bay	Herondo Parking Lot and Beach Infiltration	Water Quality	City of Redondo Beach
South Bay	Improvements to Entradero Storm Drain Channel for Storm Water Infiltration and Habitat Restoration	Water Supply	City of Torrance, SMBBB TMDL Jurisdictional Grps 5 & 6
South Bay	Inglewood New Well No. 7	Water Supply	City of Inglewood
South Bay	La Cienega and Frank Fenton Field Regional Stormwater Project	Water Quality	City of Beverly Hills
South Bay	Ladera Park Stormwater Capture Project	Water Quality	County of Los Angeles
South Bay	Landscape Irrigation Efficiency Program (LIEP)	Water Supply	West Basin Municipal Water District
South Bay	Manhattan Strand 28th Street Subsurface Infiltration Trench	Water Quality	City of Manhattan Beach
South Bay	Milton Street Park and Green Street project - Ballona Creek	Environmental	MRCA
South Bay	North Torrance Well Field Project, Phase III	Water Supply	City of Torrance
South Bay	Northeast Gardena Recycled Water Line	Water Supply	West Basin Municipal Water District
South Bay	Northeast Gardena Storm Water Quality Park, Recycled Water Line, and Landscape Makeover	Water Supply	Council for Watershed Health
South Bay	Northeast Gardena Water and Landscape Makeover, Community Involvement Module	Water Supply	Council for Watershed Health
South Bay	Ocean Friendly Garden (OFG) Program	Water Supply	West Basin Municipal Water District
South Bay	Oxford Retention Basin Multi-Use Enhancement Project	Flood/Stormwater	LACFCD
South Bay	Ozone Park Runoff Treatment and ReUse Project	Water Supply	City of Santa Monica
South Bay	Palos Verdes Peninsula Satellite Facilities Study	Water Supply	West Basin Municipal Water District
South Bay	Palos Verdes Recycled Water Lateral	Water Supply	West Basin Municipal Water District
South Bay	Recycled Water On-Site Retrofit Projects	Water Supply	West Basin Municipal Water District
South Bay	Recycled Water Supply for Palos Verdes Golf Course	Water Supply	City of Palos Verdes Estates
South Bay	Residential Indoor Plumbing Retrofit Kits	Water Supply	West Basin Municipal Water District
South Bay	San Ramon Canyon Stormwater Flood Reduction Project	Flood/Stormwater	City of Rancho Palos Verdes
South Bay	SMURRF Distributed Water Reuse Project	Water Supply	City of Santa Monica
South Bay	South Coast Botanic Gardens	Water Quality	Los Angeles County DPW
South Bay	South Park Subsurface Infiltration Gallery	Water Quality	City of Hermosa Beach
South Bay	Southeast Gardena Recycled Water Line	Water Supply	West Basin Municipal Water District
South Bay	Stormwater Diversion to Walnut Avenue Sump	Water Quality	City of Torrance
South Bay	Sustainable Water Infrastructure Project	Water Supply	City of Santa Monica
South Bay	Terminal Island WRP Advanced Water Purification Facility and Distribution System Expansion	Water Supply	LADWP
South Bay	Terminal Island WRP Advanced Water Purification Facility and Distribution System Expansion Project	Water Supply	LADWP

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
South Bay	Torrance Airport Underground Infiltration Gallery	Water Quality	City of Torrance, DPW
South Bay	Transfer Station Infiltration & Site Improvements	Water Quality	City of Inglewood
South Bay	Turf's Up Water Use Efficiency Program	Water Quality	West Basin Municipal Water District
South Bay	Van Ness and Slauson Infiltration Best Management Project	Water Quality	City of LA Bureau of Sanitation WPD
South Bay	Vermont Avenue Storm Water Capture and Green Street Beautification Project	Water Quality	City of LA Bureau of Sanitation WPD
South Bay	Vermont Median Stormwater Park	Environmental	Council for Watershed Health
South Bay	Victoria Street CSUDH Water Reuse Concept Proposal	Water Supply	City of Carson
South Bay	Walnut Storm Water Capture and Groundwater Replenishment Basin Phase I	Water Quality	City of Torrance DPW
South Bay	Washington Boulevard Stormwater Diversion Regional Project	Water Quality	City of Culver City
South Bay	Water Star Schools Pilot Program	Water Supply	West Basin Municipal Water District
South Bay	Well No. 2 Rehabilitation	Water Supply	City of Inglewood
South Bay	West Coast Basin Barrier Project	Water Supply	LACFCD
South Bay	Westwood Neighborhood Greenway Project	Water Quality	City of LA Bureau of Sanitation WPD
South Bay	Whiting St. and El Segundo Blvd. Dry Weather Diversion Structure	Water Quality	City of El Segundo
South Bay	FALSE	Water Supply	West Basin Municipal Water District
Upper LA	Aliso Creek - Limekiln Creek Restoration Project	Water Quality	City of LA Bureau of Sanitation WPD
Upper LA	Arroyo Seco Confluence Gateway	Environmental	Arroyo Seco Foundation
Upper LA	Arroyo Seco North Branch Creek Daylighting	Environmental	Arroyo Seco Foundation
Upper LA	Be A Water Saver Water Conservation Program	Water Supply	City of Burbank Water and Power
Upper LA	Bette Davis Park Water Recycling Project	Water Supply	LADWP
Upper LA	Big Tujunga Dam Spillway Dam	Water Supply	LACFCD
Upper LA	Big Tujunga Reservoir Sediment Removal	Flood/Stormwater	LACFCD
Upper LA	Boulevard Pit Stormwater Capture Project	Water Supply	LADWP
Upper LA	Branford Spreading Basin Pump Station and Pipeline	Water Supply	LACFCD
Upper LA	Bull Creek Channel Diversion System Pipeline to Pacoima Spreading Grounds Project	Water Supply	LACFCD
Upper LA	Bull CreekLos Angeles Reservoir Water Quality Improvement Project	Water Quality	LADWP
Upper LA	Burbank Partnership Water Recycling Project	Water Supply	LADWP
Upper LA	Burbank Water and Power Recycled Water System Expansion, Phase 3	Water Supply	City of Burbank Water and Power
Upper LA	Caballero Creek & Los Angeles River Confluence Park	Water Quality	MRCA
Upper LA	Camino San Rafael Recycled Water Project	Water Supply	Glendale Water & Power
Upper LA	Canterbury Powerline Easement (PLE) Stormwater Capture Project	Water Quality	LADWP
Upper LA	Chase Street Stormwater Greenway	Water Quality	City of LA Bureau of Sanitation WPD
Upper LA	Chevy Oaks Recycled Water Project	Water Supply	Glendale Water & Power
Upper LA	City-wide Green Street Project	Water Supply	City of Calabasas
Upper LA	Crescenta Valley County Park Stormwater Recharge Facility	Water Supply	Crescenta Valley Water District
Upper LA	Crescenta Valley Water District Nitrate Removal Treatment Facility at Well 2 Project	Water Supply	Crescenta Valley Water District
Upper LA	Devil's Gate Dam and Reservoir Water Conservation	Water Supply	LACFCD
Upper LA	Devil's Gate Reservoir Sediment Removal and Management Project	Flood/Stormwater	LACFCD
Upper LA	East Valley Baseball Park	Water Supply	LADWP

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
Upper LA	Elysian Reservoir Water Quality Improvement Project	Environmental	LADWP
Upper LA	Fernangeles Park	Water Supply	LADWP
Upper LA	Foothill Municipal Water District Recycled Water Project	Water Supply	Foothill Municipal Water District
Upper LA	Glen Oaks Storm Water Capture Project	Water Supply	Los Angeles Beautification Team
Upper LA	Glendale Narrows Habitat Enhancement Project	Environmental	Council for Watershed Health
Upper LA	Hansen Dam Water Conservation and Supply	Water Supply	The River Project
Upper LA	Hansen Dam Water Conservation Project	Water Supply	LACFCD
Upper LA	Headworks East Reservoir	Environmental	LADWP
Upper LA	Headworks Ecosystem Restoration	Environmental	LADWP
Upper LA	Hoover, Toll, & Keppel School Recycled Water Project	Water Supply	Glendale Water & Power
Upper LA	Humboldt Stormwater Greenway	Water Quality	City of LA Bureau of Sanitation WPD
Upper LA	Johnny Carson Park Stream Restoration and Park Revitalization	Environmental	City of Burbank
Upper LA	LA River Sixth Street Bridge Greenway	Water Quality	City of Los Angeles, Bureau of Eng.
Upper LA	Lopez Spreading Grounds Improvement	Water Supply	Los Angeles County Flood Control DistrictLACFCD
Upper LA	Los Angeles River Center and Gardens Green Conference Center	Water Quality	MRCA
Upper LA	Los Angeles River Natural Park	Water Quality	City of LAs Bureau of Sanitation WPD
Upper LA	Los Angeles River Revitalization Master Plan 32 Mile Channel and Easement Greening	Environmental	City of Los Angeles, Bureau of Eng.
Upper LA	Los Angeles State Historic Park Water Recycling Project	Water Supply	LADWP
Upper LA	Los Angeles-Burbank Groundwater System Interconnection	Water Quality	LADWP / Burbank Water and Power
Upper LA	Los Angeles-Glendale Groundwater System Interconnection	Water Supply	LADWP / Glendale Water and Power
Upper LA	Marsh Park, Phase II	Environmental	MRCA
Upper LA	Mission Hills Green Belt	Water Supply	The River Project
Upper LA	Mission Wells Improvement	Water Supply	LADWP
Upper LA	North Hollywood Central Treatment	Water Quality	LADWP
Upper LA	North Hollywood Groundwater and Surface Water Benefits Study	Water Supply	Council for Watershed Health
Upper LA	North Hollywood Street Enhancement	Water Quality	City of Los Angeles
Upper LA	North Hollywood Transmission Corridor Easement Stormwater Capture Study	Water Supply	Council for Watershed Health
Upper LA	North Hollywood West Wellhead Treatment	Water Quality	LADWP
Upper LA	Old Pacoima Wash Stormwater Project Concept Report	Water Supply	LACFCD
Upper LA	Pacoima Dam Inlet/Outlet Works Rehabilitation Project	Water Supply	LACFCD
Upper LA	Pacoima Reservoir Sediment Removal	Flood/Stormwater	LACFCD
Upper LA	Pacoima Spreading Grounds Improvements	Water Supply	LACFCD
Upper LA	Pasadena Non-Potable Water Project - Phase 1	Water Supply	Pasadena Water and Power
Upper LA	Pasadena Non-Potable Water Project - Phases 2-6	Water Supply	Pasadena Water and Power
Upper LA	Pollock Wellhead Treatment	Water Quality	LADWP
Upper LA	Rockhaven Well	Water Supply	Crescenta Valley Water District and Glendale Water and Power
Upper LA	San Rafael Creek Restoration	Environmental	Arroyo Seco Foundation
Upper LA	Septic-To-Sewer Drinking Waterwell Protection Project	Water Quality	City of LA Bureau of Sanitation Wastewater Eng. Svcs. Div.
Upper LA	Sepulveda Basin Sports Complex Multi-Purpose Open Space Project	Environmental	City of Los Angeles, Bureau of Eng.
Upper LA	Sepulveda Basin Sports Complex Riparian Buffer	Environmental	City of Los Angeles, Bureau of Eng.

