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UPPER SANTA CLARA RIVER WATERSHED MANAGEMENT GROUP

Enhanced Watershed Management Program

submitted by

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PARADIGM ENVIRONMENTAL

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Executive Summary

The Upper Santa Clara River Enhanced Watershed Management Program Group (USCR EWMP Group), which includes the City of Santa Clarita (City), Los Angeles County (County), and Los Angeles County Flood Control District, collaboratively developed an Enhanced Watershed Management Program (EWMP) to comply with requirements in their Municipal Separate Storm Sewer System (MS4) Permit (Permit). The EWMP allows collaboration among agencies on multi-benefit regional projects to retain both non-stormwater and stormwater runoff, as well as to facilitate flood control and increase water supply.

The Santa Clara River watershed is distinctive compared to other watersheds in the region, in that it is predominantly open space - nearly ninety percent of the watershed is open space with approximately eighty-eight percent being undeveloped land. The watershed contains one of the last remaining natural rivers in Southern California. The Upper Santa Clara River watershed (USCRW) presents unique challenges for maintaining the balance of population growth, agricultural beneficial uses, conservation of endangered species habitat, floodplain management, water supply and wildlife corridors that depend on the Santa Clara River and its floodplain. A map of the USCRW, showing the EWMP area, County area, and Santa Clara River reach designations, is shown in Figure ES-1.

This EWMP has been developed to meet the state issued Permit requirements to protect these beneficial uses of the Upper Santa Clara River watershed receiving waters while recognizing these unique characteristics. The EWMP was developed through a stakeholder comment process involving Permittees as well as the Regional Board, United States Environmental Protection Agency (USEPA), nongovernmental organizations (NGOs), citizens, the development community, Santa Clarita Valley family of water providers, Santa Clarita Valley Sanitation Districts, Integrated Regional Water Management Group members and other interested parties. The components of the EWMP are summarized below.

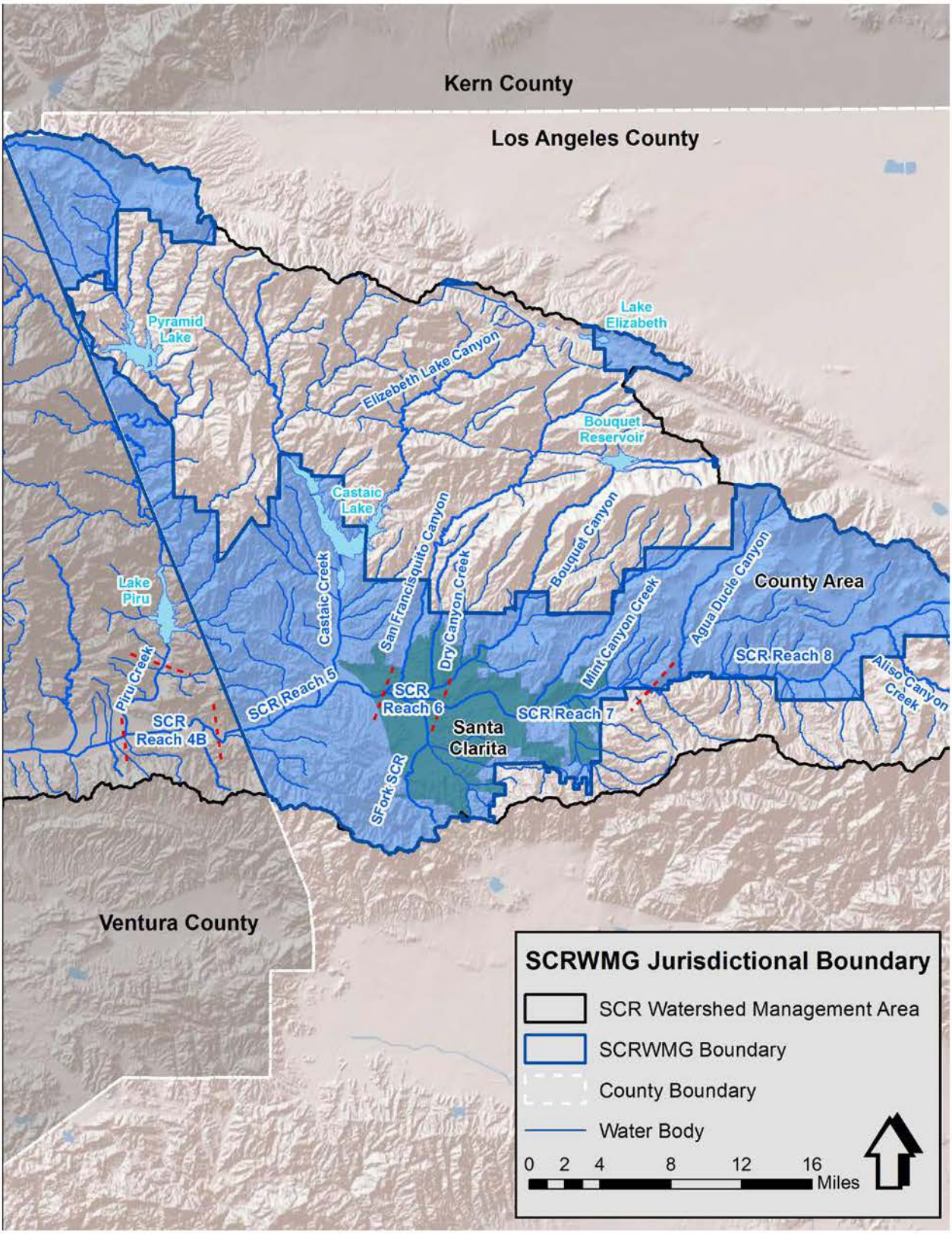


Figure ES-1. Upper Santa Clara Watershed Management Group EWMP Area

WATER QUALITY PRIORITIES

As the first step in the EWMP process, the water quality priorities were identified. The water quality priorities provide the basis for prioritizing selection and scheduling of control measures for the EWMP. The current water quality conditions, including both discharge and receiving water, were characterized based on a comparison of available data with applicable water quality objectives. Then, water body-pollutant combinations (WBPC) were classified according to the following three categories specified in the Permit:

> **Category 1 (Highest Priority)** -- WBPCs subject to an existing TMDL;
>
> **Category 2 (High Priority)** -- WBPCs that are either on the State Water Resources Control Board's 2010 Clean Water Act 303(d) list, or having sufficient exceedances to be listed; or
>
> **Category 3 (Medium Priority)** -- WBPCs with insufficient data to be included on the 303(d) list, but exceed applicable water quality objectives. Also includes water quality conditions that are not pollutants (for example, odor).

The categories were further subdivided to provide more support for the prioritization and sequencing of control measures in the EWMP, and constituents were assigned to classes. Pollutants in each class have similar fate and transport mechanisms and can be addressed by the same types of control measures.

A source assessment was conducted to identify potential sources for water quality priorities from MS4 discharges based on a review of available data and information. The source assessment provides a list of potential MS4 sources that are likely to be present in the USCR EWMP area and could be contributing to any exceedances observed in the receiving waters, which include the Upper Santa Clara River and its tributaries.

Based on the results of the classification and a source assessment, the priority constituents were identified. The prioritized constituents were utilized to direct the development of the EWMP towards the constituents of highest concern. The prioritized WBPCs are shown in **Table ES-1**.

Table ES-1. Prioritized WBPCs

Class	Constituent	Santa Clara River Reach			
		4B[1]	5	6	7
Priority 1: TMDLs					
Bacteria	*E. Coli* (wet and dry)	X	X	X	X
Salts	Chloride	X	X	X	
Priority 2: Other Receiving Water Considerations					
Metals	Copper		X[2]	X	X[4]
	Iron		X	X	
	Mercury		X[2]	X[3]	X[4]
	Zinc			X[3]	
Selenium	Selenium			X[3]	
Cyanide	Cyanide			X[3]	X[4]
Salts	TDS		X[2]		

1. Reach 4B is in Ventura County but was considered for the purposes of understanding downstream water quality.
2. Copper, mercury and TDS have been observed as exceeding applicable water quality objectives in Reach 5, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.
3. Mercury, zinc, selenium and cyanide have been observed as exceeding applicable water quality objectives in Reach 6, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.
4. Copper, mercury and cyanide have been observed as exceeding applicable water quality objectives in Reach 7, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.

WATERSHED CONTROL MEASURES

The Permit requires the identification of strategies, control measures, and best management practices (BMPs), collectively referred to in the Permit as Watershed Control Measures (WCMs), which could be implemented individually or collectively at the watershed-scale to comply with water quality objectives. The EWMP incorporates existing and planned stormwater BMPs, and also includes evaluations of additional potential control measures.

Two overarching categories of BMPs are included in the EWMP:

- **Structural BMPs** that retain, divert or treat stormwater and/or non-stormwater, and include low-impact development (LID), green streets/green infrastructure, and regional BMPs.
- **Institutional BMPs** that encompass the Minimum Control Measures (MCMs) outlined in the Permit, other non-structural BMP's, and any other source control measures.

Structural BMPs will achieve the majority of required pollutant reduction required after source reduction measures have been implemented. Regional multi-benefit projects were prioritized in the EWMP development process, as emphasized in the Permit. Regional projects are centralized facilities located near the downstream ends of large drainage areas (typically treating 10s to 100s of acres). In identifying regional BMPs, consideration was also given to the variety of benefits beyond stormwater management that could be obtained through project implementation, including water supply augmentation, community enhancement, and habitat restoration.

The MCMs provided in the Permit were evaluated during EWMP development, and customized to address water quality priorities. The customization of MCMs was evaluated separately for the

City and the County. Results of the evaluation demonstrated similarities in agencies' approaches to inspections and outreach programs. Both agencies intend to modify these types of programs to focus on the water quality priorities identified within the EWMP. In addition, the City identified several MCM modifications and enhancements to better coordinate with existing programs and provide additional focus on pollutants that are water quality priorities.

REASONABLE ASSURANCE ANALYSIS

A key component of the EWMP is the Reasonable Assurance Analysis (RAA), which uses computer modeling to demonstrate that the selected WCMs will result in compliance with applicable water quality-based effluent limitations (WQBELs) and receiving water limitations (RWLs) in Parts V.A and V1.E and Attachment L of the Permit. The RAA is a Permit required analysis to determine the full scope of what might be needed to meet water quality objectives. This analysis used a comprehensive watershed model of the entire Santa Clarita Valley area (the Watershed Management Modeling System, WMMS) that identifies cost-effective water quality improvements through an integrated, watershed-based approach. The WMMS incorporates three modeling tools to predict pollutant loading, simulate control measure performance, and optimize/select control measures based on cost-effectiveness.

The RAA was used to evaluate the many different scenarios/combinations of institutional, distributed and regional control measures that could potentially be used to comply with the Permit, and was then used to select the control measures specified in the EWMP Implementation Plan.

EWMP IMPLEMENTATION PLAN

The EWMP Implementation Plan outlines the proposed control measures and implementation process for the EWMP for the City and County to address Water Quality Priorities and comply with the provisions of the Permit based on the information available today. The plan may change over time through adaptive management based on monitoring results and updated modeling. Through the RAA, a series of quantitative analyses were used to identify the capacities of LID, green streets and regional BMPs that comprise the EWMP Implementation Plan. The RAA is also to assure those control measures will address the Water Quality Priorities and water quality objectives per the milestones/compliance schedules. Opportunities for regional BMPs that provide additional benefits beyond water quality improvements, with a focus on groundwater replenishment, have been identified and evaluated as part of the EWMP Implementation Plan. Additionally, enhanced MCMs, full capture devices for trash, and non-stormwater discharge investigations and abatement are components of the EWMP Implementation Plan. The EWMP Implementation Plan includes individual plans for each jurisdiction and each watershed/assessment area.

The scheduling and milestones for the EWMP have been carefully crafted to provide clear near term implementation actions and a structure for implementing additional actions to meet longer-term goals that leverage existing financial resources and account for the incorporation of future information. The scheduling of control measures for the EWMP Implementation Plan is based on the BMP-based milestones created by the USCR EWMP Group. The Group elected to develop milestones based on aggressive yet realistic implementation of institutional controls, high priority regional projects, and green streets over the next two five year Permit terms.

Implementation actions after the first two permit terms will be evaluated and assessed in accordance with the adaptive management process and are subject to modification. The scheduling of the EWMP Implementation Plan to achieve EWMP milestones is shown in **Figure ES-2.**

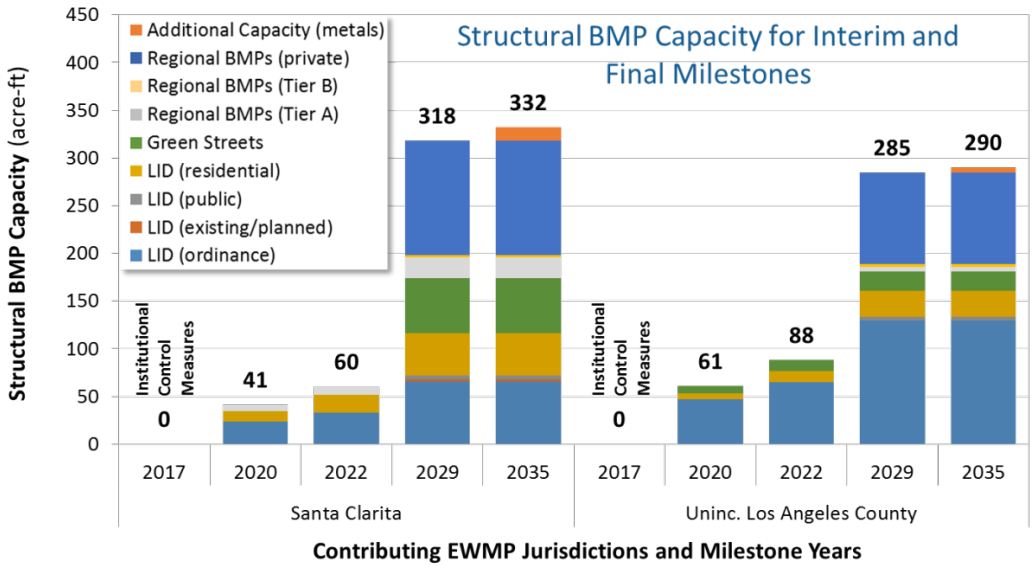


Figure ES-2. Scheduling of EWMP Implementation Plan to Achieve EWMP Milestones

COSTS AND FINANCIAL STRATEGY

The cost analysis estimates BMP-related costs associated with planning, design, permits, construction, operation, and maintenance for the selected WCMs. Planning-level construction capital costs for each milestone and for final compliance were developed using unit costs for individual construction components. The planning-level cost estimates are presented in **Table ES-2**. The implementation plan has been developed in consideration of the available financial resources and includes an implementation process that starts with the lowest cost actions (institutional controls/true source control) and progressively implements more costly controls by starting with high priority regional projects and projects on public lands, followed by implementation of projects on private parcels only if needed. The planning-level cost estimate is limited in that it does not consider the time value of money (interest, inflation, discount rates); operation and maintenance of structural facilities was assumed to be managed with existing resources; and unit costs did not take into account efficiencies in programmatic implementation or BMP construction.

Table ES-2. Cumulative Capital Cost Estimates for EWMP Structural BMPs[1,2]

Agency	Year/ Milestone	LID/Green Infrastructure Cost ($M)			Regional BMP Costs ($M)			Total Per Jurisdiction ($M)
		Public	Residential	Green Streets	Tier A[3]	Tier B	Private	
Santa Clarita	2020	---	$ 1.3	---	$ 8.5	---	---	$ 9.8
	2022	---	$ 2.2	---	$ 11.6	---	---	$ 13.8
	2029	$ 2.6	$ 5.3	$ 42.5	$ 27.9	$ 0.7	$ 258.3	$ 337.3
	2035	**$ 2.6**	**$ 5.3[4]**	**$ 42.5**	**$ 27.9**	**$ 0.7**	**$ 288.5**	**$ 367.5[5]**
Uninc. Los Angeles County	2020	---	$ 0.8	$ 5.7	$ 3.4	---	---	$ 9.9
	2022	---	$ 1.4	$ 9.2	$ 3.4	---	---	$ 14.0
	2029	$ 2.4	$ 3.3	$ 16.0	$ 3.4	$ 0.9	$ 217.7	$ 243.7
	2035	**$ 2.4**	**$ 3.3**	**$ 16.0**	**$ 3.4**	**$ 0.9**	**$ 230.2**	**$ 256.2**
EWMP Total		$ 5.0	$ 8.6	$ 58.5	$ 31.3	$ 1.6	$ 518.7	**$ 623.7[6]**

1. Operations and maintenance costs are not included in these planning-level estimates.
2. Costs are distributed proportional to contributing drainage areas, consistent with Appendix D-1.
3. These capital costs are rough estimates, prepared prior to any effort on conceptual design; they represent *minimum* investments to attain the budgetary milestones discussed in Section 7. Note that more detailed estimates presented in Appendix C-9 may exceed these minimum milestone requirements due to variations in design assumptions, and represent situations where costs may be shared with partnering agencies to achieve concurrent benefits.
4. **Bolded** numbers are the cumulative costs for each agency. For example, the Residential LID/Green Infrastructure cumulative cost for the City of Santa Clarita is $1.3M + 0.9M = $2.2M (2022); $2.2M + 3.1M = $5.3M (2029); $5.3M + 0 = $5.3M (2035).
5. The bolded numbers in the row for 2035 are added to get the total cost per jurisdiction.
6. $623.7 is the total cost for EWMP Structural BMPs.

The implementation actions planned through 2022 are based on best estimates of existing financial resources, but may require additional funding sources. Implementation actions after 2022 will likely require additional funding sources. The financial strategy describes the existing funding sources and the process that will be implemented to obtain the additional funding needed. Existing funding sources include the City's Stormwater Utility Fund, and the County and Flood Control District's general funds. The potential funding strategies to be considered include Enhanced Infrastructure Financing Districts (EIFD)s, State revolving fund loans, bonds, Prop. 1 grants, Integrated Regional Water Management (IRWM) grants, climate change funding, stormwater fees, collaborative opportunities with other agencies, and public/private partnerships. Constraints and challenges exist for all of the potential funding strategies, and as such, while the USCR EWMP Group will implement actions to gather the needed funding resources, the implementation of the actions outlined in the EWMP after 2022 is dependent on obtaining the additional resources. Additionally, to the extent additional funding is obtained earlier in the implementation schedule, those resources will be utilized to implement additional actions.

ASSESSMENT AND ADAPTIVE MANAGEMENT

Finally, an adaptive management approach was designed to address the EWMP planning process and the relationship between water quality monitoring, implementation scheduling, and BMP planning. Adaptive management is a critical component of the EWMP implementation process, and EWMP updates are required at two-year cycles by the Permit. The EWMP will be modified in response to water quality monitoring results, updated modeling results, and lessons learned from BMP implementation to meet the requirements in the Permit.

The EWMP milestones are structured around Permit terms and describe the actions to be taken by the USCR EWMP. While the EWMP is a long-term planning document that identifies a pathway to compliance with the final TMDL WQBELs and RWLs, the long timeframe of the document (through 2035) prevents the identification of specific actions to be taken for the entire implementation period. The EWMP includes more detail and specificity for implementation actions that can be implemented through 2022, though the specific projects that are implemented to meet the milestones may be modified based on available resources, opportunities for partnerships, or other factors that facilitate project implementation. However, it is likely that implementation actions after 2022 will be modified in response to water quality monitoring data collected under the coordinated integrated monitoring program (CIMP) that could impact the assumptions and analysis used to develop the EWMP.

Additionally, if land uses in the portion of the City of Santa Clarita within the Los Angeles River watershed change in the future, including the construction of any MS4 infrastructure, the EWMP will be modified to address MS4 discharges from this area to the LA River, including but not limited to requirements pertaining to MS4 discharges in Attachment O of the Permit.