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)

Subregion	Project Title	Primary Benefits	Implementing Organization
Upper LA	Sheldon Pit	Water Supply	LADWP
Upper LA	Shoestring Park	Water Supply	Council for Watershed Health
Upper LA	Silver Lake Reservoir Bypass & Regulator Station	Environmental	LADWP
Upper LA	Sun Valley Watershed Rory M. Shaw Wetlands Park Project (a.k.a. Strathern Wetlands Park)	Flood/Stormwater	LACFCD
Upper LA	Taylor Yard River Park Parcel G2	Environmental	City of LA Bureau of Eng.
Upper LA	Tujunga Central and Wellhead Treatment	Water Quality	LADWP
Upper LA	Two-Strike Park Recycled Water Project	Water Supply	Crescenta Valley Water District
Upper LA	Upper Los Angeles River Big Tujunga Restoration Arundo Eradication Project	Environmental	National Forest Foundation
Upper LA	Valley Generating Station Stormwater Capture Project	Water Supply	LADWP
Upper LA	Verdugo Hills Stormwater Project	Environmental	City of LA Bureau of Sanitation WPD
Upper LA	Water LA Phase 2	Water Supply	The River Project
Upper LA	Whitnall HWY Powerline Easement Stormwater Capture Project	Water Supply	LADWP
Upper LA	Whitsett Sports Field	Water Supply	LADWP
Upper SG & RH	Allen J. Martin Park Stormwater Capture Multi-Benefit Project	Water Quality	County of LA DPW
Upper SG & RH	Arboretum of Los Angeles County	Water Supply	City of Arcadia/Los Angeles County
Upper SG & RH	Barnes Park Stormwater Capture and Infiltration Project	Water Quality	City of Baldwin Park
Upper SG & RH	Bassett High School Stormwater Capture Multibenefit Project	Water Quality	County of LA DPW
Upper SG & RH	Bassett Park Stormwater Capture Multi-Benefit Project	Water Quality	County of LA DPW
Upper SG & RH	Big Dalton Sluiceway Rehabilitation	Flood/Stormwater	LACFCD
Upper SG & RH	Big Dalton Spreading Grounds Improvements	Water Supply	LACFCD
Upper SG & RH	City of Monrovia Fire Department - Training Center Water Recycling Project	Water Supply	USGVMWD
Upper SG & RH	Cogswell Dam Inlet/Outlet Works Rehabilitation Project	Flood/Stormwater	LACFCD
Upper SG & RH	Cortez Park EWMP Project	Water Quality	West Covina
Upper SG & RH	Downtown Glendora Storm Water Quality Improvement Project	Water Quality	City of Glendora
Upper SG & RH	Eaton Spreading Grounds Intake Improvements	Water Supply	LACFCD
Upper SG & RH	Eaton Wash Dam Inlet/Outlet Works Rehabilitation Project	Flood/Stormwater	LACFCD
Upper SG & RH	Eisenhower Park	Water Supply	City of Arcadia
Upper SG & RH	Encanto Park	Water Supply	City of Duarte
Upper SG & RH	Improvements to San Gabriel River Diversion and San Gabriel River Water Committee Canal and Appurtenances	Water Supply	Azusa Light and Water
Upper SG & RH	Indirect Reuse Replenishment Project	Water Supply	USGVMWD
Upper SG & RH	L. Garcia Park	Water Supply	City of Monrovia
Upper SG & RH	La Puente Valley County Water District Recycled Water Project	Water Supply	USGVMWD & La Puente Valley County Water District
Upper SG & RH	LADWP Easement	Water Quality	City of Azusa
Upper SG & RH	Large Landscape Irrigation Survey and Retrofit Project	Water Supply	USGVMWD
Upper SG & RH	Live Oak Dam Inlet/Outlet Rehabilitation	Flood/Stormwater	LACFCD
Upper SG & RH	Live Oak Spreading Grounds Improvement Project	Water Supply	LACFCD
Upper SG & RH	Memorial Park	Water Supply	City of Azusa
Upper SG & RH	Miller Pit Spreading Basins	Water Supply	LACFCD
Upper SG & RH	Olive Pit Water Conservation Park	Water Supply	LACFCD
Upper SG & RH	Peck Water Conservation Improvement Project	Water Supply	LACFCD
Upper SG & RH	Recreation Park	Water Supply	City of Monrovia

Table 5-3: GLAC IRWMP Approved Projects (as of August 2017)			
Subregion	Project Title	Primary Benefits	Implementing Organization
Upper SG & RH	Regional USGR EWMP Project - Kahler Russell Park	Water Quality	City of Covina
Upper SG & RH	Regional Water Supply Reliability Program Phase 1b	Water Supply	Puente Basin Water Agency
Upper SG & RH	Royal Oaks Trail	Water Supply	City of Bradbury
Upper SG & RH	San Angelo Park Stormwater Capture Multi-Benefit Project	Water Quality	County of LA DPW
Upper SG & RH	San Gabriel Dam Penstock Coatings and Valve Repair	Flood/Stormwater	LACFCD
Upper SG & RH	San Gabriel Valley Water Recycling Project (Phase I - Rose Hills Expansion)	Water Supply	USGVMW
Upper SG & RH	Santa Anita Dam Seismic Rehabilitation	Flood/Stormwater	LACFCD
Upper SG & RH	Santa Fe Spillway Basins	Water Supply	LACFCD
Upper SG & RH	Sawpit Debris Dam Seismic Strengthening Project	Flood/Stormwater	LACFCD
Upper SG & RH	Sierra Vista Park	Water Supply	City of Sierra Madre
Upper SG & RH	Six Basins and Puente Basin Integrated Water Supply Projec	Water Supply	Puente Basin Water Agency
Upper SG & RH	South El Monte Recycled Water Expansion Project	Water Supply	USGV MWD & SGV Water Company
Upper SG & RH	South El Monte Recycled Water Expansion Project Package 1	Water Supply	USGV MWD & SGV Water Company
Upper SG & RH	Walnut Creek Spreading Basin Improvements	Water Supply	LACFCD
Upper SG & RH	Well 15	Water Supply	San Gabriel County Water District

LIST OF ACRONYMS

ACS	American Community Survey
AF	acre-feet
AFY	acre-feet per year
Army Corps	United States Army Corps of Engineers
ASBS	Area of Special Biological Significance
AV	Antelope Valley
BDCP	Bay-Delta Conservation Plan
BMP	Best Management Practice
Caltrans	California Department of Transportation
CASGEM	California Statewide Groundwater Elevation Monitoring
CARB	California Air Resources Board
CCA	Critical Coastal Area
CCL	Contaminant Candidate List
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CEDEN	California Environmental Data Exchange Network
CEIC	California Environmental Information Catalog
CERES	California Environmental Resource Evaluation System
cfs	cubic feet per second
COG	Council of Governments
Council	Council for Watershed Health
CRA	Colorado River Aqueduct
CREST	Cleaner Rivers through Effective Stakeholder-led TMDLs
CSMP	Coordinated Shoreline Monitoring Plan
CWP	California Water Plan
CUWCC	California Urban Water Conservation Council
DAC	Disadvantaged Community
DDT	Dichloro-diphenyl-trichloroethane
DMS	Data Management System
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment and Protection
EJ	Environmental Justice
EPA	United States Environmental Protection Agency
ESHA	Environmentally Sensitive Habitat Area
FEMA	Federal Emergency Management Agency
FoLAR	Friends of the Los Angeles River
GAMA	Groundwater Ambient Monitoring and Assessment
GHG	Greenhouse gas emissions
GLAC	Greater Los Angeles County
GOPR	Governor's Office of Planning and Research
GWMP	Groundwater Management Plan
HOSP	Habitat and Open Space
IRP	Integrated Resources Plan
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan

I. Lower San Gabriel and Los Angeles Rivers Subregional Plan

Lower San Gabriel and Los Angeles Rivers Subregional Plan

Final

Prepared by:

RMC
Water and Environment

In Association with:

Geosyntec
consultants

Amended October 2017

Surface Water

There is no direct potable use of surface water within this Subregion; however, surface water flow from the Los Angeles River, Rio Hondo and the San Gabriel River are used to recharge groundwater at spreading grounds which are discussed further in the groundwater section.

Groundwater

Groundwater is a major water supply in this Subregion, representing approximately 55% of water supplies in ~~2010~~2017. The primary groundwater basin is Central Basin, in addition to the West Coast Basin, La Habra Basin and Orange County Basin.

The Central Basin is adjudicated through the Central Basin Judgment, with the total amount of allowable extraction rights set at 217,367 AFY. The Water Replenishment District of Southern California (WRD) ~~California Department of Water Resources~~ serves as administrative Watermaster for the Central Basin, ~~while the Water Replenishment District (WRD) of Southern California~~and is responsible for ensuring an adequate supply of replenishment water to offset groundwater production through monitoring, and various groundwater reliability programs and projects.

Groundwater recharge in the Central Basin occurs via existing and restored natural channel bottoms, percolation of rainwater (natural recharge), underflow from neighboring basins, irrigation, and other incidental recharge; however, natural recharge is typically insufficient to maintain basin water levels and current pumping levels due to the extent of impervious surfaces. To augment the groundwater which naturally recharges Central Basin, artificial recharge using river water, imported water, recycled water and runoff augments and blends with groundwater, and is eventually extracted for potable use. Artificial recharge facilities in the Central Basin include the following (LACDPW, 2011):

- Dominguez Gap Spreading Grounds – recharge controlled flows from the Los Angeles River and uncontrolled flows from storm drains
- Rio Hondo Coastal Spreading Grounds – recharge controlled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier Narrows Dam, uncontrolled runoff via San Gabriel River and Rio Hondo channel, and imported and recycled water
- San Gabriel Coastal Spreading Grounds – recharge controlled and uncontrolled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier Narrows Dam, and imported and recycled water
- San Gabriel River at Montebello Forebay – in-river recharge controlled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier Narrows Dam, uncontrolled runoff via San Gabriel River, and imported and recycled water
- Alamitos Gap Barrier Project – injects imported water and recycled water to prevent seawater intrusion

The West Coast Basin, also adjudicated, lies mostly in the South Bay Subregion to the west, but a small portion lies in the Lower San Gabriel and Los Angeles Rivers Subregion. Like Central Basin, West Coast Basin is managed by the ~~California Department of Water Resources and~~ WRD. This basin is hydrologically connected to Central Basin, receiving underflow ~~at the Dominguez Gap~~across the Newport-Inglewood Uplift. Groundwater basin recharge can occur via existing and restored natural channel bottoms, percolation of rainwater irrigation, and other native incidental recharge; however natural recharge is typically insufficient to maintain basin water levels and current pumping levels due to the extent of impervious surfaces and the presence of clay soils in parts of the Subregion. There are currently injection wells in place in the West Coast Basin which inject recycled water and imported water along the coast to form barriers to seawater intrusion in two locations (the Dominguez Gap and West Coast Basin Barriers). (West Basin MWD, 2011)

The Orange County Basin underlies the eastern portion of the southeastern portion of the Subregion, and is separated from the Central Basin boundary along Coyote Creek and the Los Angeles/Orange County line. This basin is ~~adjudicated, and is~~ managed by the Orange County Water District. Recharge to the Orange County Basin is primarily from the Santa Ana River through permeable sands and gravels within the forebay areas. Recharge also occurs through precipitation, irrigation, and other native incidental recharge. Artificial recharge activities include injection through wells at the Talbert and Alamitos seawater barriers, and spreading of imported and recycled water at spreading grounds. Artificial recharge facilities overlying the Orange County Basin allow for the recharge of Santa Ana River water, imported water, and recycled water. These facilities are located in the cities of Anaheim and Orange, as well as along the Santa Ana River. and include the following:

- Santa Ana River in the forebay areas
- Conrock and Warner Percolation Basins
- Burris Pit Percolation Basin
- Talbert seawater barrier
- Alamitos seawater barrier

La Habra Basin is located in northern Orange County, north of the Orange County Basin. Little groundwater production occurs in this basin due to low transmissivity and poor water quality caused by high TDS, sulfates, nitrates and color. The La Habra Basin is currently ~~unmanaged~~an older name for a basin now part of both the Central Basin and Orange County Basin. It is managed by either WRD (for the portion in the Central Basin) or Orange County Water District (for the portion in the Orange County Basin), or managed separately in the cities of La Habra and Brea.

In addition to the above discussed basins, some water agencies utilize groundwater pumped from the San Gabriel Basin to the northeast of the Subregion, including: the City of Whittier, California Domestic Water Company, San Gabriel Valley Water Company and Suburban Water Systems.

Groundwater Quality

Groundwater quality varies throughout the Subregion, based on naturally occurring conditions, historical land use patterns, and groundwater extraction patterns. Poor groundwater quality can be attributed to several factors including over-drafting of groundwater basins (sometimes resulting in seawater intrusion), industrial discharges, agricultural chemical usage, legacy contaminants in urban runoff, and naturally occurring constituents. The cost of treating these contaminants is often significant, and for some improperly disposed chemicals, effective treatment has not yet been identified.