While the adaptive management process will be performed on an annual basis to take into consideration new monitoring information, the EWMP and modeling will be fully updated during the ROWD development for the next Permit term (in the 2020 timeframe). At that time, the remaining regional BMPs and green streets identified in the EWMP will be re-evaluated and the remaining milestones reconsidered. Should the monitoring demonstrate that milestones are being achieved more quickly than anticipated, some implementation projects identified in the EWMP may not need to be implemented.

1 Introduction

The Municipal Separate Storm Sewer Systems (MS4s) in the County of Los Angeles are regulated under the National Pollutant Discharge Elimination System (NPDES) MS4 Permit Order No. R4-2012-0175 (Permit). The Permit was issued by the Los Angeles Regional Water Quality Control Board (Regional Board).The purpose of the Permit is to protect the beneficial uses in the receiving waters in the Los Angeles region. The Permit provides direction for Permittees to collaboratively develop an Enhanced Watershed Management Program (EWMP). The EWMP approach allows for Permittees to comprehensively evaluate opportunities, within the participating Permittees' collective jurisdictional area, for collaboration among Permittees and other partners on multi-benefit regional EWMP projects that, wherever feasible, retain (i) all non-storm water runoff and (ii) all storm water runoff from the 85th percentile, 24-hour storm event for the drainage areas tributary to the projects, while also achieving other benefits including flood control and water supply enhancement. This EWMP applies to the Permittees within the Upper Santa Clara River Enhanced Watershed Management Program Group (USCR EWMP Group), which includes the City of Santa Clarita, Los Angeles County, and Los Angeles County Flood Control District, and describes how the USCR EWMP Group will address water quality issues within the geographical scope of their EWMP area. This EWMP covers the portion of the Upper Santa Clara River watershed in Los Angeles County and the City of Santa Clarita that is regulated by the Permit. This EWMP also serves as a functionally equivalent Storm Water Resource Plan.[1]

1.1 EWMP OVERVIEW

Requirements for the EWMP are outlined in Parts VI.C.1 and VI.C.5 and C.8 of the Permit. The general content of the EWMP is outlined in Part VI.C.1 and details of the information to include in the EWMP are outlined in Parts VI.C.5 and C.8. The EWMP is structured around the permit requirements as shown in **Table 1-1**.

Table 1-1. EWMP Structure

Section Content	Permit Requirements Addressed
Section 2. Outreach and Stakeholder Process	
Describes the process and schedule for gathering input from interested parties.	C.1.f.v. Provide appropriate opportunity for meaningful stakeholder input, including but not limited to, a permit-wide watershed management program technical advisory committee (TAC) that will advise and participate in the development of the WMPs and EWMPs from month 6 through the date of program approval. The composition of the TAC may include at least one Permittee representative from each Watershed Management Area for which a WMP will be developed, and must include a minimum of one public representative from a non-governmental organization with public membership, and staff from the Regional Board and U.S. Environmental Protection Agency (USEPA) Region IX.

[1] State Water Resources Control Board. Storm Water Resource Plan Guidelines, Approved December 15, 2015.

Section Content	Permit Requirements Addressed
	C.1.g.ii. Incorporate applicable State agency input on priority setting and other key implementation issues.
Section 3. Background and EWMP Area Description	
Provides a general description of the participating Permittees and the characteristics of the EWMP area	
Section 4. Water Quality Priorities	
Presents the analysis used to identify water quality priorities for the watershed.	C.1.f.i. Prioritize water quality issues resulting from storm water and non-storm water discharges from the MS4 to receiving waters within each watershed management area (WMA).
	Whole of Part VI.C.5.a. Identification of Water Quality Priorities
Sections 5 and 6. Watershed Control Measures and Reasonable Assurance Analysis	
Summarizes the process used to identify Watershed Control Measures, multi-benefit regional EWMP projects, and demonstrates that the selected measures will result in compliance with permit requirements through a reasonable assurance analysis.	C.1.f.ii. Identify and implement strategies, control measures, and BMPs to achieve the outcomes specified in Part VI.C.1.d.
	C.1.g.iii. Provide for meeting water quality standards and other CWA obligations by utilizing provisions in the Clean Water Act (CWA) and its implementing regulations, policies and guidance.
	C.1.g.iv. Include multi-benefit regional projects to ensure that MS4 discharges achieve compliance with all final water quality based effluent limitations (WQBELs) set forth in Part VI.E. and do not cause or contribute to exceedances of receiving water (RWLs) limitations in Part V.A. by retaining through infiltration or capture and reuse the storm water volume from the 85th percentile, 24-hour storm for the drainage areas tributary to the multi-benefit regional projects.
	C.1.g.v. In drainage areas where retention of the storm water volume from the 85th percentile, 24-hour event is not technically feasible, include other watershed control measures to ensure that MS4 discharges achieve compliance with all interim and final WQBELs set forth in Part VI.E. with compliance deadlines occurring after approval of a EWMP and to ensure that MS4 discharges do not cause or contribute to exceedances of RWLs in Part V.A.
	C.1.g.vii. Incorporate effective innovative technologies, approaches and practices, including green infrastructure.
	C.1.g. In drainage areas within the EWMP area where retention of the 85th percentile, 24-hour storm event is not feasible, the EWMP shall include a Reasonable Assurance Analysis (RAA) to demonstrate that applicable WQBELs and RWLs shall be achieved through implementation of other watershed control measures.
	Whole of Part VI.C.5.b. Selection of Watershed Control Measures

Section Content	Permit Requirements Addressed
Section 7. EWMP Implementation Plan and Milestones	
Presents the BMP-based compliance pathway and its pace of implementation.	C.1.g.viii. Ensure that existing requirements to comply with technology-based effluent limitations and core requirements (e.g., including elimination of non-storm water discharges of pollutants through the MS4, and controls to reduce the discharge of pollutants in storm water to the maximum extent practicable) are not delayed;
	Whole of Part VI.C.5.c Compliance Schedules
Section 8. Costs and Financial Strategy	
Estimates BMP-related costs for the selected watershed control measures, and presents the financial strategy to manage existing funds while pursuing additional future funding.	C.1.g.vi. Maximize the effectiveness of funds through analysis of alternatives and the selection and sequencing of actions needed to address human health and water quality related challenges and non-compliance;
	C.1.g.ix. Ensure that a financial strategy is in place.
Section 9. Assessment and Adaptive Management	
Presents the adaptive management process, the schedule and process for redoing the RAA analysis in coordination with Report of Waste Discharge (ROWD) submittals, along with the adaptive management of the milestones and financial strategy.	C.1.f.iv. Modify strategies, control measures, and BMPs as necessary based on analysis of monitoring data collected pursuant to the Monitoring Report Program (MRP) to ensure that applicable WQBELs and RWLs and other milestones set forth in the Watershed Management Program (WMPs) are achieved in the required timeframes.
	Whole of Part VI.C.8 Adaptive Management Process

1.2 CONTEXT AND APPROACH TO EWMP

The Santa Clara River watershed is distinctive in that it is predominantly open space - nearly ninety percent of the watershed is open space with approximately eighty-eight percent being undeveloped land. The watershed contains one of the last remaining natural rivers in Southern California. In years of significant rainfall, ephemeral springs and year round flows exist in some tributaries and natural upstream areas. Flows in Santa Clara River reaches that pass through the EWMP area are predominantly stormwater runoff during wet weather months and water reclamation plant effluent discharges in the drier months. Agricultural runoff in the upper watershed, wildlife and post wildfire erosion in the Angeles National Forest and Los Padres National Forest are all contributors of non-point source pollution within the watershed. Consequently, the Upper Santa Clara River (USCR) watershed presents unique challenges for maintaining the balance of population growth, agricultural beneficial uses, preservation of endangered species habitat (i.e. red-legged frog, three-spined stickleback), floodplain management, water supply and wildlife corridors that depend on the Santa Clara River and its floodplain. This EWMP has been developed to meet the Permit requirements to protect these beneficial uses of the Upper Santa Clara River watershed receiving waters while recognizing these unique characteristics.

The nature of the watershed and the commitment by the City to maintain open space within the EWMP area have resulted in fewer water quality impairments and TMDLs than many other watersheds in Los Angeles County. The City and County have been proactive in attempting to

prevent impairments and the EWMP has been developed to build upon previous actions to address the Permit requirements. At the same time, a relative lack of MS4 specific monitoring data exists within the watershed to inform control measure selection. As a result, the EWMP includes a robust adaptive management process that will allow the USCR EWMP Group to leverage new monitoring data collected through the Comprehensive Integrated Monitoring Program (CIMP) to most cost effectively target implementation actions and incorporate new science and regulatory changes that may impact the effective TMDLs within the EWMP area. The scheduling and milestones for the EWMP have been carefully crafted to provide clear near term implementation actions and a structure for implementing additional actions to meet longer-term goals that leverage existing financial resources and account for the incorporation of future information.

Finally, the nature of the soils in much of the EWMP area provides opportunities to implement multi-benefit regional projects that can enhance local water supplies. Throughout the EWMP process, identification of locations that support both goals of improving water quality and enhancing the water supply has been a top priority. While some key projects and approaches have been identified and are included in the EWMP, challenges have been identified with implementing projects that will provide the most benefit from a water supply perspective and also meet the Permit and Clean Water Act requirements. These challenges are identified and discussed in the EWMP and should the barriers be resolved in the future, modifications to the EWMP will be considered to further support multi-benefit projects.

2 Outreach and Stakeholder Process

The EWMP was developed through a stakeholder process involving outreach to the local community residents, nongovernmental organizations (NGOs), the development community, and other interested parties through open house events and presentations to the Integrated Regional Water Management Plan (IRWMP) group. Through the public comment process and discussions, there has been collaboration between Permittees as well as with Regional Board staff. The Permit provides the following requirements for the stakeholder process:

- Provide appropriate opportunity for meaningful stakeholder input.
- Participate in the permit-wide watershed management program TAC.
- Incorporate applicable State agency input on priority setting and other key implementation issues.

The USCR EWMP Group member agencies have been actively participating in the permit-wide TAC process and have implemented a stakeholder process, which has allowed for the engagement of the public and other interested parties during EWMP development.

The stakeholder process included outreach to five general types of interested parties:

- General public and environmental organizations;
- City council and County Board of Supervisors (BOS); and
- IRWMP group
- Other departments within the City and County that may need to implement portions of the EWMP.
- Regional Board staff

The process included different approaches to gather feedback from each of these different types of interested parties. During EWMP development, the USCR EWMP Group member agencies have implemented the stakeholder process as shown in **Table 2-1**.

Table 2-1. Tasks and Efforts for the Stakeholder Process

Stakeholder Effort	Tasks and Efforts
Outreach to General Public	Established information site on greensantaclarita.com for EWMP documents
	Established a sign up, email list and mailing list system on greensantaclarita.com
Participate in Regional Groups	IRWMP presentations
Inform City Council on Work Plan progress	City Council Memos and informational presentations
Outreach to City and County Departments	Attended appropriate division meetings and presented information
	Senior Staff presentations

Stakeholder Effort	Tasks and Efforts
Involve the Regional Board during Work Plan development	Met informally with Regional Water Board to get feedback on Work Plan and CIMP
Inform General Public of Draft Documents	Provided public comment period on Draft Work Plan, CIMP and EWMP in May 2014
	Posted draft documents on Greensantaclarita.com – Enotify, email lists, press release in May 2015
	Hosted Open House evening events in May 2015

Comments and input received through the stakeholder process have been incorporated into the EWMP. In particular, input received on preferred locations for regional projects and the desire to locate projects in areas that will support groundwater recharge for water supply purposes was incorporated into the regional project site selection process to the extent possible while still meeting the Permit and Clean Water Act requirements.

2.1 UPPER SANTA CLARA RIVER IRMWP

The Upper Santa Clara River Integrated Regional Water Management Plan (IRWMP) was completed and adopted by the Regional Water Management Group (RWMG) in 2008. The IRWMP was updated in 2014 to document progress towards meeting IRWMP objectives, and identify ongoing regional needs and issues. **Table 2-2** lists the governing body members of the Upper Santa Clara River IRWMP

Because the Santa Clara River travels through two counties, Los Angeles and Ventura, there is coordination between the Upper Santa Clara River IRWMP and the Watershed Coalition of Ventura County IRWMP Santa Clara River Subcommittee. Representatives of the Region work with the stakeholders and agencies in the lower reaches of the Watershed, which lie in Ventura County, to include them in the IRWMP planning process and to coordinate efforts to protect the Watershed.

The purpose of the IRWMP includes the following:

- Integrate water and watershed-related planning efforts;
- Facilitate regional cooperation with the goals of:
    - reducing potable water demands,
    - increasing water supply,
    - improving water quality,
    - promoting resource stewardship over the long term;
- Improve flood management, reducing negative effects from flooding and hydromodification; and
- Reduce greenhouse gas emissions and adapt to climate change.

The intention of this IRWMP is not to duplicate existing and ongoing plans, but to better integrate these efforts and utilize the results and findings of existing plans to put forward the projects needed to address local objectives.

The stakeholders in the Upper Santa Clara River IRWMP were consulted throughout the EWMP development process. The stakeholder group is an integral group of participants in the IRWMP process, consisting of members of the RWMG as well as an extensive mix of many other agencies and organizations with an interest in improving water supply, water quality, flood management, and ecosystems in the region. Specific ongoing efforts, including direct emails, mailings, face to face interaction, event participation, classroom instruction, flyers, notices, surveys, and presentations have been performed to get environmental groups, conservancy groups, well owner groups, disadvantaged communities (DACs), water suppliers, municipalities, the local sanitation and flood control districts, American Indian Tribes, developers, landowners, adjacent IRWMP areas, State agencies, elected representatives, and others to take part in the IRWMP.

Table 2-2. Roles and Responsibilities of the Regional Watershed Management Group

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

3 Background and EWMP Area Description

3.1 GEOGRAPHICAL SCOPE AND CHARACTERISTICS

This EWMP addresses the portion of the Upper Santa Clara River in Los Angeles County and the City of Santa Clarita that is regulated by the Los Angeles County MS4 NPDES Permit. State and federal lands, including the Angeles National Forest and the State park lands, are outside Los Angeles County MS4 NPDES Permit regulation and therefore are not included in the scope of the EWMP. The Upper Santa Clara River watershed covered by the EWMP encompasses approximately 121,423 acres, all within Los Angeles County. The entire Santa Clara River Watershed is 1,045,760 acres, which includes the land area within Ventura County as well as national forest and State park land. **Table 3-1** provides a breakdown of the land area within the upper Santa Clara River watershed by Permittee and by state and federal lands that are not included in the EWMP. A description of the Santa Clara River reaches is provided in **Table 3-2.** **Figure 3-1** shows the watershed boundaries and notes the jurisdictional boundaries of the Permittees and other pertinent entities in the Upper Santa Clara River. A map of the reaches of the Santa Clara River, tributaries, and lakes within the EWMP area is included in Section 4 as **Figure 4-1**. Of the total watershed area, the City of Santa Clarita and County of Los Angeles have jurisdiction over 46% of the land area. The City of Santa Clarita and County of Los Angeles do not have jurisdiction over lands owned by the State of California or the federal government including the Angeles National Forest and state owned open space lands.

Table 3-1. Land Area within EWMP and Other Upper Santa Clara River Watershed Areas

Watershed Area	Agency	EWMP Agency	Approximate Land Area (acres) [1]
Watershed Land within EWMP under Permittee Jurisdiction	County of Los Angeles	Yes	80,205
	City of Santa Clarita	Yes	41,218
	Los Angeles County Flood Control District	Yes	N/A
	Approximate Area of EWMP Agencies		**121,423**
Watershed Land outside of EWMP and NPDES Permit Conditions	State Parks Land (upper Santa Clara only)	No	344
	Angeles National Forest	No	140,981
	Approximate Total Upper Santa Clara River Watershed		**262,748**

1. The approximate land area in this table has changed since the notice of intent was submitted due to annexations of some portions of Los Angeles County into the City of Santa Clarita during the EWMP development period.

Table 3-2. Santa Clara River Reach Descriptions[1]

Reach Number	Description	County
1	Between Highway 101 Bridge and Santa Clara River Estuary	Ventura
2	Between Freeman Diversion Dam near Saticoy and Highway 101 Bridge	Ventura
3	Between A Street, Fillmore and Freeman Diversion Dam near Saticoy	Ventura
4A	Between confluence of Piru Creek and A Street, Fillmore	Ventura
4B	Between Blue Cut gauging station and confluence of Piru Creek	Ventura
5	Between West Pier Highway 99 and Blue Cut gauging station	Los Angeles, Ventura
6	Between Bouquet Canyon Road Bridge and West Pier Highway 99	Los Angeles
7	Between Lang gauging station and Bouquet Canyon Road Bridge	Los Angeles
8	Above Lang gauging station	Los Angeles
9	Santa Paula Creek – above Santa Paula Water Works Diversion Dam	Los Angeles
10	Sespe Creek – above gauging station, 500' downstream from Little Sespe Creek	Los Angeles
11	Piru Creek – above gauging station below Santa Felicia Dam	Los Angeles

1. Santa Clara River reach numbering and descriptions as listed in the 2012 "Revised Maps of Surface Waters, Ground Waters, and Coastal Water Features." http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/

The EWMP also includes an extremely small rural and undeveloped area (0.09 square miles, or 0.233 square kilometers) of the Los Angeles River watershed located within the City of Santa Clarita. There are no storm drains, gutters, catch basins, or MS4s in this location, and when it rains, the single paved road sheds water by sheet-flow to the surrounding open areas. Other rural and undeveloped areas within the City and County in the Upper Santa Clara River watershed are included in the EWMP because they are within the Permittees' jurisdictions; however, these areas do not have MS4 systems that generate discharges to receiving water bodies. In some cases, the areas are primarily natural open space.

3.2 WATER SUPPLY

There is one water wholesaler, Castaic Lake Water Agency, and several water retailers, including Newhall County Water District, Santa Clarita Water Division, and Valencia Water. There are rural areas where the supply comes from private wells. The water supply source in the Santa Clarita Valley is diverse. **Table 3-3** details the source of the municipal water supply for the Santa Clarita Valley. There are two sources of local groundwater, accounting for roughly half of the local supply. Those two sources are the alluvium and the Saugus Formation.

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

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

Table 3-3. Current and Projected Water Supplies in the Region (AFY)[a]

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

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

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

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

(c) UWCD and CLWA 1996.

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

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

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

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

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

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

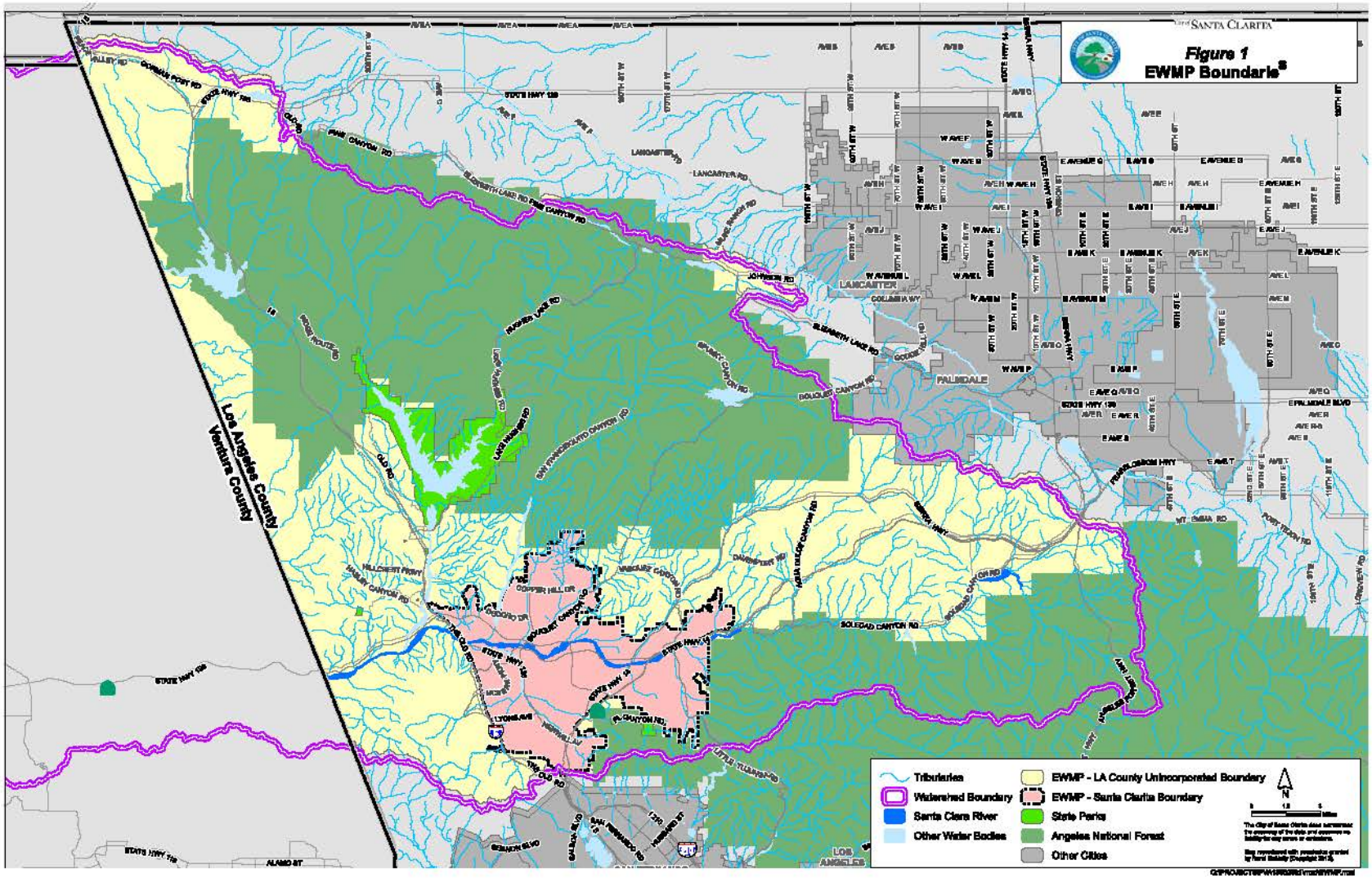


Figure 3-1. EWMP Boundaries

3.3 TMDLS

There are four Total Maximum Daily Loads (TMDLs) currently in effect within the EWMP area. **Table 3-2** lists the schedule and applicable interim and final WQBELs and RWLs established by TMDLs and identified in Attachment L of the Permit.

Table 3-4. Summary of TMDLs for the USCR EWMP

TMDL	Waterbody	Constituent	Weather Condition	Schedule							Final WQBEL
				2012	2013	2014	2015	2016	2023	2029	
Salts	Santa Clara River Reaches 5, 6[2]	Chloride	Dry	Final[1]							100 mg/L
Bacteria	Santa Clara River Reaches 4B[3], 5, 6, 7	*E. coli*	Dry					Interim[5]	Final		235 MPN/ 100mL daily max, 126 MPN/100mL geo mean WQBEL, 5 exceedance days (daily sampling), 1 exceedance day (weekly sampling), 126 geo mean RWL
			Wet					Interim[6]		Final	235 MPN/ 100mL daily max, 126 MPN/100mL geo mean WQBEL, 16 exceedance days (daily sampling), 3 exceedance days (weekly sampling), 126 geo mean RWL
Nutrients	Santa Clara River Reaches 5[4]	Ammonia		Final[1]							1-hr average 5.2 mg/L 30 day average 1.75 mg/L
		Nitrate and Nitrite		Final[1]							30 day average 6.8 mg/L
Trash	Lake Elizabeth	Trash		Interim[7]	Interim[7]	Interim[7]	Interim[7]	Final			100% Full Capture

1. Final applicable on Effective Date of Permit.
2. TMDL applies to Reaches 4B, 5, 6, and 7, but permit only includes WQBELs for Reaches 5 and 6.
3. Reach 4B is located in Ventura County, but is considered for the purposes of understanding downstream water quality.
4. TMDL includes load allocations and monitoring requirements for other reaches, but wasteload allocations and WQBELs only apply to Reach 5. USCR is in compliance with the TMDL.
5. Interim RWL of 17 allowable exceedance days, applicable to daily sampling; and 3 allowable exceedance days, applicable to weekly sampling.
6. Interim RWL of 61 allowable exceedance days, applicable to daily sampling; and 9 allowable exceedance days, applicable to weekly sampling.
7. Interim limits: 20% full capture in 2012, 40% full capture in 2013, 60% full capture in 2014, 80% full capture in 2015.

In addition, the City of Santa Clarita is identified in Attachment K as being a responsible party for the Los Angeles River Trash, Nitrogen Compounds and Related Effects, Metals and Bacteria TMDLs. However, as discussed in the geographic scope (Section 3.1), the City has no MS4 discharges to the Los Angeles River.

Implementation plans have not been developed for any of the TMDLs summarized in the table. In the source assessments for the Nutrients TMDL and the Chloride TMDL for the Santa Clara River, the storm drain system is not the primary source of these pollutants. In addition, the watershed is currently in compliance with the Nutrients TMDL. As a result, no implementation plans were required to be developed for these TMDLs. For the Lake Elizabeth Trash TMDL, Los Angeles County is complying with the TMDL requirements by installing full capture devices on 100% of MS4 outfalls discharging to Lake Elizabeth. The Bacteria TMDL is the only TMDL that requires the development of an implementation plan. However, the implementation plan was not due until March 2015. Rather than developing a separate implementation plan, on February 6, 2015 the City of Santa Clarita submitted a letter to the Regional Board requesting that the USCR EWMP Group be deemed in compliance with the Bacteria TMDL requirements for monitoring and preparing an implementation plan through submission of the CIMP and EWMP.

3.4 UPPER SANTA CLARA RIVER IRWMP

The Upper Basin of the Santa Clara River that is covered by the IRWMP is bounded by the San Gabriel Mountains to the south and southeast, the Santa Susana Mountains to the southwest, the Transverse Ranges to the northeast, the Sierra Pelona Mountains to the east, and the Ventura County Line to the west. The Region encompasses the City of Santa Clarita, the unincorporated communities of Castaic, Stevenson Ranch, West Ranch, Agua Dulce, and Acton, as well as portions of the Angeles National Forest. This is a complementary boundary to the EWMP boundary.

4 Water Quality Priorities

The identification of water quality priorities is an important first step in the EWMP process. The water quality priorities provide the basis for prioritizing selection and scheduling of control measures and demonstration of compliance with permit requirements via the RAA in the EWMP. The Permit establishes a four-step process for identifying water quality priorities, including:

1. A water quality characterization (VI.C.5.a.i, pg. 58) based on available monitoring data, TMDLs, 303(d) lists, storm water annual reports, etc.;
2. A water body-pollutant classification (VI.C.5.a.i, pg. 59), to identify water body-pollutant combinations that fall into three Permit defined categories;
3. A source assessment (VI.C.5.a.i, pg. 59) for the water body-pollutant combinations in the three categories; and
4. Prioritization and sequencing of the water body-pollutant combinations (VI.C.5.a.i, pg. 60).

The outcomes for each step in the process are summarized in the following sections and described in detail in Appendix A-1.

4.1 APPLICABLE WQBELS AND RWLS

Section 3.2 summarizes the TMDLs applicable to the EWMP area. In addition to the interim and final Water Quality Based Effluent Limitations (WQBELs) presented in **Table 3-2,** the applicable receiving water limitations (RWLs) from the Los Angeles Region Basin Plan, California Toxics Rule, TMDLs, and applicable State Water Board plans and policies were identified for comparison to the compiled water quality data. The applicable WQBELs and lowest applicable RWLs are shown in **Table 4-1,** and the data comparison is discussed in more detail in Appendix A-1.

Table 4-1. Applicable WQBELs and RWLs

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
1,1-Dichloroethane	µg/L			5 (e)
1,1-Dichloroethylene	µg/L		3.2 (a)	0.057 (d)
1,1,1-Trichloroethane	µg/L			200 (e)
1,1,2-Trichloro-1,2,2-Trifluoroethane	µg/L			1200 (e)
1,1,2-Trichloroethane	µg/L		42 (a)	0.6 (d)
1,1,2,2-Tetrachloroethane	µg/L		11 (a)	0.17 (d)
1,2-Dibromo-3-Chloropropane	µg/L			0.2 (e)
1,2-Dichlorobenzene	µg/L		17000 (a)	600 (e)
1,2-Dichloroethane	µg/L		99 (a)	0.38 (d)
1,2-Dichloropropane	µg/L		39 (a)	0.52 (d)
1,2-Diphenylhydrazine	µg/L		0.54 (a)	0.04 (d)
1,2-Trans-Dichloroethylene	µg/L		140000 (a)	10 (e)
1,2,4-Trichlorobenzene	µg/L			70 (e)
1,3-Dichlorobenzene	µg/L		2600 (a)	400 (d)
1,3-Dichloropropylene	µg/L		1700 (a)	0.5 (e)
1,4-Dichlorobenzene	µg/L		2600 (a)	5 (e)
2-Chloronaphthalene	µg/L		4300 (a)	1700 (d)
2-Chlorophenol	µg/L		400 (a)	120 (d)
2-Methyl-4,6-Dinitrophenol	µg/L		765 (a)	13.4 (d)
2,3,7,8-TCDD (Dioxin)	pg/L		0.014 (a)	0.013 (d)
2,4-D	µg/L			70 (e)
2,4-Dichlorophenol	µg/L		790 (a)	93 (d)
2,4-Dimethylphenol	µg/L		2300 (a)	540 (d)
2,4-Dinitrophenol	µg/L		14000 (a)	70 (d)
2,4-Dinitrotoluene	µg/L		9.1 (a)	0.11 (d)
2,4,5-TP	µg/L			50 (e)
2,4,6-Trichlorophenol	µg/L		6.5 (a)	2.1 (d)
3,3'-Dichlorobenzidine	µg/L		0.077 (a)	0.04 (d)
4,4'-DDD	µg/L		0.00084 (a)	0.00083 (d)
4,4'-DDE	µg/L		0.00059 (d)	0.00059 (d)
4,4'-DDT	µg/L		0.00059 (d)	0.00059 (d)
Acenaphthene	µg/L		2700 (a)	1200 (d)
Acrolein	µg/L		780 (a)	320 (d)
Acrylonitrile	µg/L		0.66 (a)	0.059 (d)
Alachlor	µg/L			2 (e)
Aldrin	µg/L		0.00014 (a)	0.00013 (d)
alpha-BHC	µg/L		0.013 (a)	0.0039 (d)
alpha-Endosulfan	µg/L		0.056 (b)	0.056 (b)
Aluminum	µg/L			1000 (e)
Ammonia as N	mg/L	1.8/5.2 (i)	(m)	(m)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Anthracene	µg/L		110000 (a)	9600 (d)
Antimony	µg/L		4300 (a)	6 (e)
Aroclors	µg/L		0.00007 (f)	0.00007 (f)
Arsenic	µg/L		150 (b)	50 (e)
Asbestos	MFL			7 (e)
Atrazine	µg/L			3 (e)
Barium	µg/L			1000 (e)
Bentazon	µg/L			18 (e)
Benzene	µg/L		71 (a)	1 (e)
Benzidine	µg/L		0.00054 (a)	0.00012 (d)
Benzo(a)Anthracene	µg/L		0.049 (a)	0.0044 (d)
Benzo(a)Pyrene	µg/L		0.049 (a)	0.0044 (d)
Benzo(b)Fluoranthene	µg/L		0.049 (a)	0.0044 (d)
Benzo(k)Fluoranthene	µg/L		0.049 (a)	0.0044 (d)
Beryllium	µg/L			4 (e)
beta-BHC	µg/L		0.046 (a)	0.014 (d)
beta-Endosulfan	µg/L		0.056 (b)	0.056 (b)
Bioaccumulation			(n)	(n)
Biostimulatory Substances			(n)	(n)
Bis(2-chloroethyl)Ether	µg/L		1.4 (a)	0.031 (d)
Bis(2-chloroisopropyl)Ether	µg/L		170000 (a)	1400 (d)
Bis(2-ethylhexyl)Adipate	µg/L			400 (e)
Bis(2-ethylhexyl)Phthalate	µg/L		5.9 (a)	1.8 (d)
BOD	mg/L		(n)	(n)
Boron	mg/L			1.0/1.5 (e) (o)
Bromoform	µg/L		360 (a)	4.3 (d)
Butylbenzyl Phthalate	µg/L		5200 (a)	3000 (d)
Cadmium	µg/L		HBC from CTR (p)	HBC from CTR (p)
Carbofuran	µg/L			18 (e)
Carbon Tetrachloride	µg/L		4.4 (a)	0.25 (d)
Chlordanes	µg/L		0.00059 (a)	0.00057 (d)
Chloride	mg/L	100 (j)	100 (f)	100 (f)
Chlorine (Total Residual)	µg/L			100 (e)
Chlorobenzene	µg/L		21000 (a)	70 (e)
Chlorodibromomethane	µg/L		34 (a)	0.41 (d)
Chlorpyrifos (l)	µg/L		0.041 (g)	0.041 (g)
Chromium	µg/L			50 (e)
Chromium (III)	µg/L		HBC from CTR (p)	HBC from CTR (p)
Chromium (VI)	µg/L		11 (b)	11 (b)
Chrysene	µg/L		0.049 (a)	0.0044 (d)
cis-1,2-Dichloroethylene	µg/L			6 (e)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Color			(n)	(n)
Copper	µg/L		HBC from CTR (p)	HBC from CTR (p)
Cyanide	µg/L		5.2 (b)	5.2 (b)
Dalapon	µg/L			200 (e)
Di-n-Butyl Phthalate	µg/L		12000 (a)	2700 (d)
Diazinon (l)	µg/L		0.17 (g)	0.17 (g)
Dibenzo(a,h)Anthracene	µg/L		0.049 (a)	0.0044 (d)
Dichlorobromomethane	µg/L		46 (a)	0.56 (d)
Dieldrin	µg/L		0.00014 (d)	0.00014 (d)
Diethyl Phthalate	µg/L		120000 (a)	23000 (d)
Dimethyl Phthalate	µg/L		2900000 (a)	313000 (d)
Dinoseb	µg/L			7 (e)
Diquat	µg/L			20 (e)
Dissolved Oxygen	mg/L		<5 (f)	<5 (f)
E. Coli	MPN/100mL	126/235 (k)	126 (h)	126 (h)
Endosulfan Sulfate	µg/L		240 (a)	110 (d)
Endothall	µg/L			100 (e)
Endrin	µg/L		0.036 (b)	0.036 (b)
Endrin Aldehyde	µg/L		0.81 (a)	0.76 (d)
Ethylbenzene	µg/L		29000 (a)	700 (e)
Ethylene Dibromide	µg/L			0.05 (e)
Exotic Vegetation			(n)	(n)
Fecal Coliform	MPN/100mL		200 (f)	200 (f)
Floating Material			(n)	(n)
Fluoranthene	µg/L		370 (a)	300 (d)
Fluorene	µg/L		14000 (a)	1300 (d)
Fluoride	mg/L			2 (e)
gamma-BHC (Lindane)	µg/L		0.063 (a)	0.019 (d)
Glyphosate	µg/L			700 (e)
Gross Alpha particle activity	pCi/L			15 (e)
Gross Beta particle activity	pCi/L			50 (e)
Heptachlor	µg/L		0.00021 (d)	0.00021 (d)
Heptachlor Epoxide	µg/L		0.00011 (a)	0.0001 (d)
Hexachlorobenzene	µg/L		0.00077 (a)	0.00075 (d)
Hexachlorobutadiene	µg/L		50 (a)	0.44 (d)
Hexachlorocyclopentadiene	µg/L		17000 (a)	50 (e)
Hexachloroethane	µg/L		8.9 (a)	1.9 (d)
Indeno(1,2,3-cd)Pyrene	µg/L		0.049 (a)	0.0044 (d)
Iron (l)	µg/L		1000 (g)	1000 (g)
Isophorone	µg/L		600 (a)	8.4 (d)
Lead	µg/L		HBC from CTR (p)	HBC from CTR (p)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
MBAS	µg/L			500 (e)
Mercury	µg/L		0.051 (a)	0.05 (d)
Methoxychlor	µg/L			40 (e)
Methyl Bromide	µg/L		4000 (a)	48 (d)
Methylene Chloride	µg/L		1600 (a)	4.7 (d)
Molinate	µg/L			20 (e)
N-Nitrosodi-n-Propylamine	µg/L		1.4 (a)	0.005 (d)
N-Nitrosodimethylamine	µg/L		8.1 (a)	0.00069 (d)
N-Nitrosodiphenylamine	µg/L		16 (a)	5 (d)
Nickel	µg/L		HBC from CTR (p)	HBC from CTR (p)
Nitrate as N	mg/L			10 (e)
Nitrite as N	mg/L			1 (e)
Nitrobenzene	µg/L		1900 (a)	17 (d)
Nitrogen (NO3-N+NO2-N)	mg/L	6.8 (i)		5/10 (e) (o)
Oil + Grease	mg/L		(n)	(n)
Oxamyl	µg/L			200 (e)
PCBs	µg/L		0.00017 (d)	0.00017 (d)
Pentachlorophenol	µg/L		8.2 (a)	0.28 (d)
pH	pH Units		6.5 < pH < 8.5 (f)	6.5 < pH < 8.5 (f)
Phenol	µg/L		4600000 (a)	21000 (d)
Picloram	µg/L			500 (e)
Pyrene	µg/L		11000 (a)	960 (d)
Radium-226 + Radium-228	pCi/L			5 (e)
Selenium	µg/L		5 (b)	5 (b)
Silver	µg/L		HBC from CTR (p)	HBC from CTR (p)
Simazine	µg/L			4 (e)
Strontium-90	pCi/L			8 (e)
Styrene	µg/L			100 (e)
Sulfate	mg/L		100-650 (o)	100-650 (o)
Taste and Odor			(n)	(n)
TDS	mg/L		500-1300 (o)	500-1300 (o)
Temperature	°C		(n)	(n)
Tetrachloroethylene	µg/L		8.85 (a)	0.8 (d)
Thallium	µg/L		6.3 (a)	1.7 (d)
Thiobencarb	µg/L			70 (e)
Toluene	µg/L		200000 (a)	150 (e)
Total Coliform	MPN/100mL		70 (f)	70 (f)
Total Settleable Solids			(n)	(n)
Toxaphene	µg/L		0.0002 (b)	0.0002 (b)
Toxicity			(n)	(n)
Trichloroethylene	µg/L		81 (a)	2.7 (d)

Constituent	Units	Final WQBELs	RWL Waterbodies without MUN designation (q)	RWL Waterbodies with MUN designation (r)
Trichlorofluoromethane	µg/L			150 (e)
Tritium	pCi/L			20000 (e)
TSS	mg/L		(n)	(n)
Turbidity	NTU		(n)	(n)
Uranium	pCi/L			20 (e)
Vinyl Chloride	µg/L		525 (a)	0.5 (e)
Xylenes (Total)	µg/L			1750 (e)
Zinc	µg/L		HBC from CTR (p)	HBC from CTR (p)

a. CTR Human Health criterion, organisms only
b. CTR criteria continuous concentrations (CCC), aquatic life
c. CTR criteria maximum concentrations (CMCs)
d. CTR Human Health criterion, water and organisms
e. Basin Plan objective for waterbodies designated as MUN.
f. Basin Plan objective not associated with a specific beneficial use designation.
g. EPA 305(c) recommended criteria
h. TMDL receiving water limitation equal to the geometric mean objective and the designated allowable exceedance days for the single sample maximum objective.
i. WQBEL for Reach 5 of Santa Clara River
j. WQBEL for Reaches 5 and 6 of Santa Clara River
k. WQBEL for Reaches 5, 6 and 7 of Santa Clara River. Single sample objective is 235 MPN/100mL. Geometric mean objective is 126 MPN/100mL and compliance is calculated based on a 30-day geometric mean of at least 5 samples. If less than 5 samples are available, then the geometric mean is not calculated and the objectives are not exceeded.
l. EPA recommended criteria are not RWLs, but are included here because these constituents are on the 303(d) list. The values were selected for comparison to the Listing Policy to assess whether or not impairments remain.
m. Ammonia objectives in the Basin Plan are pH and temperature dependent. For reaches not covered by the TMDL, ammonia objectives were calculated using the pH and temperature of the sample.
n. Narrative objective in Basin Plan.
o. Waterbody-specific objective from the Basin Plan. The range of values for the objective is shown.
p. Hardness based aquatic life criteria (HBC) from the California Toxics Rule (CTR). Criteria calculated for each sample result based on the sample hardness.
q. Applies to all reaches in the USCR EWMP area with no MUN designation or with the MUN designations of E*, P* and I*. This includes reaches 4B, 5, 6, and 7 of the Santa Clara River, Mint Canyon Creek Reach 2, Agua Dulce Canyon Creek, Aliso Canyon Creek, Munz Lake, South Fork Santa Clara River,
r. Applies to reaches within the USCR EWMP area with MUN designations of E, I or P. Includes Bouquet Canyon, Dry Canyon, Dry Canyon Reservoir, Bouquet Reservoir, Mint Canyon Creek Reach 1, Lake Hughes, Lake Elizabeth, Castaic Lake, Castaic Creek, San Francisquito Canyon

4.2 WATER QUALITY CHARACTERIZATION

The intent of the water quality characterization is to support the identification, prioritization, and eventual sequencing of management actions. The current water quality conditions, including both receiving water and discharge, were characterized, and are summarized in the following sections and described in detail in Appendix A-1.