Central Basin is generally of good quality but has some localized areas of poor quality, primarily along the basin margins and in those aquifers affected by seawater intrusion. As stated previously, WRD monitors and manages both levels and water quality in Central Basin. The primary constituents of concern in this basin include: TDS, VOCs, perchlorate, nitrate, iron, manganese, arsenic, and chromium. ~~WRD has determined through its monitoring and sampling program that special interest constituents, including arsenic, hexavalent chromium, MTBE, total organic carbon, color and perchlorate, do not pose a substantive threat to the basin. (MWD, 2007)~~

In order to mitigate localized groundwater quality problems, WRD established a Safe Drinking Water Program to provide pumpers with wellhead treatment equipment to remove VOCs from the groundwater which has restored over ~~30,000~~38,000 AFY of groundwater to beneficial use. Seawater intrusion is controlled in the basin through the Alamitos Gap Barrier Project run by the Los Angeles County Department of Public Works. (WRD, 2012)

West Coast Basin has high levels of TDS in the Torrance/Hawthorne area, which are outside the Subregion, that can be attributed to both sea-water intrusion and naturally occurring soil and geologic conditions in the region. Increases in groundwater TDS concentrations are primarily attributed to seawater intrusion, but are also a function of the recharge of storm and urban runoff, imported water, and incidental recharge. Seawater intrusion is attributed to the extraction of groundwater above natural replenishment levels. To reduce this, Los Angeles County operates and maintains two seawater intrusion barrier systems along the coast that utilize recycled water and imported water to reduce the seawater intrusion in coastal aquifers. Additionally, West Basin MWD and WRD operate desalting facilities to reduce these high TDS levels. (MWD, 2011)Water quality in the Orange County Basin is managed by the Santa Ana Water Project Authority (SAWPA). In addition to quality issues (including high TDS) due to seawater intrusion, this basin's constituents of concern include: nitrate, VOCs, perchlorate, color, and NDMA. There are several groundwater treatment projects within the basin, though they don't fall within this Subregion. (MWD, 2011)

Near-Shore Ocean Water Quality

There are several indicators of coastal water quality. One of the most publicized is the annual report by Heal the Bay. The annual report evaluates California beaches from Memorial Day to Labor Day giving them a grade of A to F based on tests for bacterial pollution, which indicate how likely the water is to make swimmers sick. Statewide, 92% of California beaches earned A or B grades over the summer, the same as last year, according to the 2011 report. Additionally, constituents such as PCBs, metals, DDT and other pesticides, and PAHs have been found in coastal waters.

2.5 Environmental Resources

Due to the Subregion being highly urbanized, with its rivers engineered to protect homes and businesses from flooding, large areas of aquatic habitat have been lost. Despite their altered state, the Subregion's channels still serve as habitat for wildlife.

J. North Santa Monica Bay Subregional Plan

North Santa Monica Bay Subregional Plan

Final

Prepared by:

RMC
Water and Environment

In Association with:

Geosyntec
consultants

Amended October 2017

2.4 Sources of Water Supply

Sources of supply vary throughout the Subregion, as shown in Table 1. This table was developed based on 2010 Urban Water Management Plans (UWMPs) from the following agencies:

- Las Virgenes (portion within the Subregion – 87% area)
- Los Angeles County Waterworks District #29
- Calleguas
- West Basin
- California Water Services Company, Westlake
- Lake Sherwood
- Triunfo Sanitation District / Oak Park Water Service

Table 1: Actual Retail Supplies (acre-feet per year)

Suppl	2010
Groundwater	<1,000
Imported	35,000
Recycled (Non-Potable Reuse)	5,000
Surface Water Diversions	0
Desalinated Ocean Water	0
Water Use Efficiency	<1,000
Stormwater Capture and Use	<1,000
Total	40,000

Data sources: 2010 Urban Water Management Plans of agencies listed above
Supplies are rounded to the nearest thousand acre-feet per year.

Groundwater

Groundwater represented less than one percent of the Subregion's supplies in 2010. The Hidden Valley, Russell Valley, ~~and~~ Thousand Oaks Area, and Malibu Valley Basins are the only groundwater basins ~~underlying the Subregion~~in the North Santa Monica Bay Subregion included in the Los Angeles Regional Water Quality Control Board's Basin Plan and in the California Statewide Groundwater Elevation Monitoring (CASGEM) Program (Figure 7). Each basin is ~~relatively~~ small with relatively low yield and for the most part produces poor quality ~~water that is not~~ non-potable water with high concentration of total dissolved solids and sulfates, chloride or alkalinity. There are no public potable supply wells. The CASGEM Basin Prioritization process listed the basins as very low priority. There are groundwater wells located in these basins and throughout the subregion, but the numbers and extent to which they are used for drinking water is unknown. There are concerns that in some cases these wells decrease streamflow and could have negative impacts on aquatic habitat. Little else is known about their water quality, including whether any has nitrate, arsenic, perchlorate or hexavalent chromium contamination. Given that there is no heavy industry or significant agriculture in the region, the presence of those contaminants is unlikely. The Russell Valley Basin is used by Las Virgenes MWD ~~pumps water from the Russell Valley Basin to augment supplies for its recycled water system~~to augment supplies for its recycled water system and by the Westlake Lake Management Association to maintain lake levels and environmental flows to Triufino Creek. The maximum yield of this basin is 400 AFY, and the basin is not adjudicated. ~~These groundwater basins are not utilized by water agencies within the Subregion~~. (MWDSC, 2007)

K. South Bay Subregional Plan

South Bay Subregional Plan

Final

Prepared by:

RMC
Water and Environment

In Association with:

Geosyntec
consultants

Amended October 2017

GLAC IRWM South Bay Subregional Plan

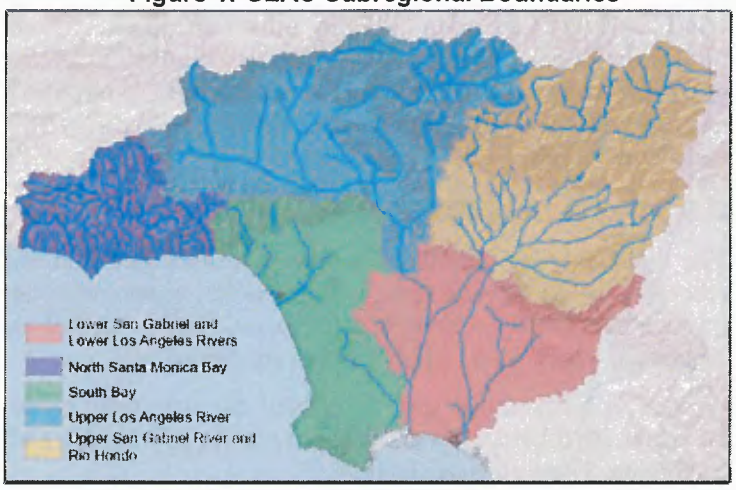
1 Background and Purpose of Subregional Plan

The South Bay Subregional Plan is one of five subregional plans that make up the Greater Los Angeles County Integrated Regional Water Management Plan (GLAC IRWM Plan). This Subregional Plan outlines the South Bay's physical setting, sources of water supply, water quality, environmental resources, planning objectives and targets, and partnership and multi-benefit opportunities. The purpose of the South Bay Subregional Plan is to outline its expected contribution to meeting the GLAC regional planning goals, objectives, and targets.

2 South Bay Subregion Description

2.1 Physical Setting

Figure 1: GLAC Subregional Boundaries



The South Bay Subregion of the Greater Los Angeles County Integrated Regional Water Management Region (GLAC IRWM Region) is located in the southwest area of Los Angeles County and is composed of the southeastern half of the Santa Monica Bay Watershed, along with the Dominguez Channel Watershed. The Subregion's watersheds consist of three defining characteristics—its coastline, its population and its industry. More than 30 miles of coastline in the South Bay attracts tens of millions of visitors every year, serves as an important recreation area for the area's residents, and in a few remaining pockets such as the Palos Verdes Peninsula, Madrona Marsh, Ballona Wetlands, portions of the Santa Monica Mountains and Baldwin Hills, supports a diverse population of birds and other wildlife.

With over 2.6 million residents according to the 2010 census, the South Bay is one of the most dense and economically diverse urban areas of the region, creating both challenges to preserve and enhance local water resources and the natural environment, as well as unique opportunities for collaboration. Population projections from the Southern California Association of Governments (SCAG) estimate that the population within the South Bay could increase to over 3 million residents by 2035. The South Bay's industries--oil refining, power generation and transportation via the Port of Los Angeles, Los Angeles International Airport and major freeways—provide similar challenges and opportunities. (U.S. Census Bureau, 2012; SCAG, 2012)

Political Boundaries

The South Bay Subregion is located within ~~the~~ Los Angeles County and includes over 20 cities and unincorporated areas. Figure 2 depicts the county and city boundaries of the South Bay Subregion.

Climate, Temperature, and Rainfall

The South Bay is within the Mediterranean climate zone, which extends from Central California to San Diego, and is characterized by winter precipitation, mostly falling in a few major storm events between November and March, followed by dry summers. Long-term annual average rainfall is approximately 12 inches per year, but can vary greatly from year to year and between the coast and the Santa Monica Mountains.

Water Suppliers and Infrastructure

The water suppliers in the Subregion can be divided into wholesalers and retailers. Wholesalers (Figure 4) provide imported water and/or recycled water and to other agencies, while retailers (Figure 5) sell water to end users. The major wholesalers in the Subregion include West Basin Municipal Water District (WBMWD) and Metropolitan Water District of Southern California (MWDSC). The major retailers in the Subregion include Los Angeles Department of Water and Power (LADWP) and the cities of Santa Monica, Torrance, and Beverly Hills(shown in Figure 5). The retailers that are customer agencies of WBMWD include California American Water Company, California Water Service ~~Company,~~ Golden State Water Company, Los Angeles County Waterworks District #29, City of Lomita, City of Manhattan Beach, City of Inglewood, and City of El Segundo. These suppliers use a combination of imported water, groundwater, and recycled water to serve potable and non-potable demand in their service areas. Each of these major suppliers has written a comprehensive 2010 UWMP to estimate future water supply demands and availability, and which were utilized in the estimation of supplies discussed later in this plan.

Given that this Subregion is highly urbanized, there is extensive water infrastructure in place for the production of water and the delivery of water to both retailers and to end-users. A number of cities have groundwater wells in place for the pumping of the groundwater basins in the area. In addition, the MWDSC delivers water through imported water feeder pipelines to WBMWD, Torrance, Los Angeles, Santa Monica and Beverly Hills.

2.3 Sources of Water Supply

The South Bay has developed a diverse mix of local and imported water supply sources. Local water resources include groundwater, recycled water, water conservation, and water transfers. Water is imported through the California State Water Project (SWP), the Colorado River Aqueduct, and the Los Angeles Aqueduct. Major water supply sources are described below.

Sources of retail supply vary throughout the Subregion, as shown in Table 1. This table was developed based on 2010 Urban Water Management Plans (UWMPs) whose service areas cover a majority of the Subregion. These agencies include:

- WBMWD (portion within Subregion)
- City of Torrance
- City of Beverly Hills
- City of Santa Monica
- City of Los Angeles (portion within Subregion)

In addition to retail supply, replenishment supply is needed to both replenish the West Coast Groundwater Basin and to use with injection wells serving as seawater barriers. Table 2 shows 2010 supplies used to meet replenishment needs.

(MGD), and treat nearly 40,000 AFY, using tertiary and advanced treatment, and reused for municipal uses (e.g., irrigation), industrial applications, and maintenance of seawater barriers in groundwater basins along the coast. The remainder is discharged to creeks and rivers, supporting riparian habitat in some locations, or directly to the ocean. The primary producers of recycled water in the Subregion are the Sanitation Districts of Los Angeles County, the City of Los Angeles, and WBMWD. Existing and future recycled water projects in the Subregion that were identified in the MWDSC's Integrated Water Resources Plan are shown in Table 3 and Table 4, respectively (MWD, 2010).

Table 3: Existing Recycled Water Projects

Sponsoring Agency	Project Name	Ultimate Capacity (acre-feet)
LADWP	Edward C. Little Water Recycling Facility Phase I-IV	1,000
City of Santa Monica	Santa Monica Urban Runoff Recycling Facility (SMURRF)	280
Torrance	Edward C. Little Water Recycling Facility Phase I-IV	7,800
West Basin MWD	Edward C. Little Water Recycling Facility Phase I-IV	54,800

Table 4: Future Recycled Water Projects

Sponsoring Agency	Project Name	Ultimate Capacity (acre-feet)
LADWP	LAX Cooling Towers	240
West Basin MWD	Carson Regional Water Recycling Facility Phase II Expansion Project to serve LADWP	9,300
	Edward C. Little Water Recycling Facility Phase V	5,026
	Carson Regional Water Recycling Facility Phase II Expansion Project to serve BP	2,100

Desalinated Ocean Water

Desalinated ocean water can add to the Region's water supply reliability by diversifying its water supply sources. From 2010-2014, WBMWD operated~~s~~ the Ocean Water Desalination Demonstration Facility and Water Education Center to evaluate and demonstrate ocean protection, energy recovery and cost reduction technologies with the goals of ensuring a full scale ocean-water desalination facility will be done in a cost and energy efficient manner while protecting the ocean. WBMWD will decommission~~is~~ this facility while working on plans for a full-scale facility ~~planning on expanding this facility~~ in the future to provide up to 21,000 AFY of desalinated ocean water.

Stormwater Capture and Use

Stormwater capture and use is a method that can be used by municipalities both to add a source of supply to its water portfolio, and to reduce runoff that can contribute to flooding and water quality issues. Because this watershed has minimal opportunity to capture large quantities of water for infiltration to underlying water supply basins, stormwater capture and use will largely be used for irrigation purposes rather than directly for drinking water consumption. Stormwater use is currently taking place at a local level ~~where~~and the City of Los Angeles has completed ~~is planning on developingits a~~ Stormwater Capture Master Plan.~~, and the~~

In addition, the City of Santa Monica and WBMWD~~which~~ actively promotes the use of rainwater for various non-potable applications through free workshops in addition to rain barrel and cistern rebates.