4.2.1 Characterization of Receiving Water Quality

Receiving water quality in the Santa Clara River watershed was characterized based on available data. The characterization process consisted of the following steps:

1. Gathering relevant data and information from numerous sources including, but not limited to: 303(d) listings and associated data, Surface Water Ambient Monitoring Program (SWAMP), Los Angeles County MS4 permit annual reports, established TMDLs, Los Angeles Department of Public Works, and Los Angeles County Sanitation Districts;

2. Defining the EWMP area and identifying the water bodies within the EWMP area and downstream of the area that might be influenced by discharges from the EWMP area;
3. Compiling water body pollutant combinations (WBPC) with TMDLs from Attachment L and O of the permit;
4. Compiling 303(d) Listings from the 2010 303(d) List;
5. Conducting a data analysis to identify constituents with exceedances of WQBELs and RWLs and other relevant criteria for 303(d) listed constituents; and
6. Comparing the data analysis to the State's Listing Policy.

The receiving water quality analysis resulted in a list of pollutants for each reach of the Santa Clara River that have exceeded applicable WQBELs and RWLs in the past ten years. A map of the reaches of the Santa Clara River, tributaries, and lakes within the EWMP area is included as **Figure 4-1**.

4.2.2 Characterization of Discharge Quality

Stormwater and non-stormwater discharges have not been well characterized within the watershed. No outfall data within the EWMP area were available for this assessment, but discharge characterization will occur as part of the CIMP developed in conjunction with the EWMP. As data were not available for discharge characterization, literature information, TMDL reports, and model output were used to evaluate potential sources. The source assessment is discussed further in Section 4.4**.**

While outside of the EWMP area, outfall monitoring sites within the Santa Clara River Watershed are monitored under the Ventura County MS4 Permit. Four major outfalls in the Santa Clara River Watershed have been monitored for 4 or 5 years[2], at a frequency of 3 wet events and one dry event per year. Locations of the outfalls, along with the land uses within their watersheds, are summarized in **Table 4-2**.

[2] Monitoring at the Ventura outfall begin in 2009/2010, and monitoring at the other three outfalls began in 2010/2011.

Table 4-2. Santa Clara River Watershed Outfalls monitored by Ventura County

Outfall	Location	Watershed Land Uses
FIL	Fillmore, on the North Filmore Drain (tributary to Sespe Creek) near Shiells Park	• Almost half residential • Over 30% vacant • Approx. 7% agriculture • <1% commercial
OXN	Oxnard, on the El Rio Drain near Buckaroo Ave. and Winchester Dr.	• Predominantly residential • Approx. 3% vacant and 3% commercial
SPA	Santa Paula, located east of the Santa Paula airport on the 11th St Drain	• Approx. 50% residential • <15% Commercial • Approx. 10% schools and 10% transportation
VEN	Ventura, on Moon Ditch near the US101-Johnson Dr. interchange	• >50% residential • 25% commercial • 7% industrial • <1% agriculture

Outfall data were characterized in the Ventura County Stormwater Quality Management Program's 2015 ROWD. The ROWD included an evaluation of "cause or contribute" exceedances, where samples from a major outfall and the receiving water (mass emission) station in the same watershed, collected during the same event, both exceed a water quality standard. The Santa Clara River Watershed outfalls caused or contributed to exceedances in receiving water for a limited number of constituents, shown in **Table 4-3**.

While the land uses in the Santa Clara River Watershed outfall within Ventura County are not necessarily reflective of the conditions in the Upper Santa Clara River Watershed, the Ventura County outfall data confirm that bacteria (*E. coli* and fecal coliform) and salts are present in MS4 discharges.

Table 4-3. Frequency (%) of major outfall samples causing or contributing to exceedances of water quality objectives in receiving water in the Santa Clara River Watershed within Ventura County (2009/10-2013/2014)[1]

Constituent	FIL	OXN	SPA	VEN
Stormwater				
E. coli	73	73	73	79
Fecal coliform	55	55	64	64
Aluminum, total	27	45	73	71
Non-stormwater				
Chloride	25			
TDS	25			
Selenium, total	25			20

1. Ventura County Stormwater Quality Management Program (2015)

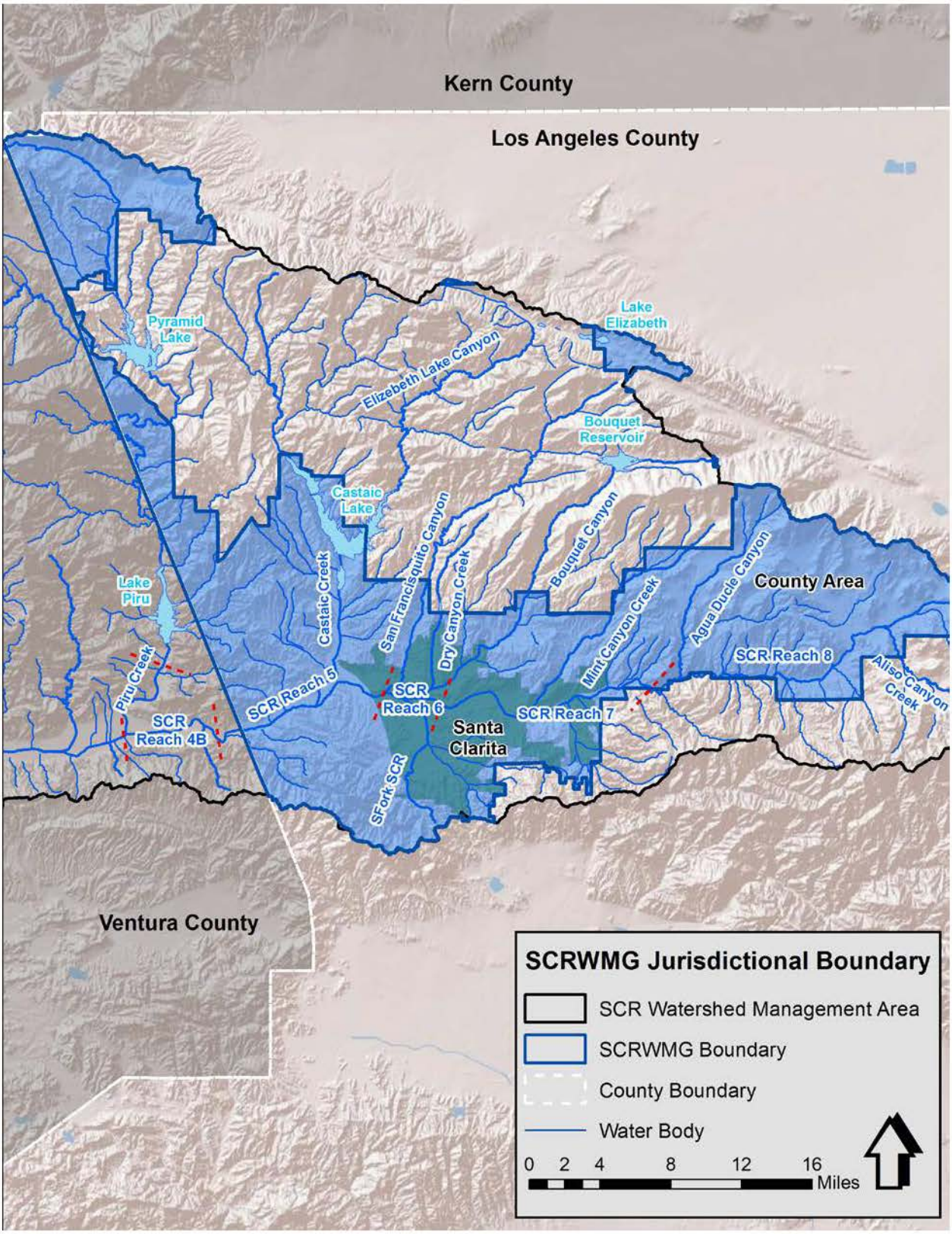


Figure 4-1. Upper Santa Clara River Reaches

4.3 WATER BODY POLLUTANT CLASSIFICATION

The classification process categorizes the WBPCs to focus subsequent EWMP components including the Source Assessment, Prioritization, and the selection of Watershed Control Measures. Based on the water quality characterization, water body-pollutant combinations were classified in one of the three Permit categories as presented in **Table 4-4.**

Table 4-4. Water Body-Pollutant Classification Categories

Category	Water Body-Pollutant Combinations (WBPCs) Included
1 Highest Priority	WBPCs for which TMDL WQBELs and/or RWLs are established in Part VI.E and Attachments L and O of the MS4 Permit.
2 High Priority	WBPCs for which data indicate water quality impairment in the receiving water according to the State's Listing Policy, regardless of whether the pollutant is currently on the 303(d) List, and for which MS4 discharges may be causing or contributing.
3 Medium Priority	WBPCs for which there are insufficient data to indicate impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance.

The categories were further subdivided to provide more support for the prioritization and sequencing in the EWMP. Additionally the subcategorization was utilized to provide a better link to the methods for demonstrating compliance with RWL exceedances as outlined in Parts VI.C.2-C.3. The water body-pollutant combination subcategories are shown in **Table 4-5.**

Table 4-5. Categorization for Water Body Pollutant Combinations

Category	Water Body-Pollutant Combinations (WBPCs)
1	**Category 1A:** WBPCs with past due or current Permit term TMDL deadlines with exceedances in the past 5 years.
	Category 1B: WBPCs with TMDL deadlines beyond the Permit term and with exceedances in the past 5 years.
	Category 1C: WBPCs addressed in USEPA TMDL without a Regional Board Adopted Implementation Plan.
	Category 1D: WBPCs with past due, current, or future Permit term TMDL deadlines without exceedances in the past 5 years.
	Category 1E: WBPCs with TMDLs for which MS4 discharges are not causing or contributing. [2]
2	**Category 2A:** 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements with exceedances in the past 5 years.
	Category 2B: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements that are not a "pollutant"[1] (i.e., toxicity).
	Category 2C: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements without exceedances in past 5 years or that could be delisted.
	Category 2D: 303(d) Listed WBPCs for which MS4 discharges are not causing or contributing. [3]
3	**Category 3A:** All other WBPCs with exceedances in the past 5 years.
	Category 3B: All other WBPCs that are not a "pollutant"[1] (i.e., toxicity).
	Category 3C: All other WBPCs that have exceeded in the past 10 years, but not in past 5 years.
	Category 3D: WBPCs identified by the USCR EWMP Group Members.

1. While pollutants may be contributing to the impairment, it currently is not possible to identify the specific pollutant/stressor.

2. The Permit requires prioritization of all constituents with established WQBELs or RWLs, regardless of source. WBPCs in this category are for reaches without MS4 discharges. While urban areas may be within the drainage area, no point source MS4 discharges to the waterbody.
3. The Permit does not require prioritization of constituents for which data indicate water quality impairment in the receiving water, but where MS4 discharges are not causing or contributing to the impairment. Pollutants in this category are in reaches within the EWMP area that do not receive MS4 discharges.

In addition to defining the categories for the WBPCs identified, the constituents were assigned a class. As defined in the permit, pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the Watershed Management Program for the TMDL. The classes assigned as part of the analysis were utilized in developing the scheduling and milestones for the EWMP.

The categorization of WBPCs developed based on the receiving water data characterization is shown in **Table 4-6.** The Santa Clara River reaches are shown in **Figure 4-1.**

Table 4-6. WBPC Categorization

Class[(1)]	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B[2]	5	6	7									
Category 1A: WBPCs with past due or current term TMDL deadlines with exceedances in the past 5 years.														
Bacteria	*E. Coli* (dry) [3]	I	I		I									
Salts	Chloride	F	F	F										
Category 1B: WBPCs with TMDL deadlines beyond the current Permit term and with exceedances in the past 5 years.														
Bacteria	*E. Coli* (wet and dry) [3]	F	F		F									
Category 1D: WBPCs with past due, current term, or future deadlines without exceedances in the past 5 years.														
Nutrients	Ammonia	F	F											
	Nitrate and Nitrite	F	F											
Trash	Trash						F							
Bacteria	*E. Coli* (wet and dry) [3]			I/F										
Category 1E: WBPCs with TMDLs for which MS4 discharges are not causing or contributing														
Trash	Trash									TMDL	TMDL			F
Nutrients	Ammonia													F
Nutrients	Nitrate and Nitrite							TMDL[4]						F
Bacteria	*E. Coli*													I
Metals	Cadmium													I
Metals	Copper													I
Metals	Lead													I
Selenium	Selenium													I
Metals	Zinc													I

Class[(1)]	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B[2]	5	6	7									
Category 2A: 303(d) Listed WBPCs with exceedances in the past 5 years.														
Metals	Copper			303 (d)										
	Iron		D	303 (d)										
Cyanide	Cyanide			L										
Category 2B: 303(d) Listed WBPCs that are not a "pollutant" (i.e., toxicity).														
Toxicity	Toxicity			303 (d)										
Other	pH				L		303(d)							
Other	Eutrophic						303(d)							
Other	Organic Enrichment/Low DO						303(d)							
Category 2C: 303(d) Listed WBPCs without exceedances in past 5 years or that could be delisted.														
Pesticides	Chlorpyrifos			D										
Pesticides	Diazinon			D										
Category 2D: 303(d) Listed WBPCs for which MS4 discharges are not causing or contributing.														
Metals	Mercury											303(d)	303(d)	
Other	Eutrophic									303(d)	303(d)			
Other	Fish Kills										303(d)			
Other	Odor										303(d)			
Other	Algae										303(d)			
Other	pH								303(d)					
Salts	Chloride								303(d)					

Class[(1)]	Constituent	Santa Clara River Reach				Bouquet Canyon	Lake Elizabeth	Mint Canyon	Piru Creek	Munz Lake	Lake Hughes	Castaic Lake	Pyramid Lake	Los Angeles River
		4B[2]	5	6	7									
Category 3A: All other WBPCs with exceedances in the past 5 years.														
Metals	Copper		X		X									
	Mercury		X	X	X									
	Selenium			X										
	Zinc			X										
Cyanide	Cyanide				X									
Salts	TDS		X											
Category 3C: All other WBPCs with exceedances in the past 10 years, but without exceedances in past 5 years.														
Phthalates	Bis-2 Ethylhexyl phthalate			X										
Category 3D: Other EWMP Priorities														
Pesticides	Pyrethroids					X								

1. Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the Watershed Management Program for the TMDL.
2. Reach 4B is located in Ventura County but was considered for the purposes of understanding downstream water quality
3. Interim limits for dry *E. Coli* during permit term, interim limits for wet *E. Coli* past permit term, final limits for dry and wet past permit term.
4. Mint Canyon is included in the Nutrients TMDL, but no WLAs for MS4 discharges are assigned for the reach in the TMDL.

I=Interim TMDL WQBEL or Receiving Water Limit

F=Final TMDL WQBEL or Receiving Water Limit

D=303(d) listing that could now be delisted

303(d)=Confirmed 303(d) Listing

L=WBPC that meets the listing criteria, but is not currently on the 303(d) list

TMDL=TMDL that does not contain MS4 allocations for the reach

Other= Used for conditions (pH and dissolved oxygen) that are not pollutants, per se, or constituents where the linkage to another type of constituent will be further investigated.

4.4 SOURCE ASSESSMENT

To complement the water quality prioritization process, permittees must identify known and suspected storm water and non-storm water sources influencing MS4 discharges by utilizing existing information for the water body-pollutant combinations in Categories 1-3. The intent of the Source Assessment is to identify potential sources within the watershed for the water body-pollutant combinations and to support prioritization and sequencing of management actions.

In order to identify potential sources for water quality priorities from MS4 discharges, a review of available data and information was conducted, including the following sources:

1. Findings from Illicit Connections and Illicit Discharge Eliminations Programs;
2. Findings from Industrial/Commercial Facilities Programs;
3. Findings from Development Construction Programs;
4. Findings from Public Agency Activities Programs;
5. TMDL source investigations;
6. Watershed model results;
7. Findings from the Permittees' monitoring programs, including but not limited to TMDL compliance monitoring and receiving water monitoring; and
8. Any other pertinent data, information, or studies related to constituent sources and conditions that contribute to the highest water quality priorities.

The City, County, and County Flood Control District submit Individual Annual Report Forms (Annual Report) to the Regional Board for each fiscal year. The submitted Annual Reports contain details pertaining to their activities under the Industrial/Commercial Facilities Program, Development Construction Program, Public Agency Activities Program and Illicit Connection and Illicit Discharge (IC/ID) Elimination program (items 1-4 in the list above), as well as other MS4 permit requirements. The annual reports include details on inspections and enforcement activities, as well as findings on BMP implementation. As part of the IC/ID program, the City of Santa Clarita produces annual maps showing the locations and type of illicit connections and illicit discharges found during the fiscal year. Available Annual Reports and IC/ID maps were reviewed for the source assessment.

Four TMDLs are pertinent to MS4s in the Upper Santa Clara River watershed: The Upper Santa Clara River Chloride TMDL, Santa Clara River Nitrogen Compounds TMDL, Lake Elizabeth, Munz Lake, and Lake Hughes Trash TMDL, and Santa Clara River Estuary and Reaches 3, 5, 6, and 7 Indicator Bacteria TMDL. Findings from source assessments from each TMDL were incorporated into the source assessment.

Data from the Permittee's monitoring programs mostly consist of receiving water monitoring, and little data is available to characterize MS4 discharges. However, these data were used to evaluate the location and timing of exceedances to inform the source assessment. Additional information and data reviewed included POTW effluent data, other TMDL source assessments from watersheds in the Los Angeles Region, and other studies and reports pertaining to the EWMP area or water quality priorities.

Finally, information from the model developed for the Reasonable Assurance Analysis (RAA) was utilized as part of the source assessment. Summaries of the relative loading estimated from the model for sediment, total zinc, total copper, total lead, and bacteria by land use are provided in Appendix A-1.

The results of source assessments for WBPCs in Categories 1-3 are shown below in **Table 4-5** and described in detail in Appendix A-1. Given the lack of watershed specific information, the source assessment provides a list of potential MS4 sources that are likely to be present in the USCR EWMP area and could be contributing to any exceedances observed in the receiving waters. A source assessment for category 2B constituents, 303(d) Listed WBPCs that are not a "pollutant", could not be developed because the constituents contributing to the condition have not yet been identified. However, source assessments have been provided for other constituents that are potentially contributing to the condition. For example, eutrophic conditions, low dissolved oxygen and changes in pH are all potentially the result of excess algae growth which could be influenced by elevated nutrient levels and pesticides may contribute to toxicity.