2.4 Water Supply and Demand

As water agency boundaries are not aligned with the subregional boundaries, water demand was estimated based on review of 2010 Urban Water Management Plans (UWMPs) for:

- West Basin MWD (portion within Subregion)
- City of Torrance
- City of Beverly Hills
- City of Santa Monica
- City of Los Angeles (portion within Subregion)

The demand projections in WBMWD's Regional UWMP were included as its service area covers the areas not covered by the individually listed cities. Given that the City of Los Angeles covers multiple subregions, the portion included in the South Bay Subregion was applied to the total demand estimated in the City of Los Angeles's UWMP to approximate the demand of the City of Los Angeles within the South Bay Subregion.

Demand projections for the South Bay Subregion can be seen in Table 5.

Table 5: Current and Projected Subregion Water Demand

2010	2015	2020	2025	2030	2035
426,000 AF	477,000 AF	498,000 AF	507,000 AF	518,000 AF	522,000 AF

2.5 Water Quality

The GLAC Region has suffered water quality degradation of varying degrees due to sources associated with urbanization, including the use of chemicals, fertilizers, industrial solvents, automobiles and household products. Both surface water and groundwater quality have been impacted by this degradation which can be classified as either point or nonpoint sources. Regulations are in place to control both types of sources, and are often updated to control constantly changing water quality issues.

The Federal Water Pollution Control Act Amendments of 1972, amended in 1977, are commonly known as the Clean Water Act. The Clean Water Act established the basic structure for regulating discharges of pollutants into the waters of the United States and gave the USEPA the authority to implement pollution control programs. In California, per the Porter Cologne Water Quality Control Act of 1969, responsibility for protecting water quality rests with the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs).

The Subregion has 303(d) listings related to both human activities and natural sources. Human activities can produce poor water quality due to trash, nutrients from wastewater treatment effluent, metals, and toxic pollutants. These pollutants can be carried in stormwater runoff and through point source discharges, impacting streams, canyon ecosystems, and eventually beaches and offshore waters. Natural sources of contaminants primarily include minerals and metals from underlying local geology.

Even though agencies and cities in the Subregion have significantly reduced pollutants that are discharged to water bodies from individual point sources since the Clean Water Act was established, many of the major water bodies are still considered impaired due to trash, bacteria, nutrients, metals, and toxic pollutants. Water quality issues affecting the Subregion's local surface waters and groundwater basins are discussed below.

The City of Santa Monica pumps, treats, and distributes groundwater for drinking water purposes from the Santa Monica Basin. Within the Santa Monica Basin, there are three City well fields, the Arcadia Well Field located in the Arcadia Subbasin, the Santa Monica Well Field located in the Olympic Subbasin, and the Charnock Well Field located in the Charnock Subbasin (Figure 8-A). The City actively monitors the groundwater in these Subbasins in accordance with the Los Angeles Regional Water Quality Control Board and the State Water Resources Control Board: Division of Drinking Water Programs. Extensive groundwater
monitoring and chemical analysis are performed to confirm compliance with Federal and State Drinking Water standards.

The City of Santa Monica reported no detections of perchlorate during the 1st Period (2011-2013) and the Second Period (2014-2016) of the Third Compliance Cycle for the groundwater from the Santa Monica Basin entering the City of Santa Monica's Arcadia Water Treatment Plant – System No. 1910146 and Amended Permit No. 1910146PA-003.

The two City drinking water wells located at the Water Treatment Plant and in the Arcadia Subbasin are non-detect for perchlorate. In the Charnock Subbasin, there have only been 3 low and sporadic detections of perchlorate in the more than 17 years of groundwater monitoring efforts. Well RMW-19 revealed a perchlorate detection of 2.9 ppb and 3.1 ppb in July 2010. Well RMW-9 revealed a perchlorate detection of 2.2 ppb in July 2013. The CA State MCL for perchlorate is 6.0 ppb. Perchlorate was not detected in both wells before and after these reported detections.

In the Olympic Subbasin, perchlorate was detected in 2 of the 3 aquifer zones, according to the October 2010 Groundwater Monitoring Report, prepared by AMEC Geomatrix. It was detected in the upper A and B zones. Perchlorate concentrations ranging from non-detect to 37.3 ppb were detected in the A zone. Perchlorate concentrations ranging from non-detect to 77.0 ppb were detected in the B zone. Perchlorate was not detected in the lower aquifer C zone where the City pumps groundwater for drinking water use. Figures 8-A, 8-B, and 8-C present perchlorate concentrations in the 3 aquifer zones as reported in 2010. The RWQCB determined that perchlorate contamination in the upper aquifer zones was not significant and further groundwater monitoring was not required.

There has been no impact to the City of Santa Monica and surrounding communities located within the Santa Monica Basin due to the localized and low-level detections of perchlorate. Perchlorate has not been detected in groundwater influent to the Santa Monica Water Treatment Plant.

There are no efforts being undertaken in the region to address the localized and low-level detections of perchlorate in the Santa Monica Basin. The presence of perchlorate in the Santa Monica Basin is not considered significant and does not present a health risk. No further efforts are required.

Figure 8-A: Perchlorate 1-4-Dioxane, and Hexavalent Chromium Concentrations Zone A

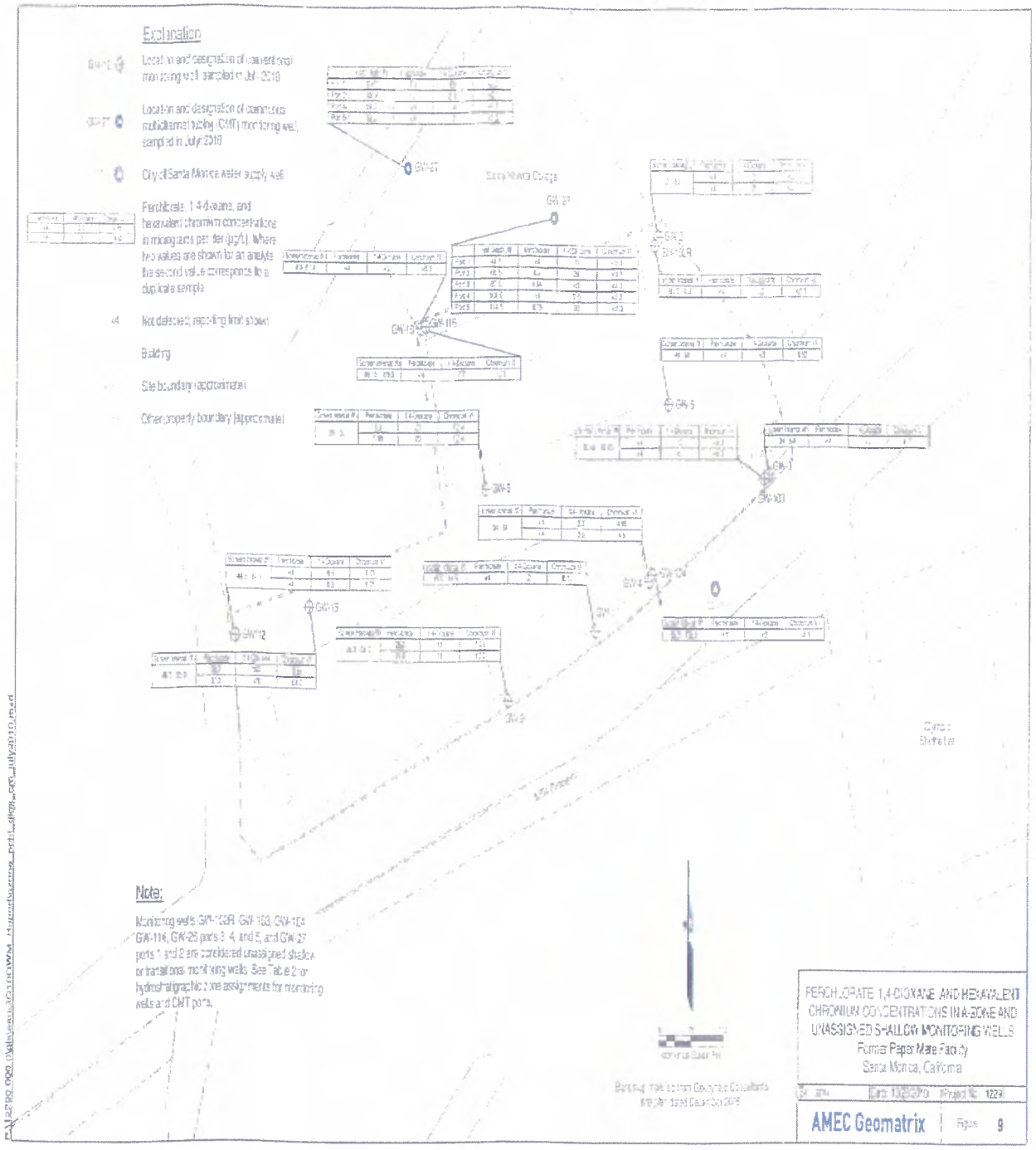


Figure 8-B: Perchlorate 1-4-Dioxane, and Hexavalent Chromium Concentrations Zone B

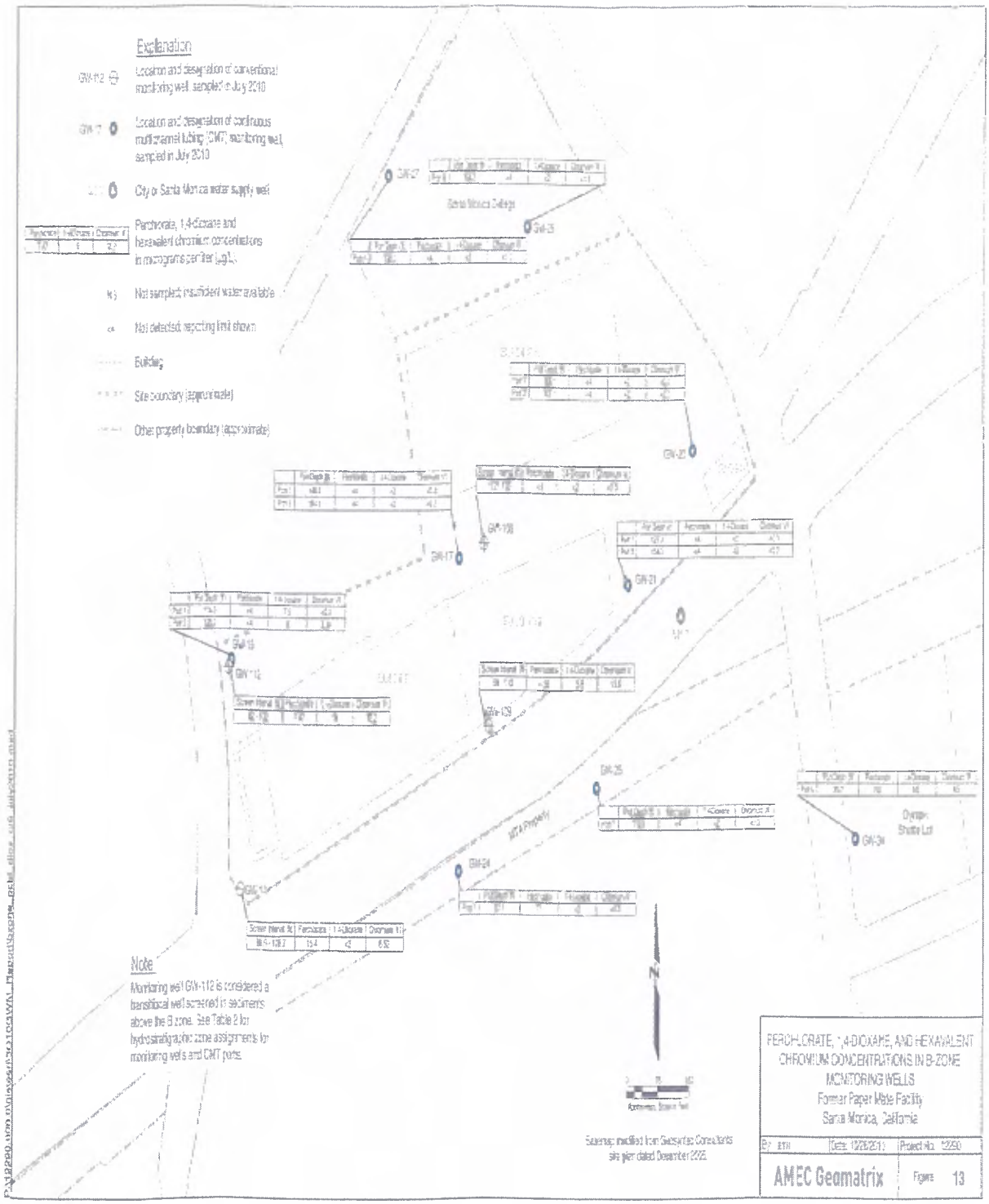
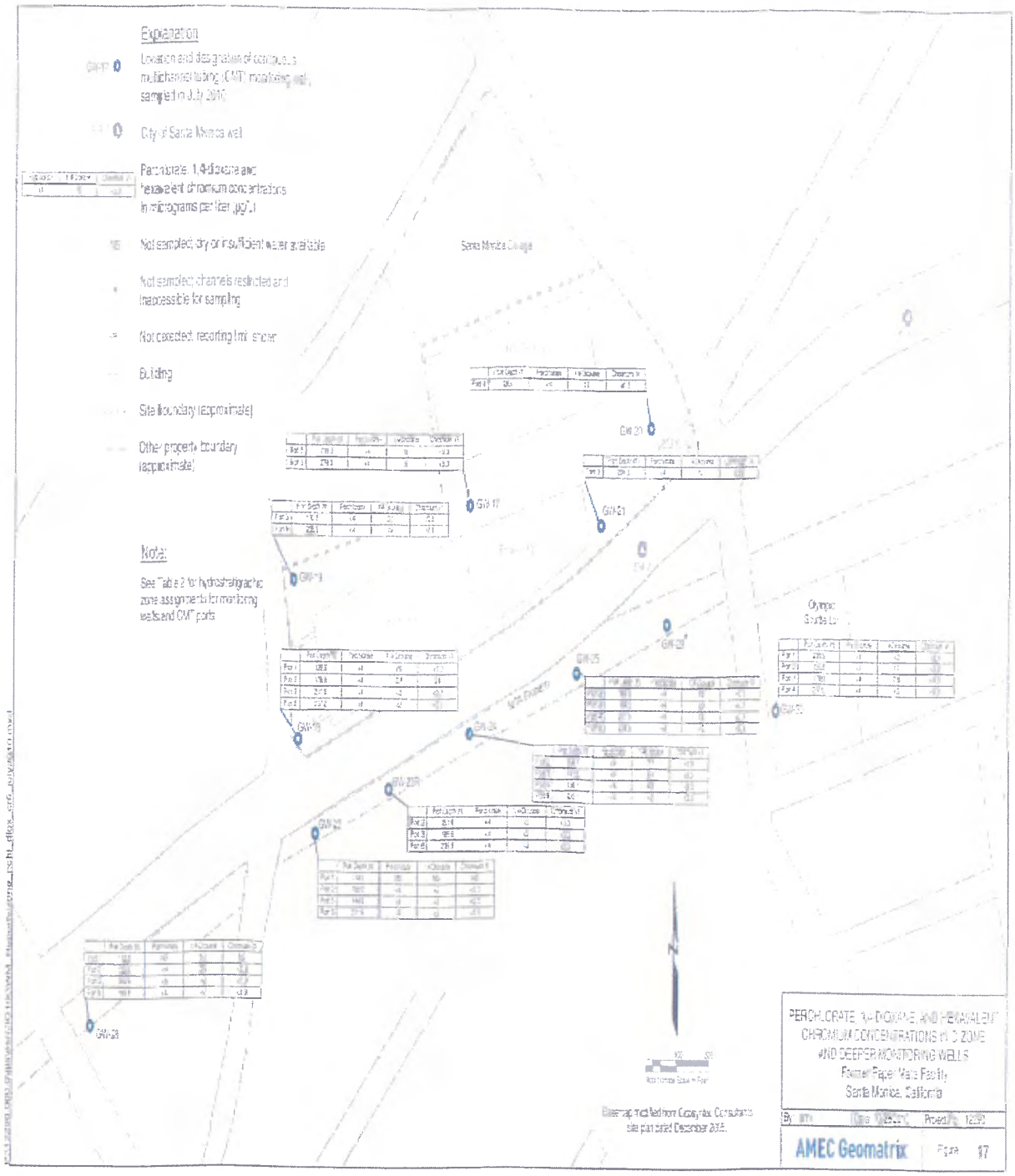


Figure 8-C: Perchlorate 1-4-Dioxane, and Hexavalent Chromium Concentrations Zone C



Madrona Marsh

The Madrona Marsh Preserve, located in Torrance, is the last vernal marsh remaining in the South Bay Subregion and one of few aquatic habitats located within its urban landscape. Formed eons ago when the mountains of the Palos Verdes Peninsula rose to the south, Madrona Marsh is a shallow depression fed by wet season storms, as the name "vernal" indicates. After the rainy season, evaporation, percolation and transpiration reduce the water depth by about one-quarter of an inch (6 mm) per day. By the end of August, the aquatic habitat is dry and remains so until the following rainy season. Situated on land that was set aside for oil production in 1924, Madrona Marsh was never developed—unlike the surrounding city—and remains a valuable natural habitat for birds, reptiles, insects and even small mammals. (Friends of Madrona Marsh, 2012)

Machado Lake

Machado Lake, located in Ken Malloy Harbor Regional Park along the Wilmington Drain, is a perennial freshwater lake and marsh that provides aquatic habitat to a number of species. Due to contamination by surrounding urban land uses, this area ~~is~~has undergone~~ing~~ ecosystem rehabilitation by the City of Los Angeles and Los Angeles County (SDLAC, 2010). Partial funding for this rehabilitation ~~comes~~ came from the Proposition 50 Integrated Regional Water Management Grant Program.

2.6.2 Riparian Habitat

Riparian habitat is typically a linear corridor of variable width that occurs along perennial, intermittent, and ephemeral streams and rivers. In undisturbed areas, two distinguishing features of riparian ecosystems are the hydrologic interaction that occurs between the stream channel and adjacent areas through periodic exchange of surface water and groundwater, and the distinctive geomorphic features and vegetation communities that develop in response to this hydrologic interaction.

Due to the extensive urbanization on the coastal plain and inland valleys, current riparian habitat within the Subregion bears little resemblance to the pre-development conditions. Faber et al. (1989) estimated that 90- to 95-percent of the riparian habitat has been lost. Most native riparian habitat in the Subregion is located in the Santa Monica Mountains; in the restored riparian corridor below the Westchester Bluffs.

Ballona Creek

Ballona Creek is an approximately nine mile long flood control channel surrounded by urban development and traversed by roads, freeways, and infrastructure. The creek has the potential of providing a habitat corridor from Baldwin Hills to the Ballona Wetlands, but currently does not contain significant riparian habitat. However a 50 acre riparian corridor and freshwater marsh for stormwater management purposes were completed in the early 2000's and contains many willows, cattails and tule habitat areas.

The Ballona Creek Greenway Plan is the result of collaboration between the Ballona Creek Watershed Task Force and the SMBRC. It is a plan that will explore issues related not only to short-term recreational improvements but also to longer-term restoration design possibilities. The Task Force is comprised of state and local agencies, environmental organizations, private businesses, and resident stakeholders. Concurrently, SMBRC - with the aid of partner agencies such as the State Coastal Conservancy, Baldwin Hills Conservancy (BHC), Mountains Recreation Conservation Authority (MRCA), and City and County of Los Angeles – have embarked on the Lower Ballona Ecosystem Restoration Feasibility Study (LBERF) with the U.S. Army Corps of Engineers.

Stone Creek

UCLA and the University Lab School (ULS) campuses are conducting restoration efforts at Stone Creek which runs through the UCLA campus. Since 2007, the SMBRC has been working with support of the State Coastal Conservancy and the RWQCB to restore the stream with monthly volunteer weeding and planting events.

Dominguez Channel

The Dominguez Channel extends from the Los Angeles International Airport to the Los Angeles Harbor and drains large if not all portions of the cities of Inglewood, Hawthorne, El Segundo, Gardena, Lawndale, Redondo Beach, Torrance, Carson and Los Angeles. Dominguez Channel is in the Dominguez Watershed which is comprised of approximately 110 square miles of land in the southern portion of Los Angeles County. The remaining land areas within the watershed drain to several debris basins and lakes or directly to the Los Angeles and Long Beach Harbors. Because of the largely industrial land base in this watershed, very little native riparian vegetation remains. (RWQCB, 2008)

Madrona Marsh

The Madrona Marsh Preserve, located in Torrance, is the last vernal marsh remaining in the South Bay Subregion. Ongoing efforts are restoring native plants including wildflowers and butterfly species. The area has long been popular with bird watchers and the Audubon Society has used Madrona Marsh for their annual bird census since 1967. El Camino College uses it as an outdoor biology and botany lab. Torrance operates the Madrona Marsh Nature Center in cooperation with the Friends of the Madrona Marsh. (Friends of Madrona Marsh, 2012)

Bixby Marshland

The Bixby Marshland is a remnant of a formerly extensive, natural-freshwater aquatic habitat known as Bixby Slough. Over the years, most of Bixby Slough was destroyed due to development. The Bixby Marshland, a 17-acre marsh, located to the northwest of the Sanitation Districts of Los Angeles County Joint Water Pollution Control Plant (JWPCP) near the intersection of Figueroa Street and Sepulveda Boulevard in the City of Carson, has recently been restored by the Sanitation Districts of Los Angeles County (SDLAC, 2012). Partial funding for this restoration ~~comes~~ came from the Proposition 50 IRWM Grant Program.

Beach Bluff Restoration

Beach bluff restoration is underway at several locations within the Subregion. The Los Angeles Conservation Corps is working with at-risk youth to restore three acres of bluff habitat adjacent to a Youth Center at Dockweiler Beach. The site is a priority restoration site due to its proximity to other native plant habitat supporting the federally endangered El Segundo blue butterfly within the dunes just west of Los Angeles International Airport. The Palos Verdes Peninsula Land Conservancy (PVPLC) has implemented a number of nature preserves that will preserve beach bluff areas, including the Vicente Bluffs, Abalone Cove, Alta Vicente, and the future Ocean Trails preserves. (Palos Verdes Peninsula Land Conservancy, 2012)

2.6.3 Upland Habitat

Upland habitat that exists further inland serves as a linkage between aquatic habitats. Within the Subregion, these habitats include the Los Angeles Coastal Plain and the Santa Monica Mountains to the north. A majority of the coastal plain has been urbanized, which inhibits linkage between aquatic habitats. The small portion of the Santa Monica Mountains in the northern portion of the Subregion are by contrast mostly open space and free of development, but impacted by invasive species and water quality issues. (RWQCB, 2011) PVPLC has developed preserves in upland areas, including the following: Agua Amarga, Three Sisters, Upper Filiorum, Portuguese Bend, and San Ramon. In addition, Rolling Hills Estates has established the Linden H. Chandler Preserve and the George F. Canyon Nature Preserve, and San Pedro has established the Fuel Depot managed area and the White Point Nature Preserve.

4 Partnership and Multi-benefit Opportunities

Many agencies and other entities have successfully been working together for decades on many collaborative projects. For instance in this Subregion, the entire system of flood management, conservation of local water supply, and recreation is a longstanding set of activities and facilities that represents collaboration and integration among the Los Angeles County Flood Control District, ~~West Basin~~ MWD, the Water Replenishment District, other water agencies, LA County Dept of Parks & Recreation and others. Projects that seek to enhance or extend these existing activities should be encouraged, because often they will be the most cost-effective.

Implementation of projects is the vehicle to meeting the objectives and planning targets discussed in Section 3. Integration and collaboration can help these projects achieve synergies and, at times, increase their cost-effectiveness in meeting multiple objectives. In addition to the collaboration described above, the GLAC IRWM Region will continue to build upon a wealth of potential multi-benefit project opportunities for partnership projects including:

- **Local Supply Development:** Alternative supply development such as distributed stormwater capture projects are often too costly for a water supply agency to construct on their own for water supply purposes only. The near-term unit cost can be well in excess of the cost of imported water. However, partnerships often help to share the costs, thus providing opportunities for more complex, multi-benefit projects (such as water quality improvement) that otherwise might not be accomplished.
- **Improving Stormwater Quality:** In preparing this update of the IRWM Plan, a methodology to identify priority drainage areas based on their ability to improve water quality for the coastal and terrestrial waters was developed. Integrated projects that can provide water quality benefits can be cited relative to that prioritization to achieve the highest benefits.
- **Integrated Flood Management:** Earlier studies, such as the Sun Valley Watershed Management Plan (2004), demonstrated the potential for similar cost-effective synergies between flood control, stormwater quality management, water supply, parks creation and habitat opportunities. Flood control benefits usually achieved through significant traditional construction projects can sometimes be accomplished with alternative multi-benefit projects.
- **Open Space for Habitat and Recreation:** When habitat is targeted for restoration, there are often opportunities for cost-effective implementation of flood control, stormwater management and passive recreation (such as walking and biking trails) as well.