Table 4-7. MS4 Sources of Water Quality Priorities

Class	Constituent	Reaches/ Waterbodies	MS4 Potential Sources

Bacteria[1,5]	*E. coli*	4B[2], 5, 6, 7	- Dry- and wet- weather urban runoff
			  - Animal wastes, including those from pets, wildlife and birds
			  - Trash
			- Direct human discharges
			- Sanitary sewer overflows
			- Leaking septic systems
			- Illicit discharge of sewage and wastewater

Nitrogen Compounds[5]	Ammonia, Nitrate/ Nitrite	4B[2], 5, 6, 7	- Atmospheric deposition
			- Leaf litter and debris
			- Runoff from over-fertilized landscaping
			- Improper storage or disposal of fertilizers and ammonia
			- Soil concentrations
			- Leaking septic systems
			- Groundwater concentrations
			- Industrial and commercial sources including:
			  - Landscaping businesses
			  - Nurseries

Salts	Chloride, TDS	4B[2], 5, 6, 7	- Naturally occurring salts in water supply - Saltwater swimming pool discharges
Pesticides	Pyrethroids	Bouquet Canyon	- Residential and professional use of pyrethroids as an insecticide, often to control Argentine ants[3]
	Diazinon and chlopyrifos	6	- Professional pesticide applications

Class	Constituent	Reaches/ Waterbodies	MS4 Potential Sources

Metals[2,5]	All (Copper, Iron, Mercury, Selenium, Zinc)	5,6,7	- Atmospheric deposition
			- Water supply
			- Commercial and municipal vehicle sources
			  - Gas stations, service stations and car washes
			  - Dealerships
			  - Municipal maintenance and storage yards
			- Soil concentrations, release of sediment during:
			  - Construction activities
			  - Gravel mining

	Copper	5,6,7	- Automotive sources
			  - Brake pad debris
			  - Vehicle fluids
			  - Wear on vehicle exterior and engine
			  - Tailpipe emissions
			- Architectural copper
			- Corrosion of copper pipes
			- Runoff of atmospheric deposition
			- Copper-containing pesticides and algaecides
			- Industrial uses including electroplating, metal finishing and semiconductor manufacturing

	Mercury	5,6,7	- Runoff of atmospheric deposition - Mercury containing products including batteries, dental amalgam, fluorescent lamps, jewelry, paint, thermometers and thermostats - Vehicle sources such as mercury switches and emissions that contribute to atmospheric deposition - Industrial uses including semiconductor manufacturing
	Selenium	6	- Nursery runoff - Groundwater concentrations - Mining and oil extraction
	Zinc	6	- Galvanized metal[4] - Vehicle sources such as tires
Other	Cyanide[6]	7	- Industrial uses including metal finishing, electroplating, plastics manufacturing, animal control and fumigation
Trash	Trash	Lake Elizabeth	- Litter from adjacent areas and roadways - Direct dumping

1. Los Angeles Regional Water Quality Control Board (RWQCB), 2010. Los Angeles River Watershed Bacterial TMDL. Adopted by the RWQCB on July 9, 2010.
2. Reach 4B is located in Ventura County but was considered for the purposes of understanding downstream water quality.
3. Castaic Lake Water Agency (CWLA), 2013. The Santa Clarita Valley 2013 Water Quality Report.
4. Larry Walker Associates (LWA), 2009. Urban Water Quality Management Plan for Copper, Mercury, Nickel, and Selenium in Calleguas Creek Watershed. March 25, 2009.
5. California Stormwater Quality Association (CASQA), 2014. Draft Effectiveness Assessment Guidance. May 2014.
6. California Regional Water Quality Control Board, San Francisco Bay Region, 2006. Staff Report on Proposed Site-Specific Water Quality Objectives for Cyanide for San Francisco Bay. December 4, 2006.

The Appendix A-1 includes a map of the major MS4 outfalls as part of the source assessment. No major structural controls were identified in the EWMP area.

The source assessment also identified that MS4s are not the primary source of several of the water quality priorities. As noted in both the Chloride and Nitrogen TMDLs, the primary sources of these constituents in the USCR are the wastewater treatment plants. Additionally, cyanide can be a laboratory contaminant and not many potential MS4 sources exist in the USCR EWMP area.

4.5 PRIORITIZATION

Based on the WBPC categorization and the source analysis, water quality priorities were identified. The prioritization was used to structure the process of identifying watershed control measures, conducting the RAA, and defining the adaptive management process for the EWMP.

Section VI.C.5.a.iv of the Permit identifies the minimum priorities to be considered for the first permit term (2012 to 2017) covered by the EWMP. The minimum priorities are:

- **Priority 1 (TMDLs):** TMDLs for which there are WQBELs and/or RWLs with interim or final compliance deadlines within the Permit term, or TMDL compliance deadlines that have already passed and limitations have not been achieved. This priority corresponds to WBPC categories 1A.
- **Priority 2 (Other Receiving Water Considerations):** WBPCs where data indicate impairment or exceedances of RWLs in the receiving water and the findings from the source assessment implicate discharges from the MS4. This priority corresponds to WBPC categories 2A and 3A.

In addition to the two priorities identified in the permit, Category 1B, TMDLs with deadlines beyond the current permit term were determined to be a priority for the USCR EWMP group and are considered Priority 1. The prioritized WBPCs are shown in **Table 4-6.** The prioritized constituents were utilized to direct the development of the EWMP towards the constituents of highest concern. The prioritized constituents were used to define the RAA approach and analysis and are the drivers for identification of control measures. Further discussion of how the prioritized constituents were utilized in the RAA is described in Section 6.

Table 4-8. Prioritized WBPCs

Class	Constituent	Santa Clara River Reach				Lake Elizabeth
		4B[1]	5	6	7	
Priority 1: TMDLs						
Bacteria	*E. Coli* (wet and dry)	X	X	X	X	
Salts	Chloride	X	X	X		
Trash	Trash					X
Priority 2: Other Receiving Water Considerations						
Metals	Copper		X[2]	X	X[4]	
	Iron		X	X		
	Mercury		X[2]	X[3]	X[4]	
	Zinc			X[3]		
Selenium	Selenium			X[3]		
Cyanide	Cyanide			X[3]	X[4]	
Salts	TDS		X[2]			

1. Reach 4B is in Ventura County but was considered for the purposes of understanding downstream water quality.
2. Copper, mercury and TDS have been observed as exceeding applicable water quality objectives in Reach 5, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.
3. Mercury, zinc, selenium and cyanide have been observed as exceeding applicable water quality objectives in Reach 6, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.
4. Copper, mercury and cyanide have been observed as exceeding applicable water quality objectives in Reach 7, and are prioritized as "other receiving water considerations" per Permit Provision 5.a.iv.2.a.

Categories without recent exceedances and WBPCs located in areas where MS4s are not a source contributing to the exceedances (categories 1D, 1E, 2C, 2D, 3C) are not considered to be priorities for the EWMP. Constituents within these categories have not had exceedances within the past 5 years, and are considered to be no longer exceeding water quality objectives, or MS4s were determined to not be the source because the exceedances occur in areas where there is no MS4 infrastructure. However, the RAA analysis addresses all of the WBPCs for which MS4s are contributing (1D, 2C, 3C and 3D) and demonstrates they will likely be addressed by the control measures identified for the prioritized constituents. Additionally, the constituents contributing to the impairments in Category 2B (e.g. toxicity, organic enrichment, etc.) are not yet identified and therefore cannot be specifically evaluated in the RAA analysis. As noted in the source assessment, controlling constituents identified as water quality priorities, such as pesticides and nutrients, may also contribute to reducing the Category 2B impairments and the EWMP is focused on addressing the constituents identified in the other categories. If the impairments continue after the other water quality priorities are addressed, further investigation will be conducted to identify control measures to address the remaining impairment(s).

5 Watershed Control Measures

The Permit requires the identification of Watershed Control Measures (WCMs), which are strategies, control measures, and BMPs[3] that will be implemented individually or collectively at the watershed-scale to result in compliance with WQBELs and RWLs (as identified through the water quality priorities analysis). This section provides an overview of the categories of BMPs identified in the USCR EWMP (and simulated by the RAA), summarizes existing and planned structural BMPs, and describes the institutional control measures that will be implemented, including customization of MCMs. In addition, details are provided for the highest priority regional projects that have been identified for the USCR EWMP.

The objectives for the WCMs as identified in the Permit are as follows:

- Prevent or eliminate the non-storm water discharges to the MS4 that are determined to be a source of pollutants to the MS4 or receiving waters.
- Implement pollutant controls necessary to achieve interim and final WQBELs and RWLs at the corresponding compliance schedules.
- Ensure the discharges from the MS4s do not cause or contribute to RWLs.

A network of control measures was selected and included in the EWMP Implementation Plan using a combination of existing information and modeling. The approach for selecting the control measures included the following steps:

1. Summarize existing structural and institutional BMPs (as described in this section);
2. Identify a menu of potential control measures to be considered (as described in this section);
3. Evaluate effectiveness of potential BMPs on receiving water quality and jurisdictional loading with modeling (Section 6); and
4. Identify the combination and sequencing of BMPs to be included in the EWMP Implementation Plan to achieve interim and final water quality objectives (Section 7).

As outlined in Section 1, by definition the USCR EWMP shall include multi-benefit regional projects that retain the storm water volume from the 85th percentile, 24-hour storm for the drainage areas tributary to the multi-benefit regional projects. Additionally, the WCMs should incorporate effective innovative technologies, approaches and practices, including green infrastructure. This section highlights multi-benefit regional projects to be implemented by the EWMP, along with innovative green infrastructure BMPs.

5.1 INTRODUCTION TO GENERAL BMP CATEGORIES

The first step in the process to select control measures for the EWMP was to identify existing and planned BMPs within the EWMP area. To effectively conduct this step and provide for consistency in discussing BMPs, standard nomenclature was developed. Two overarching categories of BMPs will be discussed throughout the EWMP:

[3] In this EWMP, the terms "control measures" and "best management practices (BMPs)" are used interchangeably.

- **Structural BMPs:** these BMPs retain, divert or treat stormwater and/or non-stormwater, and generally fall within distributed and regional approaches (see **Figure 5-1** for an illustration of distributed versus regional approaches).
- **Institutional BMPs:** these BMPs encompass the Minimum Control Measures (MCMs) outlined in the permit, other non-structural BMP's, and any other source control measures.

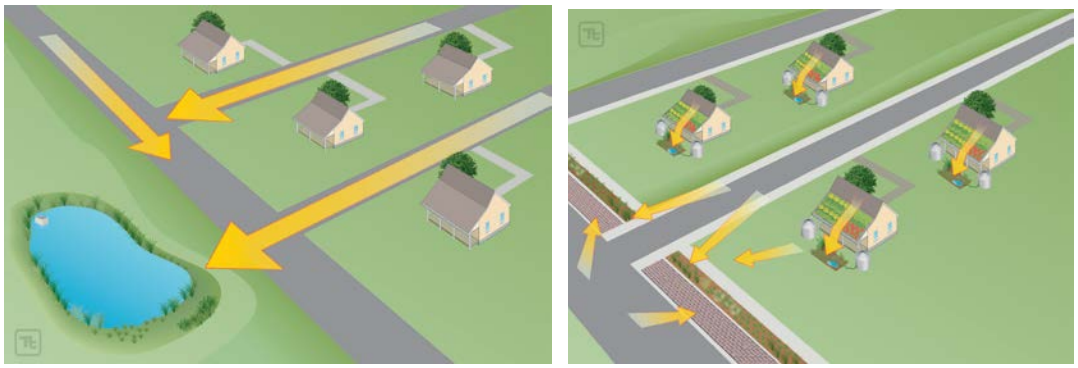


Figure 5-1. Conceptual Schematic of Regional (left) and Distributed (right) BMP Approaches

Furthermore, the three main categories of structural BMPs include low-impact development, green streets/green infrastructure, and regional, as defined below:

Low-Impact Development Distributed structural practices intended to treat runoff relatively close to the source and typically implemented at a single-parcel- or few-parcel-level (normally less than 10 tributary acres) (**Figure 5-2L**).

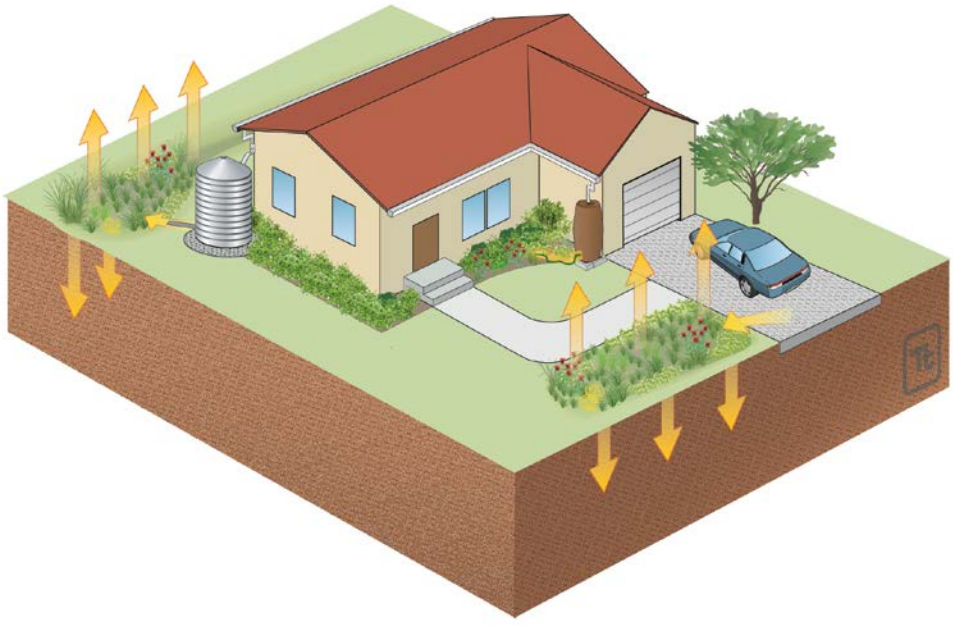


Figure 5-2. Conceptual schematic of LID implemented at the site scale (arrows indicate water pathways)

Green Streets and Green Infrastructure Distributed structural practices typically intended to treat runoff within public transportation rights-of-way (normally less than 10 tributary acres) (**Figure 5-3L**).

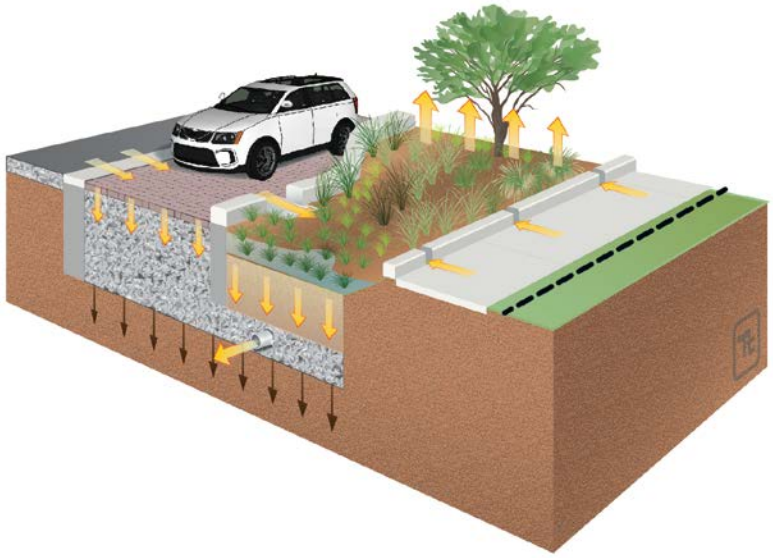


Figure 5-3. Conceptual schematic of green street/green infrastructure (arrows indicate water pathways)

Regional BMPs[4]: Constructed structural practices intended to treat runoff from a contributing area of multiple parcels (normally on the order of 10s or 100s of acres or larger) (**Figure 5-4**).

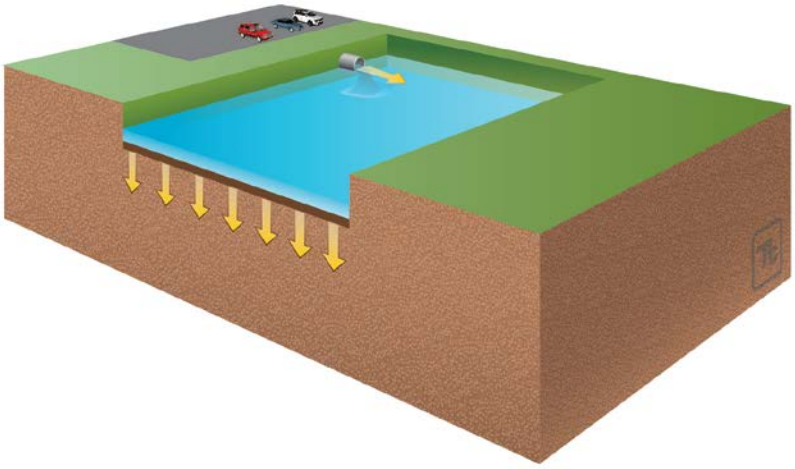


Figure 5-4. Conceptual schematic of regional BMP (arrows indicate water pathways)

[4] Note these regional BMPs are not necessarily able to capture the 85thpercentile, 24-hour storm. The subset of regional BMPs that can capture the 85th percentile, 24-hour storm are referred to as "Regional EWMP Projects" herein.

5.2 STRUCTURAL CONTROL MEASURES

Constructed BMPs will perform the majority of required pollutant reduction remaining after institutional control measures implementation for the Upper Santa Clara EWMP. To implement structural control measures efficiently at the watershed-scale and support compliance tracking, structural BMP programs will be an important element of EWMP implementation. This section describes the structural BMP programs necessary to implement the EWMP. The following categories of structural BMPs are included in the USCR EWMP (and each of these was modeled with the RAA):

BMP Type	Program	Category
Regional	Regional BMP Program	Regional BMPs on public land (Tier A and Tier B)
		Regional BMPs on private land
Distributed	Low Impact Development Program	LID ordinance
		LID on public land (retrofits)
		Residential LID
	Green Street Program	Green streets

5.2.1 Regional BMP Program

In the development of the EWMP, regional multi-benefit projects are prioritized, as emphasized in the Permit. Regional EWMP projects should retain (i) all non-storm water runoff and (ii) all storm water runoff from the 85th percentile, 24-hour storm event (design storm) for the drainage areas tributary to the projects, while also achieving other benefits including flood control and water supply. A RAA does not need to be conducted for areas draining to a regional EWMP project. Regional projects not sized to capture the 85th percentile, 24-hour storm (design storm) are included in the EWMP as smaller projects were sufficient in some cases to meet the TMDL and RWL requirements. These projects are included in the RAA to demonstrate the proposed size of the projects will be sufficient.

Figure 5-5. Subsurface infiltration gallery being constructed below a public park (source: Tetra Tech)

Regional projects are centralized facilities located near the downstream ends of large drainage areas (typically treating 10s to 100s of acres). Unlike LID and green streets, runoff is typically diverted to regional projects after it has already entered storm drains and engineered channels. Routing offsite runoff to public parcels (versus treating surface runoff near its source) often allows regional BMPs to be placed in the cost-effective locations with the best available BMP

Regional BMP Program Highlights:

- Implements large-scale BMPs on parcels
- High potential for significant load reduction
- Strategic selection of sites can yield cost savings
- Multi-benefits include water supply augmentation
- Integration with recreation & water supply key for funding
- Acquisition of parcels likely needed in the future

opportunity. Regional projects have access to large volumes of runoff from extensive upstream areas, and thus can provide a cost-effective mechanism for infiltration and pollutant reduction.