These benefit synergies and cost effectiveness outcomes can best be attained when the unique physical, demographic and agency service area attributes of the region are considered. In addition to existing collaborative processes, the GLAC IRWMP has developed the geodatabase tool to assist in identifying areas and partnerships conducive to both inter-subregional and intra-subregional integrated project development. This section discusses these tools as well as some preliminary analyses on the South Bay Subregion's potential partnerships and integrated project opportunities.

4.1 GLAC IRWMP Integration Process and Tools

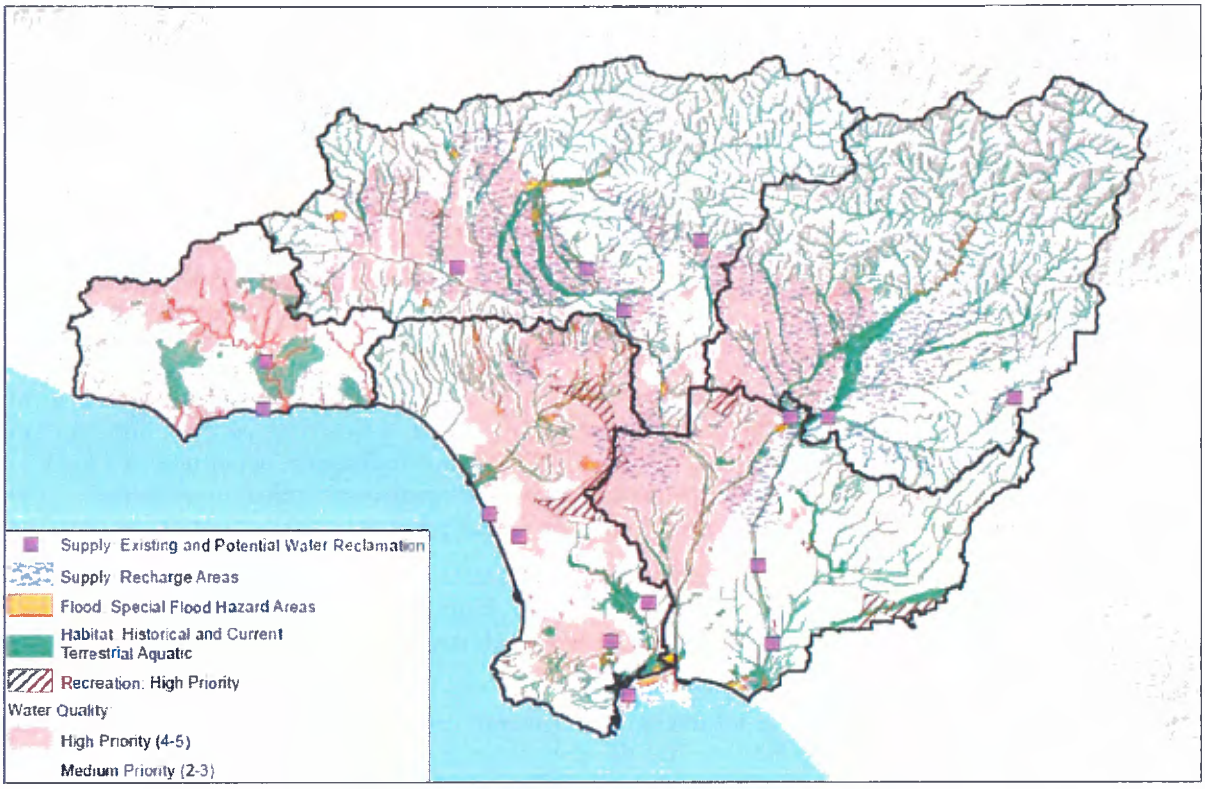
As part of the objectives and targets update process, the GLAC Region compiled and developed several geo-referenced data layers to assist in spatially identifying priorities and potential opportunities to achieve water supply, water quality, habitat, recreation and flood management benefits. These data layers were initially used individually to determine the objectives and planning targets for each water management

area. However, these datasets can also be overlaid to visually highlight areas with the greatest potential to provide multiple benefits. The resulting Potential Benefits Geodatabase (Geodatabase) can also align these areas relative to other layers containing agency service areas and jurisdictions – allowing for project proponents and partners to be identified.

Potential Benefits Geodatabase

The GLAC IRWMP Potential Benefits Geodatabase is a dynamic tool that should be updated as new data is made available in order to maintain its relevance in the IRWM planning context. However, in order to provide an analysis of potential integration and partnership opportunities for the 2013 GLAC IRWM Plan, current data layers were overlaid and analyzed. The key layers used are shown in Figure 14 and described in Table 11. It should be noted that these datasets may not be complete or in need of further refinement and therefore will be updated on an as-needed basis – which is part of the dynamic process previously described. Therefore, the Geo-database should only be used as an initial step in identifying multi-benefit potential and by no means used to invalidate the potential for achieving benefits in other areas.

Figure 14: GLAC Region Potential Benefits Geodatabase Layers



Using the Geodatabase

The Geodatabase is a dynamic visual tool. The data layers and maps shown in this Section are only some of a multitude of ways to package and view the datasets to help with the integration process. It is important to note that not all data that could be useful in identifying integration and partnership potential for the region is easily viewed spatially in this format. ~~Therefore~~Therefore, the Geodatabase should only be used as one of several potential integration tools or methods.

The Geodatabase can also be used to identify the potential for further integration between existing projects included in an IRWMP. Currently the GLAC Region has web-based project database (OPTI) that

References

Bay Restoration Foundation, 2011. *Ballona Wetlands.* http://www.santamonicabay.org/ballonarestoration.html

Beverly Hills, City of, 2011. *2010 Urban Water Management Plan.*

City of Santa Monica, April 12, 2017. *Summary of Perchlorate Contamination in Santa Monica Basin.*

Friends of Madrona Marsh, 2012. *Explore the Marsh.* http://www.friendsofmadronamarsh.com/j/index.php?option=com_content&view=category&layout=blog&id=34&Itemid=53

Los Angeles, City of, 2011. *2010 Urban Water Management Plan.*

Los Angeles County Department of Regional Planning (LACDRP), 2011. *Los Angeles County General Plan 2035.* Public Review Draft.

Metropolitan Water District of Southern California (MWD), 2010. *Integrated Regional Plan.*

MWD, 2007. *Groundwater Assessment Study.* Report Number 1308. http://www.mwdh2o.com/mwdh2o/pages/yourwater/supply/groundwater/GWAS.html

Palos Verdes Peninsula Land Conservancy, 2011. *Restoration and Land Stewardship.* http://www.pvplc.org/_lands/stewardship.asp

Regional Water Quality Control Board - Los Angeles Region (RWQCB), 2011. *State of the Watershed - Report on Water Quality, The Santa Monica Bay Watershed Management Area.* 2nd Edition.

RWQCB, 2011b. Shapefiles of Permitted Storm Sewer System (MS4) Discharges, Industrial General Discharges, and Caltrans Discharges.

RWQCB, 2008. *State of the Watershed - Report on Surface Water and Sediment Quality, The Dominguez Channel and Los Angeles/Long Beach Watershed Management Area.* November.

Sanitation Districts of Los Angeles County (SDLAC), 2012. *Bixby Marshland.* http://www.lacsd.org/wastewater/wwfacilities/jwpcp/bixbymarshland.asp

SDLAC, 2010. *Machado Lake Ecosystem Rehabilitation Project and Wilmington Drain Multi-Use Project.* http://www.lacitysan.org/wpd/Siteorg/LAPropO/sitefiles/Machado/machadointro.htm

Santa Monica, City of, 2011. *2010 Urban Water Management Plan.*

State Water Resources Control Board (SWRCB), 2010. *2010 Integrated Report (Clean Water Act Section 303(3) List / 305(b) Report) - Statewide.* http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

Southern California Association of Governments (SCAG), 2012. *Adopted 2012 RTP Growth Forecast.* http://www.scag.ca.gov/forecast/index.htm

Torrance, City of, 2011. *2010 Urban Water Management Plan.*

L. Upper Los Angeles River Subregional Plan

Upper Los Angeles River Subregional Plan

Final

Prepared by:

RMC
Water and Environment

In Association with:

Geosyntec
consultants

Amended October 2017

Lincoln Park Lake	
Nutrients: Ammonia, Eutrophic, Organic Enrichment/Low Dissolved Oxygen, Odor	Lincoln Park Lake TMDLs
Trash	
Lead	No TMDL necessary as lead determined to be meeting numeric targets

1. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report

Table 7: 303(d) Listed Waters without Approved TMDLs

303(d) Listed Waters and Impairments[1]
Arroyo Seco
Benthic-Macroinvertebrate Bioassessments
Burbank Western Channel
Cyanide
Los Angeles River
Oil

1. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report

Groundwater Quality

Groundwater quality in the ULARA Basins is managed by the ULARA Watermaster which reports on water quality, treatment and remedial investigation activities in its annual report. The overall quality of the ULARA Basins is generally within the recommended limits of drinking water standards, except for those areas of concern listed in Table 8. Groundwater pumped from these areas (for those wells that haven't been shut down) are treated to meet state drinking water standards.

Within the San Fernando Valley, three Operable Units (OUs) have been created as part of long-term groundwater remediation activities in the San Fernando Basin. These OUs include: 1) North Hollywood OU due to VOC contamination, 2) Burbank OU due to VOCs and hexavalent chromium, and 3) Glendale North and South OUs due to VOCs. Various groundwater quality investigations are also taking place throughout the ULARA Basins to determine the cause and extent of the above listed contamination.

Table 8: Groundwater Quality Concerns in the ULARA Basins

Basin Area	Water Quality Concern
San Fernando Basin – eastern portion	TCE, PCE, hexavalent chromium, nitrate
San Fernando Basin – western portion	Sulfate, TDS
Verdugo Basin	MTBE, nitrate
Sylmar Basin	nitrate

Raymond Basin groundwater quality is managed by the Raymond Basin Management Board. This basin provides potable supply, with good to fair groundwater quality in most areas. Constituents of concern include TDS, nitrate, perchlorate, and VOCs. There is one Superfund site located at the Jet Propulsion Laboratory (JPL) due to liquid waste seepage which released perchlorate and VOCs into the groundwater. Water agencies which pump from the Raymond Basin have treatment facilities in place to treat groundwater for VOCs and Perchlorate.

Within the ULAR Subregion (San Fernando, Sylmar and Verdugo Basins), nitrate and hexavalent chromium contamination are known to be prevalent. As of June 2017, there are no known impacts to communities, as mitigation is currently underway. Water agencies that pump water must be compliant with all drinking water regulations. Currently, a number of efforts between City of Los Angeles, City of San Fernando, City of Burbank, City of Glendale, and Crescenta Valley Water District are underway to treat groundwater contamination. Figures 11, 12, and 13 show maps of hexavalent chromium and nitrate contamination in the Eastern Portion of the San Fernando Basin.