For the Upper Santa Clara EWMP, both public and private parcels were considered candidates for regional projects, although public parcels received priority over the (more expensive) private parcels (see Section 6 and Appendix C-3 for screening and prioritization details). The highest priority public parcel candidates were deemed "Tier A" regional projects, whereas remaining public parcel opportunities were labeled "Tier B" regional projects. The following specific types of regional BMPs are described further in Appendix B:

- Surface infiltration basin
- Subsurface infiltration gallery
- Surface detention basin
- Subsurface detention gallery
- Constructed wetland, flow-through/linear wetland

In identifying regional BMPs, consideration was also given to the variety of benefits beyond stormwater management that could be realized through project implementation, including water supply augmentation, community enhancement, park redevelopment, reducing flood hazards and habitat restoration. Water supply augmentation was prioritized when considering the benefits from specific regional projects in the Upper Santa Clara EWMP area. The Santa Clara River Valley receives much of its potable water from groundwater wells, and the alluvial aquifer along the river provides a valuable opportunity for groundwater recharge. Selection of regional projects prioritized areas that would provide water quality improvements required by the EWMP with water supply benefits. As a result, several of the regional projects in the USCR EWMP are located in recharge areas to help improve the water supply resiliency of the region and bolster support and potential funding for EWMP efforts. While efforts were made to coordinate with recharge areas wherever possible, it is recognized that one of the best locations for recharging groundwater is through the streambed. To meet the requirements of the Permit, regional BMPs must prevent the discharge of pollutants to the receiving waters and therefore must be located outside of receiving waters. As a result, regional BMP projects within the receiving waters were not considered at this time, but could be evaluated in the future with Regional Board approval for select, multi-benefit projects.

Regional projects can provide many other amenities to the community, including the following:

- Development and/or improvement of park facilities promotes recreation and enhances accessibility. Underground systems can allow the beneficial use of a site to be maintained while simultaneously managing stormwater.
- Where conditions restrict infiltration, runoff can be captured, stored, and used to offset potable water supplies for activities like toilet flushing and irrigation.
- Naturalized systems like infiltration basins and stormwater wetlands can also enhance plant and bird habitat, and allow educational opportunities through the creation of "outdoor classrooms."

While the RAA and Appendix C-3 provide a clear roadmap for regional project selection and execution in the near-term, the projects implemented under the EWMP will evolve over time to continue to identify and prioritize the best locations, sizes, and types of BMPs for pollutant reduction. Implementation of the regional BMP program will include methods to efficiently site, construct, maintain, and track regional BMPs. The program will consider not only the interactions between BMPs and their environmental factors, but also consider synergies and integration with concurrent drinking water, wastewater, and other engineering programs. In the developing Santa Clara River Valley, a regional BMP program is also particularly important in that undeveloped land can be identified, acquired (if necessary), and dedicated to multi-benefit projects *before* it is developed.

5.2.2 Highest-Priority (Tier A) Regional Control Measures

Multi-benefit regional projects are prominently featured in the Permit as "signature" components of the EWMP. This section highlights six specific highest-priority (Tier A) regional projects which the City and County have identified for the EWMP Implementation Plan.

Figure 5-6 shows the location of six example Tier A projects which are briefly described below. Detailed fact sheets for all Tier A candidates are provided in Appendix C-6, and Appendix C-9 provides conceptual designs for the projects detailed below.

Note that these projects are only a subset of all regional projects included in the EWMP. Appendix C-3 discusses the additional Tier A and Tier B regional projects. The approach/assumptions for representing regional BMPs in the RAA is described in Section 6.3, and the sequencing for implementing regional projects is discussed in Section 7. Projects were sized to capture and retain the 85th percentile design storm where practicable.

Site 3b: Newhall Park

Description

Runoff will be diverted to a subsurface cistern or infiltration chamber from an existing 90-inch storm drain. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

Key Facts

Owner:	**City of Santa Clarita**
Drainage Area:	**415 acres**
Parcel Size:	**14 acres**
BMP Capacity:	**9.7 acre-ft** ***(retains 85th%-ile)***

Site 7: Hasley Canyon Park

Description

Runoff will be directed to a subsurface cistern or infiltration chamber from an existing 84-inch storm drain. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

Key Facts

Owner:	**County of LA**
Drainage Area:	**187 acres**
Parcel Size:	**12 acres**
BMP Capacity:	**4.9 acre-ft** ***(retains 85th-%ile)***

Site 25: Canyon Country Park

Description

Runoff will be captured in a subsurface cistern or infiltration chamber from two storm drains that currently traverse the parcel. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

Key Facts

Owner:	**City of Santa Clarita**
Drainage Area:	**77 acres**
Parcel Size:	**2 acres**
BMP Size:	**2.8 acre-ft** ***(retains 85th%-ile)***

Site 26: Pico Canyon Park

Description

Runoff will be treated by regional and "naturalized" bioretention facilities incorporated into the existing park. In addition to water quality benefits, this retrofit could provide public outreach benefits and would be an ideal volunteer project.

Key Facts

Owner:	**LA County**
Drainage Area:	**38 acres**
Parcel Size:	**21 acres**
BMP Size:	**0.6 acre-ft (retains 85th%-ile)**

Site 26: Jake Kuredjian Park

Description

Runoff will be directed to a subsurface cistern or infiltration chamber from multiple existing storm drains. This project has potential to augment local water supply both through groundwater recharge or storage and use for onsite irrigation.

Key Facts

Owner:	**LA County**
Impervious Drainage Area:	**438 acres**
Parcel Size:	**6 acres**
BMP Size:	**8.0 acre-ft** ***(sized for water quality)***

Site X: Santa Clara River Floodplain

Description

Runoff from an existing concrete channel will be diverted to an infiltrating wetland basin along the bank of the Santa Clara River. This project was the potential to augment local water supply and provide opportunities for public education and recreation.

Key Facts

Owner:	**LA County**
Drainage Area:	**982 acres**
Parcel Size:	**27 acres**
BMP Size:	**18 acre-ft (retains 85th%-ile)**

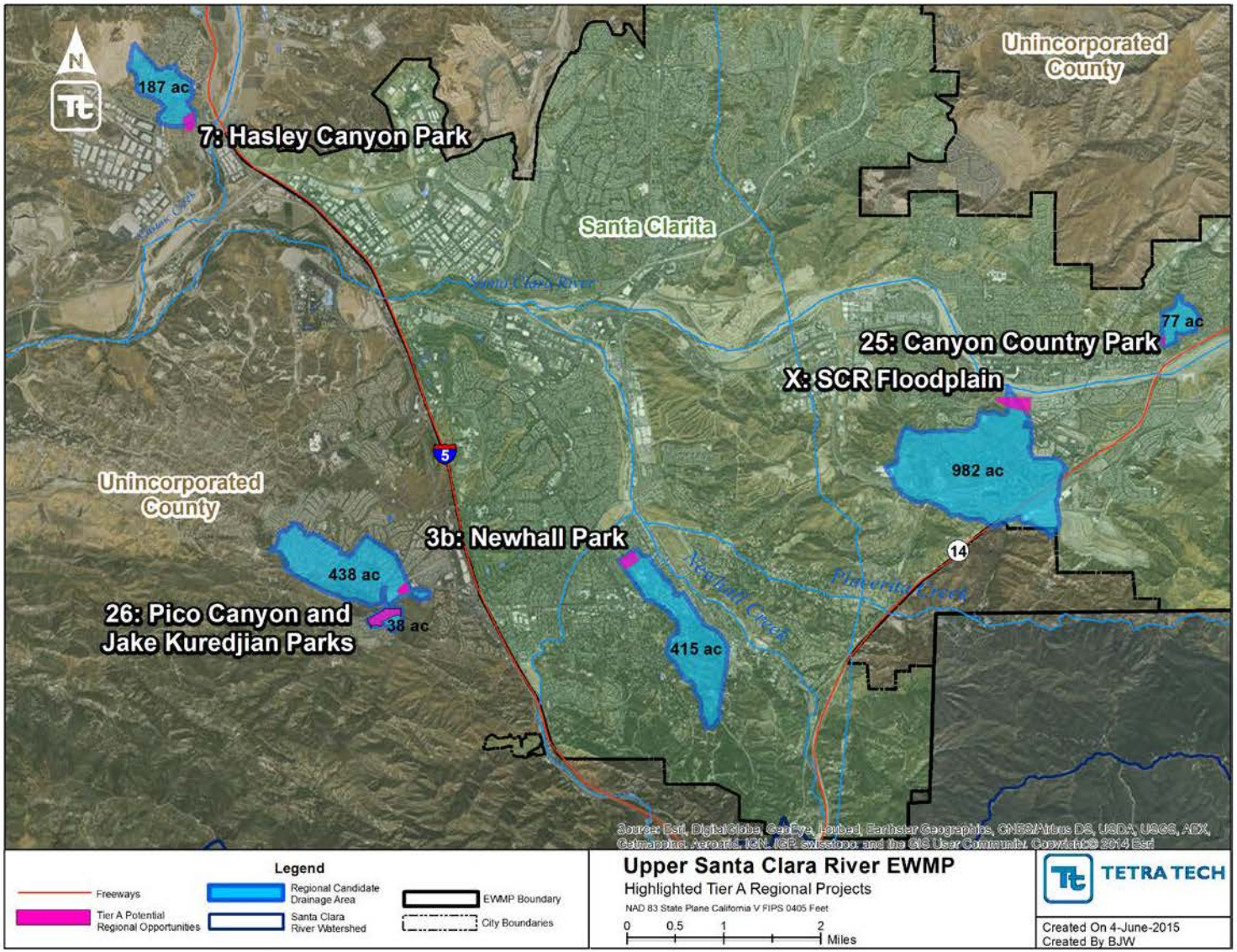


Figure 5-6. Map of Six Highlighted Tier A Projects
Notes: Site numbers correspond to identifiers listed above and in Appendix C

5.2.3 Low Impact Development (LID) Programs

A key element of the structural BMP strategy for the USCR EWMP is to assume that low impact development (LID) will be distributed throughout the watershed. For the purposes of this EWMP, it is assumed that LID is defined as a series of distributed structural practices that capture, infiltrate, and/or treat runoff at the parcel scale. Common LID practices include bioretention, permeable pavement, and other infiltration BMPs that manage runoff at the source. Rainfall harvest practices such as cisterns can also be used to capture rainwater - that would otherwise run off a parcel - and use it to offset potable water demands. Appendix B provides fact sheets explaining several potential LID practices. For the RAA, the LID BMPs are designed to capture the 85th percentile storm from the parcels on which they are located.

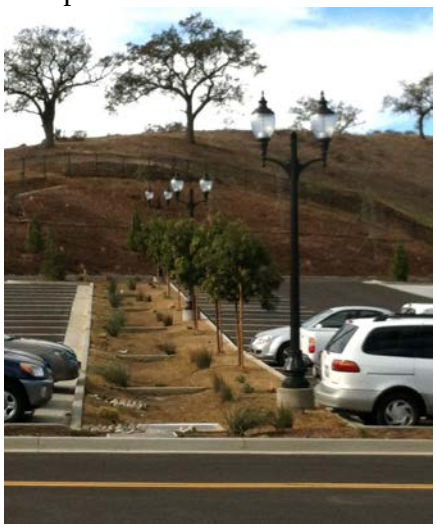


Figure 5-7. City of Santa Clarita Biofiltration Parking Lot - McBean Transfer Station

(source: City of Santa Clarita)

While individually these features are not large, when deployed across numerous parcels throughout the watershed, they can collectively make significant progress towards improving water quality and achieving RWLs. Since the vast majority (nearly 90 percent) of runoff from the developed portion of the watershed is generated from impervious areas on parcels, LID is a natural choice as a key strategy to address imperviousness. This strategy can be viewed as the "first line of defense" due to the fact that the water is treated on-site before it runs off from the parcel and travels downstream into the MS4. Especially for areas where regional opportunities do not exist downstream, LID is an effective strategy that will only be limited by the extent of implementation.

The following paragraphs provide an overview of each specific LID strategy. Appendix C-3 provides an analysis that defines the overall opportunity for and extent of implementation for each LID strategy. The approach/assumptions for representing LID BMPs in the RAA is described in Section 6.3. As the LID Program is implemented throughout the watershed, it will be important for the City and County to track BMP implementation and compare efforts to the assumptions and projections made in the RAA and adapt as necessary.

LID Ordinance Program Highlights:

- Ongoing water quality improvement program
- EWMP needs to account for water quality benefits
- Costs to WMG agencies minimal
- Requires strong standards and oversight
- Benefit based on number of redeveloped parcels

LID Ordinance (Redevelopment)

Stormwater regulations require significant development and redevelopment projects to incorporate LID concepts into their site design. For redevelopment projects, this means that the runoff normally generated by the parcel will be routed to individual BMPs, greatly improving the effluent water quality and materially advancing EWMP objectives. The key benefit to the WMG members is that these projects are 100 percent funded by the developer. As such, the RAA assumes that a certain percentage of parcels are redeveloped over the course of the compliance period to reflect the benefits of the LID ordinance. Note that, although the LID ordinance also addresses new development, only *re*development is assumed to accomplish a net improvement in water quality (because

redevelopment disconnects and treats existing impervious surfaces, whereas newly developed sites with LID will maintain existing, pre-development conditions).

Figure 5-8. Residential CLWA Drought Tolerant Landscaping
(source: City of Santa Clarita)

As this program matures it is important to maintain a robust set of engineering standards to ensure that BMPs are being sized, sited, and designed properly. The City and County will retain the responsibility of reviewing and approving calculations, engineering plans, and specifications provided by developers. Ultimately, a strong LID ordinance program provides an inexpensive strategy to continually make progress towards EWMP goals.

Residential LID

Accounting for approximately 14 percent of all developed impervious area in the watershed, residential parcels represent an important opportunity for LID implementation. Runoff from residential parcels is often directly connected to a curb and gutter or other conveyance system on the street. The RAA assumes that a residential LID program will be initiated within the watershed to encourage and incentivize residential homeowners to retrofit their properties with LID features. This program targets runoff from existing residential developments that would not be subject to the LID ordinance.

Residential LID Program Highlights:

- Incentivizes installation of BMPs on residential land
- Offsets more expensive BMPs downstream
- NGO partners can help develop and operate program
- Homeowner engagement and stewardship is critical
- Benefit based on rate of adoption by homeowners

Treating runoff through a voluntary program at the residential parcel scale can significantly offset the need for regional or green infrastructure BMPs retrofits and could reduce the overall operations and maintenance burden on the City and County. A well-designed residential LID program will thoroughly engage individual homeowners to establish a sense of stewardship and ownership as they transform small areas of their property into stormwater treatment elements. Incentive programs can potentially be aligned with existing water conservation programs such as turf replacement or xeriscaping incentives. Partnering with key non-governmental organizations can be an effective strategy to rapidly developing an effective program that includes community engagement and preparation of standard plans and procedures.

Figure 5-9. Permeable Paver Parking Lot - City of Santa Clarita Valencia Glen Park
(source: City of Santa Clarita)

LID on Public Parcels (retrofits)

Although public parcels represent less than 1 percent of all impervious land use in the watershed, they provide key opportunities to implement LID on parcels where the City and County have domain. These opportunities provide several key advantages, including the ability to coordinate efforts with already-planned infrastructure upgrades (e.g., parking lot rehabilitations), avoidance of land acquisition costs, and the opportunity for public engagement and education.

Public Parcel LID Program Highlights:

- Implements LID on public parcels through retrofits
- Key opportunities for public education
- Readily integrated into planned site rehabilitation
- Can be leveraged to generate public support/funding
- Small number of public parcels limits total impact

Sites that attract significant public traffic, such as libraries, City Hall, and parks can also provide excellent forums to demonstrate LID practices. Not only will these demonstrations help the City and County to achieve the goals of the EWMP, if done properly they can advance the public's understanding, acceptance, and support for these types of projects which will be critical for developing financial funding strategies for larger efforts (such as green streets and regional projects).

Existing and Planned BMPs

In addition to the above three programs, the EWMP incorporates ongoing structural BMP activities that have recently been or are currently taking place. An inventory of existing and planned structural BMPs within each jurisdiction was developed to account for these activities. Existing and planned BMPs were identified through a data request distributed to the City and County to identify BMPs within the Upper Santa Clara River EWMP area. In addition, a literature review was performed to identify further structural BMP projects that were not encompassed by the data request.

Figure 5-10. City of Santa Clarita Valencia Library Parking Lot (source: City of Santa Clarita)

The literature review included the following documents/sources:

- Integrated Regional Watershed Management Plan (IRWMP) documents,
- Notice of Intent (NOI),
- 2011-2012 Annual Report, and
- Online OPTI database[5] (for planned BMPs).

Existing and Planned BMP Highlights:

- Accounts for ongoing or recent BMP activity
- Projects will count as credit toward EWMP objectives as they are completed
- Documentation of project details is key

Appendix C-3 summarizes the existing and planned structural BMPs and Appendix C-5 provides a detailed list of all identified projects.

[5] OPTI is the regional tracking database cited in the Greater LA Region Integrated Regional Water Management Plan: http://www.ladpw.org/wmd/irwmp/index.cfm?fuseaction=Projects

5.2.4 Green Streets Program

The public right-of-way along streets may be the most extensive opportunity for the City and County to implement BMPs on public land. In developed areas, curb and gutter in the road provides the primary means of conveying stormwater (and associated pollutants) directly to storm drain inlets and receiving waters. Green streets provide an opportunity to intercept this runoff prior to entering the MS4 and treat it within the extents of the public right-of-way. Green streets have been demonstrated to provide "complete streets" benefits in addition to stormwater management, including pedestrian safety and traffic calming, street tree canopy and heat island effect mitigation, increased property values, and even reduced crime rates.

Figure 5-11. Green Street - City of Santa Clarita Sand Canyon Highway On Ramp Project (source: City of Santa Clarita)

As with LID, green streets tend to be distributed practices that are deployed throughout a watershed to treat runoff near the source. Key advantages of green streets, however, are that they are located on land directly controlled by public entities and can intercept runoff from larger upstream drainage areas when compared to LID projects.

Green streets are typically implemented as linear bioretention/biofiltration BMPs installed parallel to roadways. The infiltration/biofiltration BMPs receive runoff from the gutter via curb cuts or curb extensions (sometimes called bump outs) and infiltrate it through native or engineered soil media. Permeable pavement can also be implemented in tandem, or as a standalone practice, in shoulders of the streets. The approach/design assumptions for representing green streets in the RAA are described in Section 6.3. Details on green street BMPs, including the additional benefits, are presented in Appendix B.

Due to the large number of locations where green streets could be implemented, and the relative magnitude of green streets as a BMP category (compared to other BMPs) in the EWMP Implementation Plan, a green streets program will be a key element of the compliance strategy for the EWMP, and other retention BMPs may be used also.

Green Street Program Highlights:

- Implements green infrastructure in the rights-of-way
- High potential for significant load reduction
- Agencies retain ownership and O&M burden
- Design/construction standards can yield efficiency
- Strategic selection of streets can yield cost savings
- Opportunity for integration with CIP
- Data limitations currently hamper decision making

The development of a reliable, repeatable, and cost-effective program will require several considerations:

- Development and integration of standard specifications and drawings tailored to meeting EWMP objectives (by December 2018);
- Strategic identification and prioritization of street-scale opportunities (which can significantly reduce capital costs; by December 2017);
- Coordination with existing street and/or utility rehabilitation programs (by December 2018);

- Adaptation and/or enhancement of existing O&M practices for roadside bioretention and permeable pavement (by December 2018); and
- BMP tracking systems (by December 2017).

Although the green streets program will carry significant responsibility for achieving EWMP goals, effort on this program must be balanced with other programs, especially the residential LID program and the regional BMP program. For example, downstream of places where the residential LID program is heavily implemented, or upstream of locations where large regional projects are constructed, the need for green street retrofits will be re-assessed. As with the LID Program, the City and County will track the details of green street implementation, such as street length, retention design characteristics, and drainage area to compare to the assumptions/performance used in the RAA.