Figure 11: Eastern San Fernando Valley – Hexavalent Chromium (Cr6) Contamination Groundwater Plume Map

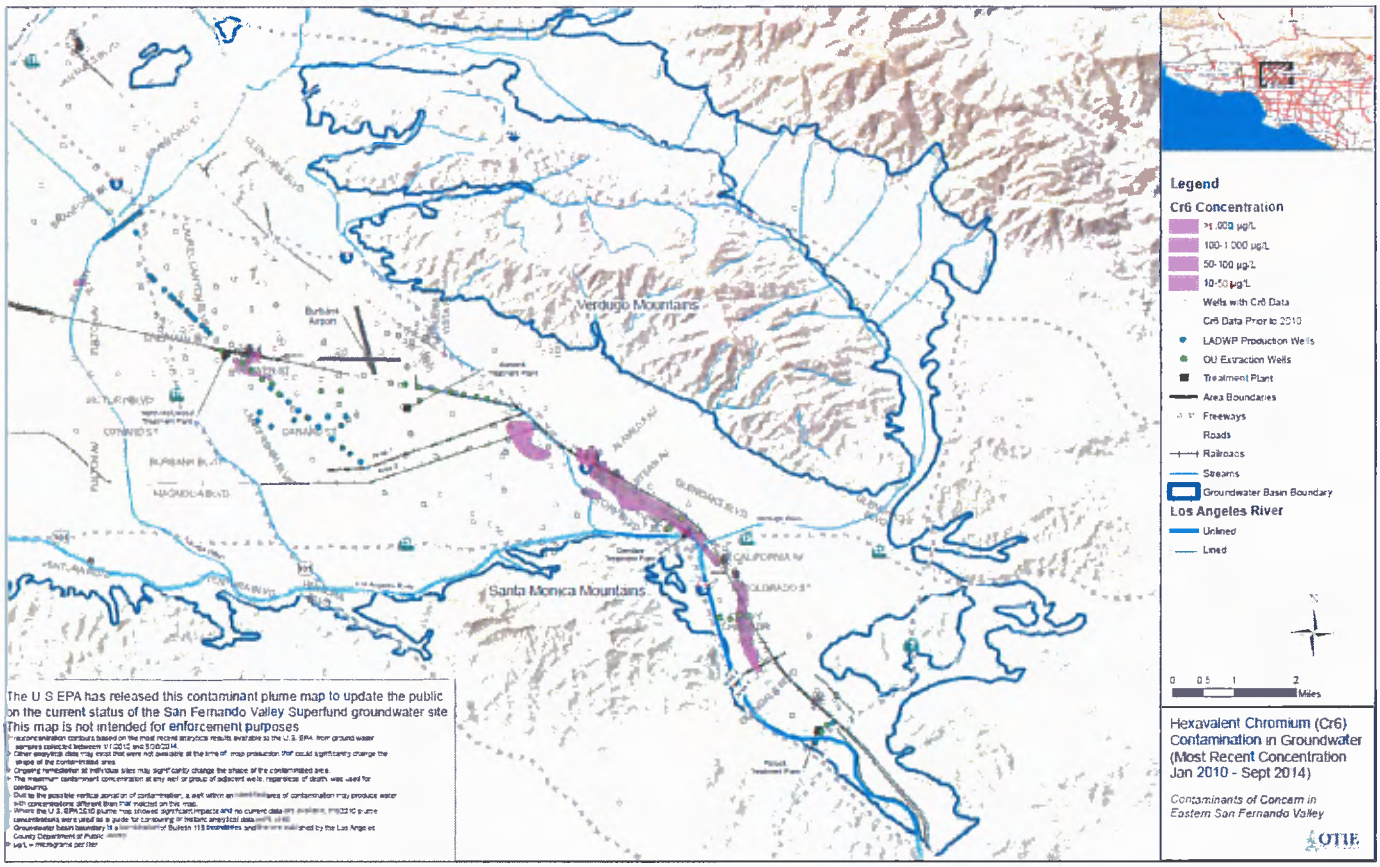


Figure 12: Eastern San Fernando Valley – Hexavalent Chromium (Cr6) Contamination Groundwater Plume Map

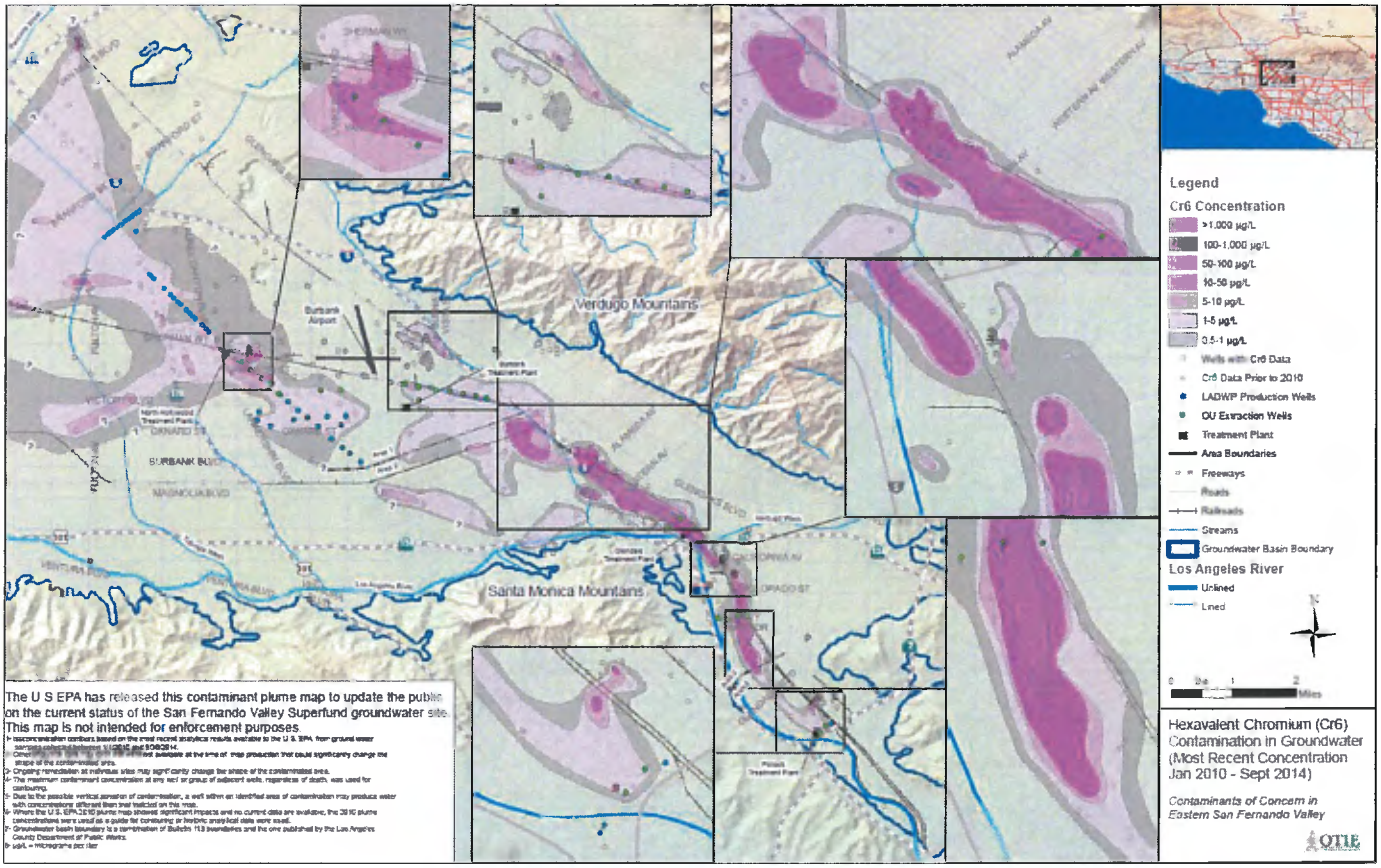
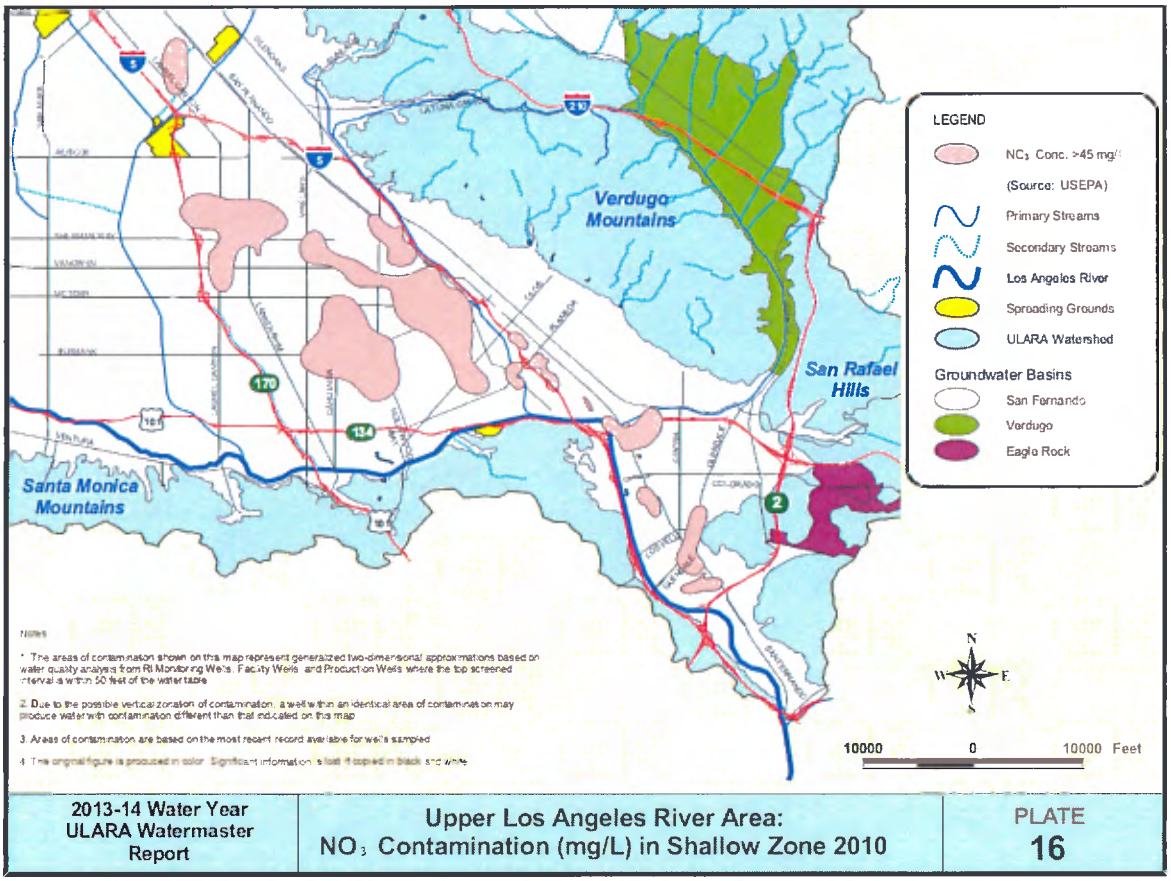


Figure 13: Eastern San Fernando Valley – Nitrate Contamination Groundwater Plume Map



M. Upper San Gabriel River and Rio Hondo Subregional Plan

Upper San Gabriel River and Rio Hondo Subregional Plan

Final

Prepared by:

RMC
Water and Environment

In Association with:

Geosyntec
consultants

Amended October 2017

Groundwater Quality

Groundwater quality in the San Gabriel Basin (which includes all basins discussed in the Groundwater Supply section except for Raymond Basin and Six Basins) is managed by the Main San Gabriel Basin Watermaster (Watermaster) under its authority from the court. The Watermaster administers the Main San Gabriel Basin Judgment and enforces its provisions which establish water rights and responsibility for management of quantity and quality of the groundwater. They review and adopt their "Five-Year Water Quality and Supply Plan" each year. In addition, the San Gabriel Basin Water Quality Authority (WQA) was created by the state legislature to promote improvement of groundwater quality in the San Gabriel Basin. Their Basin-wide Groundwater Quality Management and Remediation Plan is reviewed and adopted annually. This plan includes all projects that the WQA is facilitating, and identifies various funding sources to ensure full funding for each project. The San Gabriel Valley's groundwater basin has water quality issues across the basin that are being addressed by WQA projects with a focus on 1) accelerating removal of contaminant mass in the basin, 2) preventing migration of contamination into critical groundwater supplies, 3) integrating cleanup with water supply, and 4) minimizing economic impact to the public.

One of the primary constituents of concern in the groundwater basins of the Subregion is volatile organic compounds (VOCs) which are used primarily in industrial and commercial activities. Over time, VOCs have leached into the groundwater from ground disposal of chemicals. Additionally, the basins ~~has~~ have been found to have high levels of NDMA, nitrate, perchlorate, and TDS, primarily caused by industrial and commercial activities. Also, hexavalent chromium, arsenic, and radon have been detected as well. Groundwater quality specific to each basin will be discussed below.