5.3 INSTITUTIONAL CONTROL MEASURES

The Permit provides a list of Minimum Control Measures (MCMs) in Part VI.D that can be assessed by the Permittees to focus their resources on the water quality priorities addressed by the EWMP. As described in the Permit (Part VI.D, pg 67), each Permittee shall implement the requirements in Parts VI.D.4 through VI.D.10, or may implement customized actions within each category of control measures as set forth in an approved EWMP (with the exception of MCMs in the Planning and Land Development Program, which may not be modified or eliminated). Customization may include replacement of an MCM with a more effective measure, reduced implementation of an MCM, augmented implementation of the MCM, focusing the MCM on the water quality priority, or elimination of an MCM. In addition, institutional control measures proposed for non-stormwater discharges meet the requirements for these measures described in Part III.A.

As part of EWMP development, the MCMs were evaluated and customized to address water quality priorities using the process shown in **Figure 5-12.** The results of MCM evaluation are presented in the sections below.

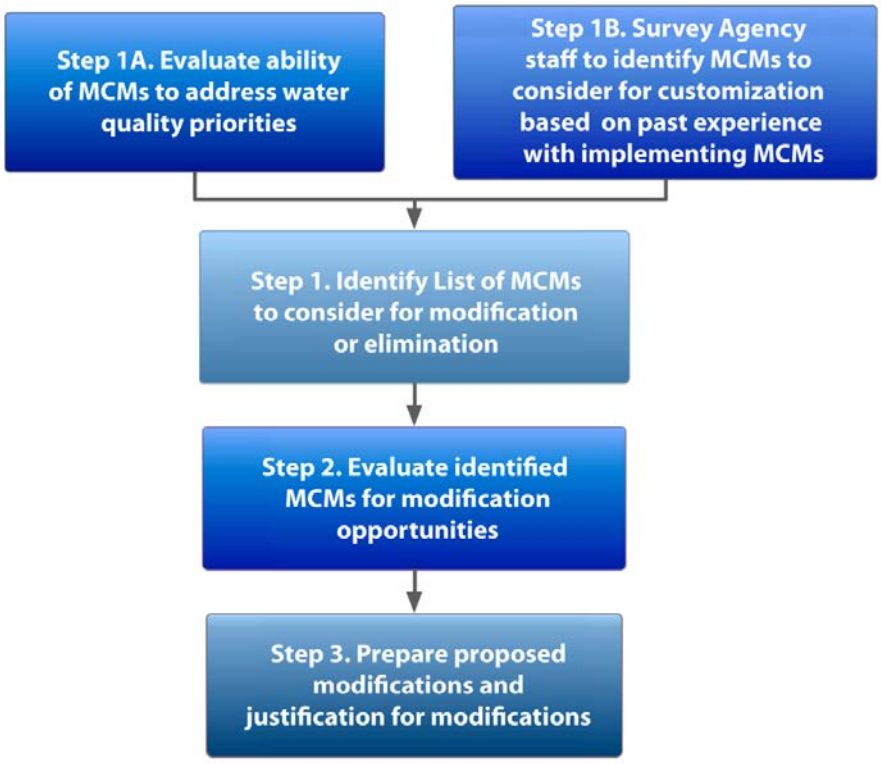


Figure 5-12. MCM Customization Process

5.3.1 MCM Customization Process

As the first step in the MCM customization process, the MCMs listed in Part VI.D of the Permit were evaluated to identify whether they address each water quality priority. Resources such as the California Stormwater Quality Association (CASQA) BMP Handbooks[6] that relate the control measures to the targeted constituents, and information from the source assessment were used in this evaluation. In addition, MCMs were identified that only indirectly address a water quality priority. For example, a Public Outreach control measure may directly address a water quality priority if that pollutant is the focus of an outreach message, or the message may broadly address pollution prevention without targeting any specific pollutants. The results of this evaluation are presented in Appendix B-2. MCMs that do not address or only partially address the water quality priorities were considered candidates for customization.

In addition, MCMs were evaluated for their effectiveness in addressing each water quality priority. This assessment was qualitative, based on resources including CASQA BMP Handbooks and effectiveness assessment guidance,[7] stormwater program implementation experience, available scientific literature, and Center for Watershed Protection resources. The results of the effectiveness evaluation are presented in Appendix B-2. MCMs with low effectiveness for the water quality priorities were candidates for customization.

[6] https://www.casqa.org/store/category/tabid/146/c-4-best-management-practice-bmp-handbooks.aspx
[7] https://www.casqa.org/casqastore/products/tabid/154/p-7-effectiveness-assessment-guide.aspx

MCMs were also evaluated by USCR EWMP Group agency staff to identify candidates for customization based on stormwater program staff's knowledge and experience. The survey results identified MCMs that have presented challenges or have not provided useful information. When filling out the survey, the agency staff evaluated control measures based on his/her experience within the stormwater program, and indicated which control measures the agency believes should be eliminated or customized.

The customization of MCMs was evaluated separately for the City and the County. Results of the evaluation demonstrated similarities in agencies' approaches to inspections and outreach programs. Both agencies intend to modify these types of program to focus on the water quality priorities identified within the EWMP. **Table 5-1** summarizes the proposed MCM modifications common to both the City and the County to focus the EWMP on the water quality priorities. The County will implement the remaining MCMs identified in Part VI.D with no additional modifications.

In addition, to the common MCM modifications, the City has identified additional MCM modifications and enhancements. The City will implement the MCMs identified in Part VI.D of the Permit, with the exception of the modifications presented in **Table 5-1** and **Table 5-2.** The modifications were selected to focus the City's program to most effectively target the water quality priorities. In addition, a number of additional MCMs and enhancements to the MCMs identified in Part VI.D. were identified to provide further reductions to the pollutants that are water quality priorities. The proposed MCM enhancements to the MCMs identified in Part VI.D. are presented in **Table 5-3**.

Table 5-1. Common Modifications-City and County

2012 Permit Requirement	Modification	Justification for Modification
D.5 Public Information and Participation Program (PIPP)		
Develop and distribute public education materials on: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes.	Outreach material content and distribution will be focused on sources with the potential to contribute pollutants identified as water quality priorities (bacteria, metals, pesticides). For example: • Pet shops/feed stores-- focused on pet waste/bacteria sources • Automotive parts stores and home improvement centers –focused on automotive sources of metals, household mercury-containing products	Outreach efforts will focus on water quality priorities to most effectively utilize agency resources.
Distribute public education materials at points of purchase including automotive parts stores, home improvement centers, landscaping/garden centers, pet shops/feed stores.		
D.6. Industrial/Commercial Facilities		
Educate - notify each facility in inventory of BMP requirements once per permit cycle.	Outreach material content and distribution will be focused on industrial/commercial facilities with the potential to contribute to pollutants identified as water quality priorities.	Outreach to industrial/commercial facilities will focus on water quality priorities to most effectively utilize resources.
Inspect facilities twice during the 5 year permit term (w/first inspection within 2 years of the effective date and 6 months in between inspections); industrial facilities that have been inspected within 24 months do not have to be inspected (evaluate year 2/year 4).	Inspection frequencies will be modified based on potential for facility to be a source of pollutants identified as water quality priorities. For example: • All facilities to be inspected once within 2 years of the effective date, and evaluated as potential source of pollutants identified as water quality priorities. • Facilities not determined to be potential sources may not warrant a second inspection. • Facilities determined to be potential sources will be inspected up to two additional times during the permit term.	Implement prioritized inspection program focused on water quality priorities to most effectively utilize resources.

2012 Permit Requirement	Modification	Justification for Modification
D.8. Development Construction		
Conduct as needed inspections of sites < 1 acre based on threat to water quality (TTWQ); Establish priority inspection process.	Prioritized inspection process will be developed based on the potential for site to be a source of pollutants identified as water quality priorities[1].	Implement prioritized inspection program focused on water quality priorities to most effectively utilize resources.
D.9 Public Agency Activities		
Develop retrofit opportunity inventory (within public ROW or in coordination with TMDL implementation plan; evaluate and rank.	EWMP regional and distributed project selection process will be utilized to meet these requirements rather than implementing separate evaluations for retrofit opportunities.	Separate procedures are not needed as these considerations are incorporated into the EWMP control measure selection process
Develop procedures to assess impact of flood mgmt. projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible.		
Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible.		
D.10 Illicit Connections and Illicit Discharges Elimination		
Signage adjacent to open channels provide info re: public reporting.	Implement signage in prioritized areas only	Modify to focus on water quality priorities

1. Per the 2012 Permit, the following factors shall be considered in evaluating the threat to water quality: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; non-storm water discharges; past record of noncompliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

Table 5-2. Additional City Modifications to MCMs

2012 Permit Requirement	Modification	Justification for Modification
D.8. Development Construction		
Develop/implement SOPs/inspection checklist	Develop/Modify checklist to explicitly address watershed priorities and associated sources	Modify to focus on water quality priorities

Table 5-3. City Enhancements to MCMs

2012 Permit Requirement	Enhancement
D.5. Public Information and Participation Program (PIPP)	
Develop and distribute public education materials on: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes.	PIPP expansion to focus on water quality priorities, including the following enhancements: • Rain Barrel artist decoration/ Kids Water Art/Street Fair; • Keep California Beautiful participation; • Work with Community College Santa Clarita Environmental Education Consortium (SCEEC) to find opportunities for water quality related education; • Provide Residential Outreach Through HOA program, Advertise National Wildlife Foundation Backyard Habitat Certification program, Residential rain barrel program
Distribute public education materials at points of purchase including automotive parts stores, home improvement centers, landscaping/garden centers, pet shops/feed stores.	
D.2 Progressive Enforcement (Applies D.6, D.7, D.8, and D.10)	
Take progressive enforcement	Provide education program in conjunction with enforcement program.
D.6 Industrial/ Commercial Facilities	
Implement a Business Assistance Program (mandatory) for select sectors or small businesses - technical assistance, and distribute materials to specific sectors	Make accessible water quality training related to businesses through local business organizations (i.e. Chamber of Commerce, etc.).
D.9 Public Agency Activities	
Develop retrofit opportunity inventory (within public ROW or in coordination with TMDL implementation plan; evaluate and rank	Tree/Sidewalk Backlog as a Criteria for Determining Green Streets Retrofit Locations
Post signs at access points to water bodies (open channels, creeks; lakes)	Develop and implement Adopt-a-Creek program to include signage at access points.
Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains	SSORP/SSMP/MS4 Maintenance Program
Street sweeping - Priority A: 2x/mo; B: 1x/mo; C: as needed, not less than 1x/yr	Continue implementation of current program; enhance with advanced sweeping technology in areas that require additional pollutant reduction
	Install satellite based irrigation controllers for public spaces
	River and Creek restoration projects (e.g., Arundo/tamarisk removal, reforestation)

The City is also committed to maintaining open space in the EWMP area. This practice will prevent future degradation of water quality in the most rapidly developing portion of Los Angeles County.

5.3.2 Additional Institutional Control Measures

In addition to potential modifications to the MCMs, opportunities for additional institutional controls were identified. These opportunities include:

- True source control, such as removal of metals from brake pads and pesticide bans
- Ordinances or other agency controls on sources, such as requirements for saltwater pools
- Water conservation, such as increased irrigation control measures and drought response

- Enhanced street sweeping
- Enhanced illicit connection program, particularly targeting sanitary sewer cross connections/overflows
- Enhanced inspection and enforcement programs
- Enhanced enforcement of community aesthetics standards regarding trash

During implementation of the EWMP, the USCR EWMP Group members will look for opportunities to maximize the use of institutional control measures.

6 Reasonable Assurance Analysis

A key element of the EWMP is the RAA, which is prescribed by the Permit as a process to demonstrate "that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term" (Permit section C.5.b.iv.(5), page 63). While the Permit prescribes the RAA as a quantitative *demonstration* that identified watershed control measures will be effective, the RAA also promotes a modeling process to support the EWMP Group with *selection* of control measures. In particular, the RAA was used to evaluate the many different scenarios/combinations of institutional, distributed and regional control measures (described in Section 5) that could potentially be used to comply with the RWLs and WQBELs of the Permit, and was then used to select the control measures specified in the EWMP Implementation Plan (described in Section 7). It is acknowledged that while the RAA is a critical element of the EWMP, the content can be rather technical and some readers may wish to skip to Section 7 which describes the EWMP Implementation Plan (the outcome of the RAA).

This section describes key elements of the RAA including the following:

- Modeling system used for the RAA (6.1)
- Baseline critical conditions and required pollutant reductions (6.2)
    - Baseline model calibration (6.2.1)
    - Water quality targets (6.2.2)
    - Critical conditions for wet weather and dry weather (6.2.3)
    - Selection of limiting pollutants (6.2.4)
    - Required interim and final pollutant reduction (6.2.5)
- Representation of control measures in RAA (6.3)
- Approach for selecting control measures for the EWMP Implementation Plan (6.4)

As referenced throughout this section, many details of the RAA are provided in the RAA Appendix which is attached as Appendix C (including several sub-appendices). In 2014, the Regional Board issued RAA Guidelines (Regional Board, 2014), which outline expectations for developing RAAs, and those guidelines were followed closely during development of this RAA.

6.1 MODELING SYSTEM USED FOR THE RAA

The Watershed Management Modeling System (WMMS) is the modeling system used to conduct the RAA for the USCR EWMP. WMMS is specified in the Permit as an approved tool to conduct the RAA. The LACFCD, through a joint effort with United States Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decision making when managing stormwater. The WMMS is a comprehensive watershed model of the entire Los Angeles County area that includes the unique hydrology and hydraulics features and characterizes water quality loading, fate, and transport for all of the key TMDL constituents (Tetra Tech 2010a, 2010b). The ultimate goal of WMMS is to identify cost-effective water

quality improvement projects through an integrated, watershed-based approach. A version of WMMS[8] is available for public download from Los Angeles County Department of Public Works website (http://dpw.lacounty.gov/wmd/wmms/).

The entire WMMS domain encompasses Los Angeles County's coastal watersheds of approximately 3,100 square miles, representing 2,566 subwatersheds. Of those, the USCR EWMP area encompasses 260 subwatersheds[9] (**Figure 6-1**).

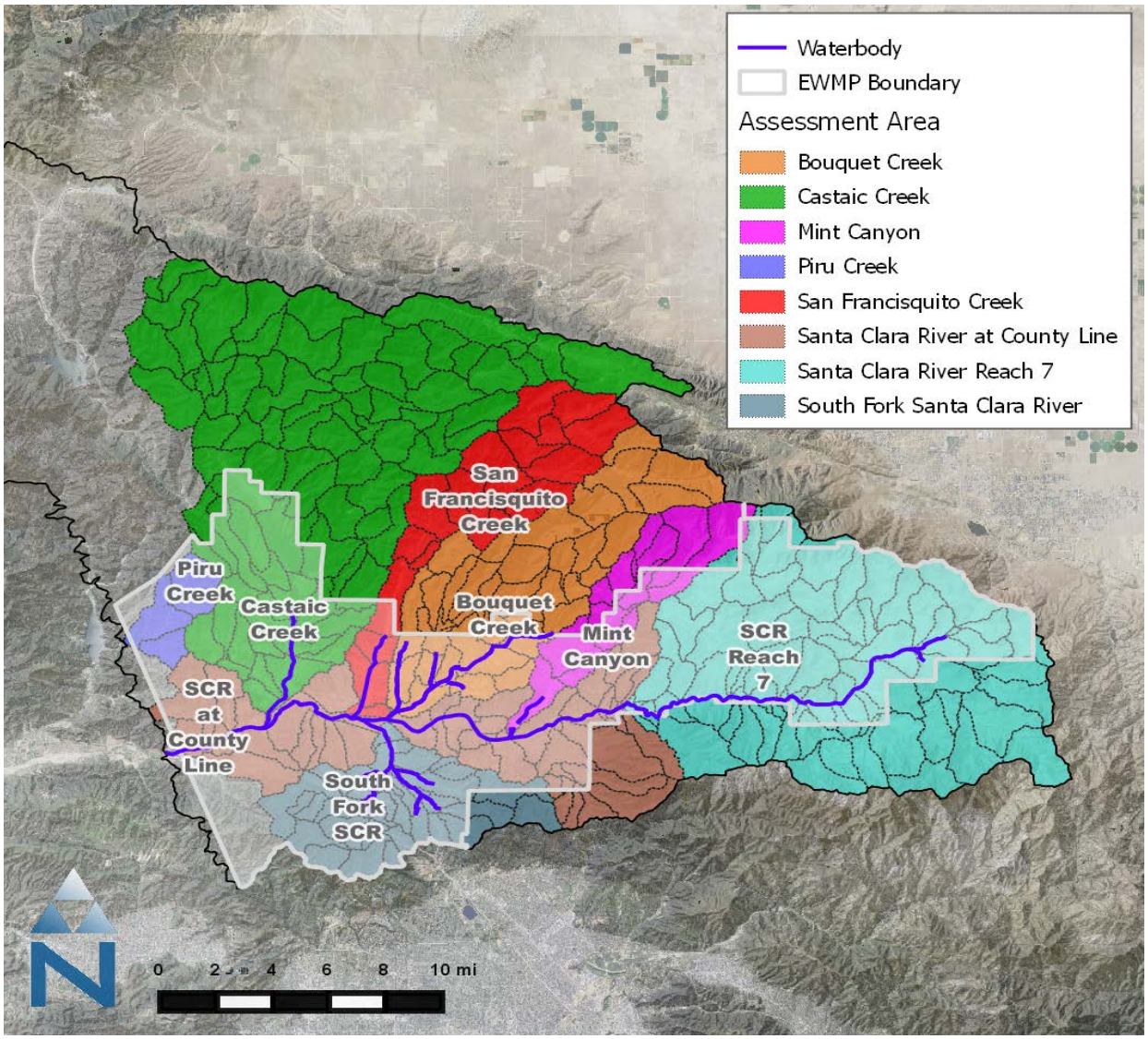


Figure 6-1. USCR EWMP Area and 260 Subwatersheds Represented by WMMS

[8] The version of WMMS used for this RAA was enhanced from the version available for download. Enhancements include updates to calibration parameters according to the RAA Guidelines (Regional Board, 2014), more refined BMP routing assumptions, and application of an updated two-tier, jurisdiction-based BMP optimization approach.

[9] To support evaluation of regional BMPs, some of these subwatersheds were further grouped by "pour point" to receiving waters.

The WMMS is a suite of three modeling tools to support BMP planning:

1. A watershed model for prediction of baseline hydrology and pollutant loading (Loading Simulation Program – C+ [LSPC]);
2. A model for simulating the performance of control measures in terms of flow, concentration and load reduction (System for Urban Stormwater Treatment Analysis and Integration [SUSTAIN]); and
3. A tool for running millions of potential scenarios and optimizing/selecting control measures based on cost-effectiveness (also within SUSTAIN).

The LSPC and SUSTAIN models within WMMS are described in more detail in the following subsections.

6.1.1 Watershed Model - LSPC

The watershed model included within WMMS is the Loading Simulation Program C++ (LSPC) (Tetra Tech and USEPA 2002; USEPA 2003; Shen et al. 2004). LSPC is a watershed modeling system for simulating watershed hydrology, erosion, and water quality processes, as well as in-stream transport processes. LSPC also integrates a GIS, comprehensive data storage and management capabilities, and a data analysis/post-processing system into a convenient Windows-based environment. The algorithms of LSPC are identical to a subset of those in the Hydrologic Simulation Program–FORTRAN (HSPF) model with selected additions, such as algorithms to dynamically address land use change over time. USEPA's Office of Research and Development (Athens, Georgia) first made LSPC available as a component of USEPA's National TMDL Toolbox (http://www.epa.gov/athens/wwqtsc/index.html). LSPC has been further enhanced with expanded capabilities since its original public release.