Water pumped from the Main San Gabriel Basin is used as potable supply. Though water quality is good in most areas, constituents of concern for the Main San Gabriel Basin include high TDS, nitrate, VOCs, perchlorate, and NDMA. Hexavelent chromium has also been detected at low levels. Due to industrial and commercial contamination, five Operable Units (OUs) have been defined by the US EPA's Superfund Program: Baldwin Park OU, El Monte OU, Puente Valley OU, Whittier Narrows OU, and Area 3 OU. Each of these OUs has a specific plan laid out to address contamination remediation. ~~Several~~Many treatment facilities are in place to treat groundwater pumped out of this basin. (San Gabriel Basin Water Quality Authority, 2012)

The Puente Basin underlies an area in the south east portion of the Subregion and is managed by the Puente Basin Watermaster. Puente Basin groundwater is used as a non-potable supply due to its poor quality, and is used for blending with recycled water, construction water and irrigation. Constituents of concern include TDS, Nitrate, hexavalent chromium, and VOCs. Remediation is underway to ~~remove VOCs~~address these contaminants in the US EPA's Puente Valley Operable Unit which is located in the western portion of the basin. (MWDSC, 2007)

Six Basins has varying water quality, much of which can easily be considered potable through blending or other simple remediation efforts. Primary constituents of concern include nitrate, perchlorate and VOCs. Some areas also have high levels of arsenic and radon. Several of the pumpers in Six Basins treat the groundwater for these contaminants. New projects to offset the shutdown of wells due to water quality have been considered and studies are being completed to determine a means of improving this area's groundwater quality. (MWDSC, 2007)

The Raymond Basin underlies the north-western portion of the Subregion and is managed by the Raymond Basin Management Board. This basin provides potable supply, with good to fair groundwater quality in most areas. Constituents of concern include TDS, nitrate, perchlorate, and VOCs. There is one Superfund site located at the Jet Propulsion Laboratory (JPL) due to liquid waste seepage which released perchlorate and VOCs into the groundwater. Water agencies which pump from the Raymond Basin have treatment facilities in place to treat groundwater for VOCs and Perchlorate. (MWDSC, 2007) ~~This basin is an unmanaged basin primarily used as a non-potable supply due to water quality issues. Constituents of concern include nitrate and TDS. Perchlorate and VOCs have also been detected in the basin.~~

O. Climate Change Vulnerability Exercise

GLAC-IRWMP
Climate Change Vulnerability Exercise

The GLAC IRWM Climate Change Subcommittee ~~conducted an exercise to answer~~ a vulnerability ~~questions~~ assessment aligned with ~~taken from~~ Box 4-1 of the *Climate Change Handbook* ~~and associated the answers with~~ concerning potential water management issues/vulnerabilities. Table 1 summarizes the analysis and was updated based upon the latest local climate research within the Los Angeles region. Qualitative vulnerability questions are framed to help assess resource sensitivity to climate change and prioritization of climate change vulnerabilities within a region. Answers to vulnerability questions are given for the GLAC Region with local examples provided as justification for the answer.

Table 1: Climate Change Vulnerability Indicator Questions

Vulnerability Question	Answer	Justification	Vulnerability
Water Demand			
Are there major industries that require cooling/process water in your planning region?	N	Oil companies in southern harbor areas primarily use recycled water for cooling. Scattergood plus other OTC power plants use ocean water for cooling but OTC Policy moving plants off OTC. Aerospace industry needs cooling water, but is considered to be downsizing its presence in the Region.	Industrial demand would increase: increased cooling needs due to higher temperatures
Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night- time cooling, be prohibitive for some crops?	Y	There are some small-scale farming plots but no major agriculture. Nurseries may be vulnerable, but uncertain if decreasing in size.	Agricultural demand would increase: evapotranspiration will increase per unit of biomass due to higher temperatures
Do groundwater supplies in your region lack resiliency after drought events?	N	Groundwater basins are relatively large in size and have replenishment requirements. During the last drought, however, Main San Gabriel Basin levels were in their lower range, but still had opportunity to recharge. The recharge potential of the Region's basins has not been fully realized and it is critical to further increase recharge so as to offset imported supply and provide longer term and seasonal storage.	Lack of groundwater storage: to buffer drought conditions
Are water use curtailment measures effective in your region?	Y	Demand has decreased as a result of conservation programs. Region is already concerned about meeting 20% by 2020 potable use reduction, even without climate change effects.	Decrease ability to meet conservation goals: due to saturation conservation programming or inability to conserve further
Does water use vary by more than 50% seasonally in parts of your region?	Y	Current climate requires a strong peak in summer demand for irrigation.	Limited ability to meet higher peaks in demand (both seasonally and annually): infrastructure sized to only existing demand peaks.
Are some in-stream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?	N	The Regional Board requires Tapia WRF to discharge to Malibu Creek when minimum flow criteria are met to provide sufficient aquatic habitat. However, climate change may increase vulnerability.	Habitat demand would increase: exacerbated by decreased flows, which are already challenging
No specific question called out in handbook – but vulnerability issue was identified independently.	Y	Increasing population in areas of Region that will have higher temperatures and lower precipitation as a result of climate change. Older development is in cooler and drier parts of the region while more recent development and current development pressure is in hotter and drier areas.	Municipal demand would increase: exacerbated by distribution of population increases

Vulnerability Question	Answer	Justification	Vulnerability Issue
Water Supply			
Does a portion of the water supply in your region come from snowmelt?	~~Y~~N	~~Some~~ The local supply ~~comes~~ from snowmelt in the San Gabriel Mountains is generally negligible and annual rainfall is the key indicator for the health of the local water supply.	Minimal ~~D~~decrease in local surface supply: Due to decrease in local snowpack
Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?	Y	Large portion of the Region's supply comes from imported water (both direct uses and replenishment).	Decrease in imported supply: Due to decreases in SWP and Colorado supplies
Would your region have difficulty in storing carryover supply surpluses from year to year?	Y	Large system of groundwater basins allows the Region to store seasonal and annual supply in basins, but can only capture so much from storms given limited recharge facility area available Other parts of the Region without groundwater basins have limited or no capacity to carry over supply surpluses.	Decrease in seasonal water reliability: given recharge facilities and decreases in local and imported surface supply
Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?	Y	Santa Monica and West Coast Basins have salt water intrusion issues. Seawater intrusion barriers have operated since 1950s to mitigate these impacts, however SLR will further exacerbate the current situation.	Decrease in coastal groundwater supply: due to sea level rise increasing intrusion
Has your region faced a drought in the past during which it failed to meet local water demands?	Y	There have been droughts in the Region where normal demands were not able to be met so drought management plans were implemented to reduce demands to be more in-line with available supplies. In this way demands were met.	Reduced resiliency to drought: Increased need for rationing and other drought response
Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?	Y	Arundo, quagga mussels (aqueducts) have been detected and could increase -already decreasing infrastructure reliability as well as alter flood regimes and alter wildfire regimes.	Invasives can reduce supply available: Increased invasives leads to increased water consumption (and flood and wildfire regimes)
Water Quality			
Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?	Y	The 2009 Station fire and others caused great damage and sedimentation issues from large increases in erosion.	Increased erosion and sedimentation: leads to decreased water quality, available supply

Vulnerability Question	Answer	Justification	Vulnerability Issue
Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?	Y	Many of the Region's local surface waters are 303(d) listed for nutrient issues	Increased nutrient loading and decreased Dissolved Oxygen: leads to decreased water quality through eutrophication
Are seasonal low flows decreasing for some water bodies in your region? If so, are the reduced low flows limiting the water bodies' assimilative capacity?	Y	Most streams in the region are naturally ephemeral or intermittent. For example, some streams that were once intermittent are now perennial after being channelized to a depth below the summer water table. Natural streams may have decreased flow, but the only gauged streams are those with significant anthropogenic alteration in upstream watersheds. Seasonal low flows in effluent dependent water bodies are decreasing given conservation and recycled water use. Assimilative capacity is already compromised since normal dry season flows are low. Any amount of pollutants added to small volumes of water during low flow will have a proportionally large effect.	Decreased dilution flows: to help dilute contaminants
Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?	Y	There are many beneficial uses in the Region which are not being met. For example, beach closures and fishing restrictions have occurred in the past.	Decrease in recreational opportunity: from poor water quality
Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?	Y	Some areas that treat local surface water have issues with turbidity and first flush contaminant levels during high flows. High intensity storms can also disrupt biological wastewater or stormwater treatment processes that may affect minimum standing time and discharge water quality	Increase in source control or surface water treatment: for surface waters to meet increases in contaminants

Vulnerability Question	Answer	Justification	Vulnerability Issue
Sea Level Rise			
Has coastal erosion already been observed in your region?	Y	Malibu, Santa Monica, and Palos Verdes areas	Decrease in land: From erosion along coasts
Are there coastal structures, such as levees or breakwaters, in your region?	Y	Marina areas and ports have breakwaters~~.~~; the Ballona Creek channel outlet is a levee.	Damage to coastal infrastructure/recreation/ tourism: Due to sea level rise
Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?	Y	Examples of areas at risk due to SLR include wastewater treatment (e.g. Hyperion, Terminal Island), stormwater outfalls at beaches, beach recreation features, also potential for planned desalination facilities. Residences (including DACs) and other non-water-related infrastructure/recreation are also at risk along coastal areas of the Region.	
Is there land subsidence in the coastal areas of your region?	N	Nothing prevalent known	
Are there areas in your region that currently flood during extreme high tides or storm surges?	Y	The FEMA definition of flooding includes coastal wave uprush. There have been flooding events along the coast when high tides and storm surges coincide, generally during El Nino events.	
Are there climate-sensitive low-lying coastal habitats in your region?	Y	Ballona Wetlands and Malibu Lagoon are examples.	Damage to ecosystem/ habitat: Due to sea level rise
Do tidal gauges along the coastal parts of your region show an increase over the past several decades?	N	There have been documented increases, however, this just indicates that climate change is occurring but is not a vulnerability issue.	No issue just indicates that climate change is happening
Flooding			
Does critical (water/wastewater) infrastructure in your region lie within the 200-year floodplain?	Y	Assuming yes	Increases in inland flooding
Does aging critical flood protection infrastructure exist in your region?	Y	See Appendix G Flood Management Objectives and Targets.	
Have flood control facilities (such as impoundment structures) been insufficient in the past?	Y	Regionally there has generally been sufficient protection, but there is still some localized flooding. Debris basins have been insufficient in the past (O&M issue) and caused debris flows. Long Beach, San Pedro Sun Valley are example areas with inland flooding issues.	

Vulnerability Question	Answer	Justification	Vulnerability Issue
Are wildfires a concern in parts of your region?	Y	Annual occurrence of wildfires	Increases in flash flooding and debris flows
Does part of your region lie within the Sacramento-San Joaquin Drainage District?	N	Not applicable	No issue since it is out of Region
Ecosystem and Habitat			
Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?	Y	Ballona Wetlands, and Malibu Lagoon other riparian areas	Increased impacts to habitat and flow availability for species: from various current issues and those associated with climate change
Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?	Y	Malibu Lagoon and Ballona Wetlands are examples	
Do climate-sensitive fauna or flora populations live in your region?	Y	Numerous species dependent upon the Mediterranean climate live in the Region	
Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?	Y	Los Angeles River does not yet have flow requirements but could have them in the future – however there are current stressors on aquatic life. There are minimum flow requirements to sustain steelhead trout habitat in Malibu Creek that trigger a requirement to discharge recycled water each summer.	
Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?	Y	A number of endangered and threatened species exist in the Region. The Region is the southern limit to endangered southern steelhead trout; climate change could alter their extent.	
Does the region rely on aquatic or water- dependent habitats for recreation or other economic activities?	Y	Beach tourism, creeks and lakes recreation, creek riparian habitat and river adjacent trails	
Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?	Y, Y, N	The Region has natural aquatic habitat areas that are severely fragmented by channelization, impassible culverts and lost riparian areas. There are some corridors, but no new known infrastructure projects are planned that would further fragment aquatic habitat.	

Vulnerability Question	Answer	Justification	Vulnerability Issue
Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?	Y	Not frequent storms but there are exposed beaches and habitats that are at risk during El Nino storm events.	Decrease in habitat protection against coastal storms.
Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?	N	None listed.	
Hydropower			
Is hydropower a source of electricity in your region?	Y	Small hydropower projects	Decrease in hydropower potential.
Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?	Y, N	No future known plans for hydropower generation	

P. Other Planning Documents (October 2017)

Appendix P. Planning Documents (Sept. 2017)		
SUB-REGION	**Plan Name**	**IRWMP Incorporation**
Lower San Gabriel & Los Angeles River	1. Los Angeles River Upper Reach 2 Watershed Management Plan	10/23/2016
	2. Gateway Integrated Regional Water Management Plan	02/22/2017
	3. Los Cerritos Channel Watershed Management Plan	10/25/2017
	4. Lower Los Angeles River Storm Water Resource Plan	10/25/2017
	5. Long Beach Nearshore Stormwater Resource Plan	10/25/2017
	6. Lower San Gabriel River Storm Water Resource Plan	10/25/2017
North Santa Monica Bay	7. Malibu Creek Watershed Stormwater Resource Plan	10/23/2016
	8. North Santa Monica Bay Coastal Watersheds Enhanced Watershed Management Program / Stormwater Resource Plan	10/23/2016
South Bay	9. Dominguez Channel Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	10. Ballona Creek Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	11. Santa Monica Bay Jurisdictions 2 & 3 Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	12. Palos Verdes Peninsula Watershed Management Group Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	13. Beach Cities Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	14. Machado Lake Watershed Enhanced Watershed Management Plan	10/23/2016
	15. Marina Del Rey Watershed Enhanced Watershed Management Program Plan	10/23/2016
Upper Los Angeles River	16. Los Angeles Stormwater Captures Master Plan	10/23/2016
	17. Upper Los Angeles River Enhanced Watershed Management Plan	10/23/2016
Upper San Gabriel and Rio Hondo	18. East San Gabriel Valley Watershed Management Stormwater Resource Plan	10/25/17
	19. Rio Hondo/San Gabriel River Enhanced Watershed Management Program Stormwater Resource Plan	10/23/2016
	20. Upper San Gabriel Enhanced Watershed Management Program Plan	10/23/2016