6.1.2 BMP Performance and Selection Model – SUSTAIN

The System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) was developed by the USEPA to support practitioners in developing cost-effective management plans for municipal stormwater programs and evaluating and selecting BMPs to achieve water quality goals (USEPA, 2009; http://www2.epa.gov/water-research/system-urban-stormwater-treatment-and-analysis-integration-sustain). SUSTAIN was specifically developed as a decision-support system for selection and placement of BMPs at strategic locations in urban watersheds **(see Figure 6-2**). It includes a process-based continuous simulation BMP module for representing flow and pollutant transport routing through various types of structural BMPs. This simulation provides the *primary application* of SUSTAIN – simulating the performance of selected stormwater control measures.

The *secondary application* of SUSTAIN is BMP selection, which is based on cost-benefit of different BMP alternatives. The SUSTAIN model in WMMS includes a cost database[10] comprised of typical BMP cost data from a number of published sources including BMPs constructed and maintained in Los Angeles County (Tetra Tech 2010a, 2010b). SUSTAIN considers certain BMP properties as "decision variables," meaning they are allowed to vary within a given range during model simulation to support BMP selection and placement

[10] The BMP cost database from WMMS was updated for this EWMP, as described in Section 6.4.2.

optimization. As BMP sizes and locations change, cost and performance change too. SUSTAIN runs iteratively to generate a cost-effectiveness curve comprised of millions of BMP scenarios (e.g., the model was used for the EWMP to evaluate the different combinations of green infrastructure as compared to regional BMPs, and provides a recommendation on the most cost-effective scenario)[11].

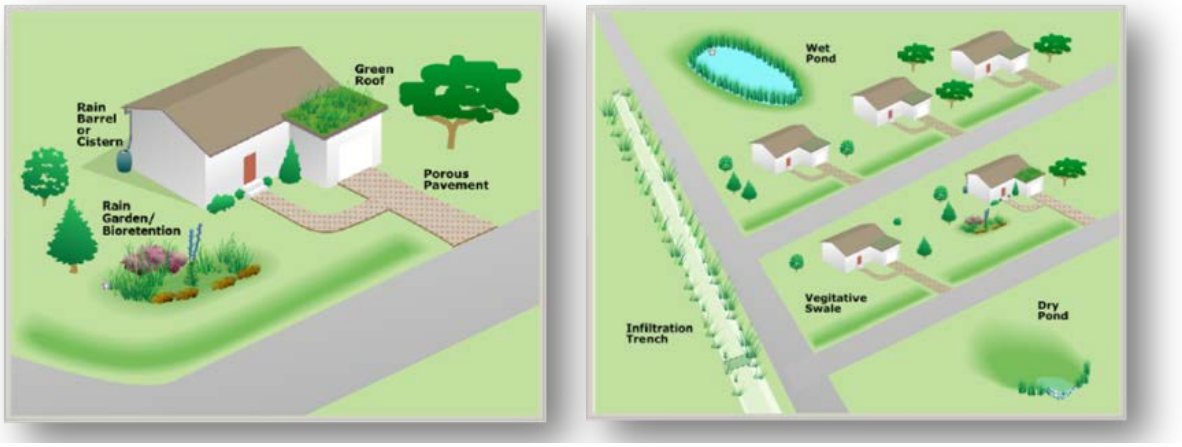


Figure 6-2. SUSTAIN Model Interface Illustrating BMP Opportunities in Watershed Settings

6.2 BASELINE CRITICAL CONDITIONS AND REQUIRED POLLUTANT REDUCTIONS

This section describes the application of the LPSC model to simulate current conditions, identify critical conditions and calculate required pollutant reductions. The calculated required reductions drive the extent of the control measures to be implemented by the EWMP under the EWMP Implementation Plan.

6.2.1 Baseline Model Development and Calibration

A fundamental element of the RAA is simulating baseline / existing conditions in the watershed prior to implementation of control measures. For the USCR RAA, baseline conditions were simulated using the LSPC watershed model in WMMS, including predictions of flow rate and pollutant concentrations over a 10-year period, as follows:

- The simulation period is October 1, 2001 to September 20, 2011[12].
- Simulated pollutants include total suspended solids, *E. coli*, total copper, total zinc, total lead, total nitrogen and total phosphorous.
- An hourly time step was used to simulate the flow rate and pollutant concentration at each of the 260 subwatershed outlets **(see Figure 6-1)** and the resultant downstream receiving water conditions.

[11] For the EWMP, optimization was conducted at the jurisdictional-level using SUSTAIN as opposed to the watershed-level using the Nonlinearity-Interval Mapping Scheme (NIMS) component of WMMS.
[12] All stormwater control measures implemented prior to September 30, 2011 are assumed to be implicitly represented within the baseline conditions.

- The model explicitly accounts for effects of major hydraulic structures in the watershed including impoundments such as Castaic Lake.

To encourage accurate representation of existing/baseline conditions, the RAA Guidelines provide "model calibration criteria" for demonstrating that the baseline predictions are accurate and to ensure the "calibrated model properly assesses all the variables and conditions in a watershed system" (Regional Board, 2014). Detailed hydrology and water quality calibrations were performed for the USCR RAA, as follows (see **Figure 6-3** for a map of water quality and hydrology calibration stations):

- Water quality calibration: the water quality calibration process for the USCR RAA leveraged two primary monitoring datasets: (1) small-scale, land use-specific water quality monitoring data collected by the Southern California Coastal Water Research Program (LACDPW, 2010b) and (2) large-scale receiving water monitoring data collected by LACDPW at mass emission stations in Santa Clara River (S29).
- Hydrology calibration: a total of two (2) stations were used for the hydrology calibration including gages in the headwaters Santa Clara River.

The comparison of the calibrated hydrology model to the RAA Guidelines is shown in **Table 6-1,** and the water quality calibration is shown in **Table 6-2.** The baseline (LSPC) model performs quite well for representing existing hydrologic and water quality conditions. Details of the baseline model development and calibration are presented in Appendix C-1.

Table 6-1. Summary of Hydrology Calibration Performance by Baseline Model

Location	Model Period	Hydrology Parameter	Modeled vs. Observed	RAA Guidelines Performance Assessment
Santa Clara River at Old Bridge Road (LA DPW F92C)	10/1/2002 – 9/30/2011	Annual Volume	12.1%	Good
		Storm Volume	20.0%	Fair
Santa Clara River near Lang Station (LA DPW F93B)	10/1/2002 – 9/30/2011	Annual Volume	8.3%	Very Good
		Storm Volume	16.6%	Fair

Table 6-2. Summary of Water Quality Calibration Performance by Baseline Model

Water Quality Parameter	Santa Clara River Mass Emission Station (S29)		
	Sample Count	Modeled vs. Observed Load (% Error)	RAA Guidelines Performance Assessment
Total Sediment	50	-10.2%	Very Good
Total Copper	46	1.3%	Very Good
Total Zinc	49	-6.1%	Very Good
E.coli *	52	-3.0%	Very Good

* *E. coli* was assumed to have a 1:1 translator with fecal coliform.

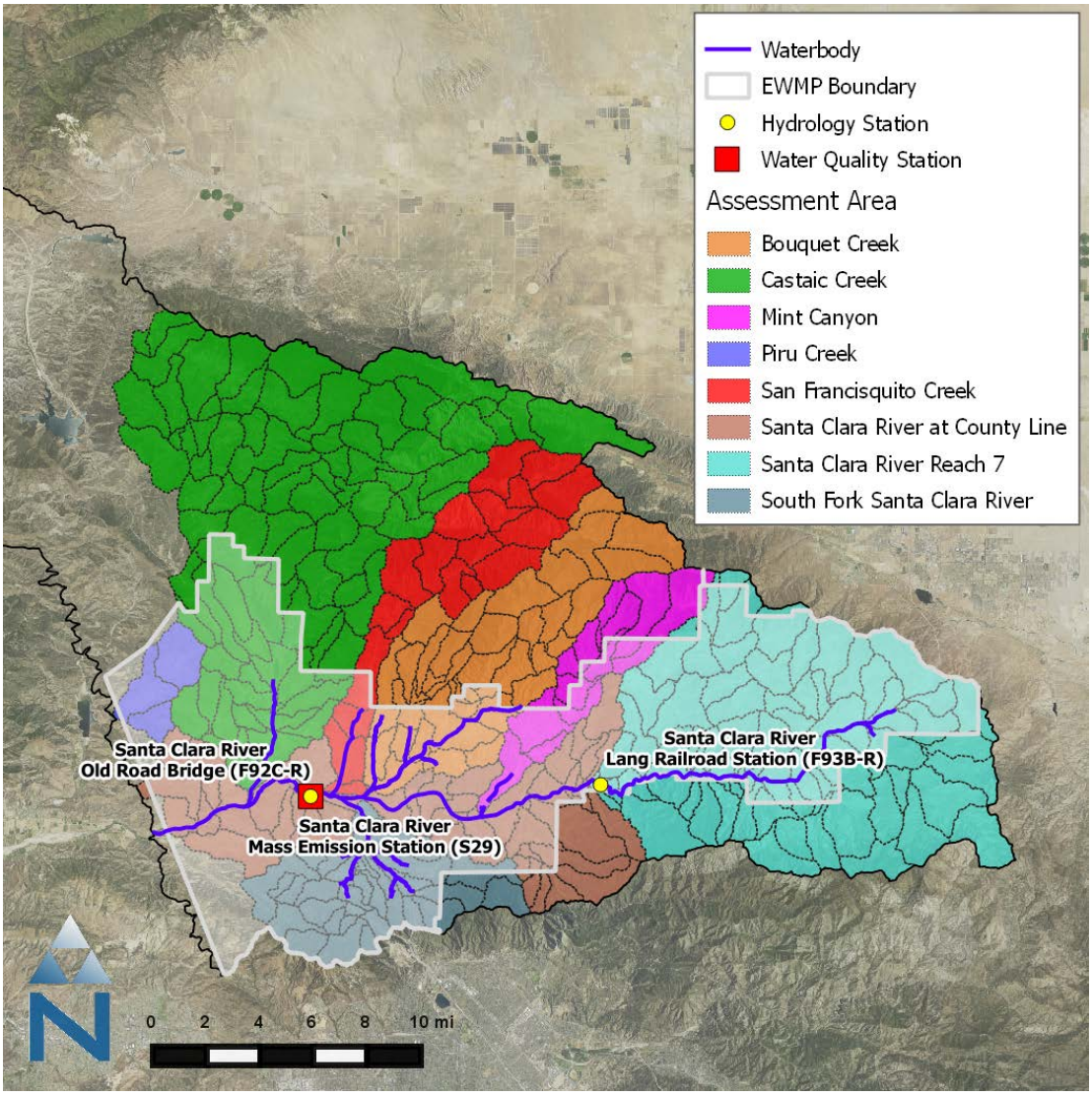


Figure 6-3. Hydrology and Water Quality Calibration Stations for USCR RAA

6.2.2 Water Quality Targets

The RAA is designed to achieve the RWLs and WQBELs shown in **Table 4-1** with a focus on addressing the prioritized water quality priorities identified in Section 4 of the EWMP. The RWLs and WQBELs serve as the "water quality targets", or loads or concentrations to be achieved through implementation of the control measures specified by the EWMP.

While a number of constituents were identified as water quality priorities, as discussed in Section 4.5, the prioritized water quality priorities that are of most concern and therefore drive the RAA analysis are bacteria, metals, salts, selenium and cyanide. Based on the source analysis, only bacteria and metals are expected to have significant MS4 sources. As a result, not all pollutants are directly modeled. Only the prioritized constituents with significant MS4 sources were modeled – total suspended solids, zinc, copper, and *E. coli*. The targets for USCR Water Quality Priorities are listed in **Table 6-3**, organized by pollutant class. Because upstream discharges can impact downstream waterbodies, the targets were applied to all assessment areas in the model. For non-modeled water quality priorities, the RAA uses analyses of monitoring data to demonstrate that control of one or more "limiting pollutants" will address the non-modeled pollutants (as discussed below).

6.2.3 Critical Conditions

The following subsections describe the critical conditions for wet weather (stormwater) and dry weather (non-stormwater).

6.2.3.1 Wet Weather Critical Conditions

A key consideration of the RAA is the "critical condition" under which water quality targets must be achieved. Stormwater management for different size storms generally requires different size BMPs. For example, for most pollutants, management of a 90th percentile storm requires larger BMPs than management of a median (50th percentile) storm. The RAA Guidelines specify the RAA for final compliance should be based on critical conditions, for example, the 90th percentile flow rates and/or the critical conditions specified by applicable TMDLs (Regional Board, 2014). For the USCR RAA, two primary *wet weather* critical conditions were considered as follows:

1. **Critical <u>bacteria</u> storm:** for addressing *E. coli* impairments, the "critical bacteria storm" is the 90th percentile wet day when bacteria RWLs apply. Bacteria RWLs were assumed to *not* apply on days subject to Allowable Exceedance Days. The bacteria TMDL allows 16 Exceedance Days annually. As such, the critical condition for the RAA is the 90th percentile, 17th wettest day of the year. The critical condition was defined to provide reasonable assurance of compliance on the 17th wettest day in 9 of 10 years, which is consistent with the TMDL and RAA Guidelines. Within each water year between 2002 and 2012, the 17th-wettest day was determined (the first day with RWLs apply). For the 10-year simulation, there are 10 of those days (one per year) and the 2nd wettest is the critical bacteria storm (the 2nd highest of 10 values is the 90th percentile). The simulated critical bacteria storm is a

24-hour storm. The EWMP retains[13] the critical bacteria storm runoff from each subwatershed outlet, prior to discharge to receiving waters, to achieve *E. coli* WQBELs.

2. **90th percentile metals Exceedance Volume:** to address metals Water Quality Priorities, the 90th percentile daily flow condition was used, which is consistent with metals TMDLs in the region including the San Gabriel River metals TMDL. As an analog to daily flow volume, the USCR RAA analyzes the volume of runoff during each rolling 24-hour period[14] of the 10-year simulation when water quality targets were exceeded, referred to as the "Exceedance Volume" **(see Figure 6-4).** The storm that produces the 90th percentile Exceedance Volume[15] is the critical condition for management[16] of metals in stormwater by USCR EWMP. The Exceedance Volume differs for each metal (zinc and copper) and for different subwatersheds (end-of-pipe) and assessment areas (instream) depending on land use, imperviousness, slope, etc. The EWMP manages (retains and/or treats) the Exceedance Volume from each of the 260 subwatersheds in the USCR area to achieve metals RWLs. Of the assessment areas / watersheds in the USCR EWMP area, South Fork Santa Clara River was the only one where bacteria control measures did not manage the 90th percentile zinc Exceedance Volume (as described in the next section), and thus the summary statistics for zinc Exceedance Volumes for South Fork SCR are shown in **Table 6-4.** The 51 subwatersheds in South Fork SCR required additional capacity to manage zinc.

These critical conditions form the basis of the planning control measures for inclusion in the EWMP. Appendix C-10 provides additional information regarding the Exceedance Volume critical condition, including comparison to other 90th percentile conditions.

[13] Addressing bacteria though retention of the critical bacteria storm has several benefits for the RAA. First, the RAA for bacteria is essentially based on *hydrology* rather than prediction of bacteria concentrations / loads which can be challenging given the variability of bacteria concentrations in the environment and multitude of potential bacteria sources. By emphasizing *retention* prior to discharge to receiving waters, the RAA acknowledges that few stormwater control measures are able to reliably treat bacteria to concentrations below applicable RWLs. Note the depth of rainfall that generates the critical bacteria storm varies by subwatershed based on historical rainfall at rain gages in the EWMP area (e.g., generally larger storms at higher elevations and smaller storms at lower elevations). Subwatersheds where bacteria concentrations are predicted to be below *E. coli* RWLs in 100% of the time steps during the 10-year simulation are excluded from retaining the critical bacteria storm (generally, only watersheds with 0% impervious area meet this exclusion condition).

[14] A duration of 24-hours was selected for several reasons. First, the metals TMDLs in the region use a daily flow rate as the critical condition and thus 24-hours is an analogous duration. Second, the 24-hour duration allows the Exceedance Volume to be directly compared to the runoff volume from the 85th percentile, 24-hour storm. Finally, stormwater control measures are generally sized to manage an individual storm – and thus the 24-hour Exceedance Volume is much more relevant to BMP sizing than an annual runoff volume.

[15] The Exceedance Volume is an appropriate metric for RAA critical conditions because the *volume* of stormwater to be managed ultimately drives the capacity of control measures in the EWMP. The Exceedance Volume allows the volume to be defined based on applicable RWLs and assures attainment of RWLs. For example, a storm that generates a large volume of stormwater runoff with pollutant concentrations slightly above the RWLs is more difficult to manage than a storm that generates a small volume of runoff with concentrations that greatly exceed the RWLs. Also, the Exceedance Volume is dependent on the water quality target / RWLs – if a target / RWL is increased then the volume of stormwater to be managed is decreased.

[16] For metals, the term "manage" incorporates both retention and treatment approaches (unlike bacteria, which is based on retention). Retention of the Exceedance Volume for metals assures attainment of metals RWLs. Treatment of the Exceedance Volumes to concentrations below the RWLs also assures RWL attainment. Furthermore, institutional control measures reduce pollutant build-up on watershed surfaces and thus can also decrease the Exceedance Volume.

Table 6-3. Targets for Water Quality Priority Pollutants in USCR

Pollutant Class	Pollutant	Modeled Y/N?	Target for RAA (units are ug/L except when noted otherwise)				Assessment Area[4]							
			Dry Weather	Source	Wet Weather	Source	Bouquet Creek	Castaic Creek	Mint Cyn	Piru Creek	San Francis-quito Creek	SCR at R7	SCR at County Line	South Fork SCR
Bacteria [1]	*E. coli*	Yes	126 MPN / 100mL	Basin Plan	235 MPN / 100mL	Basin Plan	×	×	×	×	×	×	×	×
Metals [2]	Copper	Yes	14.6	CTR	23	CTR	×	×	×	×	×	×	×	×
	Zinc	Yes	187	CTR	187	CTR	×	×	×	×	×	×	×	×
	Iron	No	1,000 mg/L			Basin Plan	×	×	×	×	×	×	×	×
	Mercury	No	0.051			CTR	×	×	×	×	×	×	×	×
	Cyanide	No	5.2	CTR	22	CTR	×	×	×	×	×	×	×	×
	Selenium	No	5			CTR	×	×	×	×	×	×	×	×
Nutrients[3]	Ammonia	No	pH dependent RWL			Basin Plan	×	×	×	×	×	×	×	×
	Nitrate+Nitrite	No	5 mg/L			Basin Plan	×	×	×	×	×	×	×	×
Salts	Chloride	No	100 mg/L			TMDL	×	×	×	×	×	×	×	×
	TDS	No	600-1300 mg/L			Basin Plan	×	×	×	×	×	×	×	×
Pesticides	Diazinon	No	0.17			EPA	×	×	×	×	×	×	×	×
	Chlorpyrifos	No	0.041	EPA	0.083	EPA	×	×	×	×	×	×	×	×

1. The Bacteria TMDL allows 16 wet Allowable Exceedances per year. Dry weather target based on 30-day geometric mean WQO while wet weather target is based on single sample maximum WQO. While the dry weather RAA is based on the simulation of a 30-day critical dry period, Attachment L of the Permit includes WQBELs and RWLs, applicable in dry weather, that are based on a single sample maximum threshold as well as the geometric mean limitation.
2. Based on total metals. Target based on hardness of 169 mg/L as CaCO3, which is the average hardness of the SCR according to mass emission station monitoring. Dry weather target based on chronic criteria and wet weather based on acute criteria, when applicable.
3. Permittees are subject to the Santa Clara River Nitrogen Compounds TMDL for discharges to Reach 5, described in Attachment L, which indicates a 1-hr average and a 3-day average effluent limitation for ammonia and a 30-day average effluent limitation for nitrate+nitrite
4. Analysis was conducted to ensure applicable WQBELs and RWLs were achieved in reaches where the constituents were water quality priorities. Not all of these pollutants are priorities in every waterbody.

Table 6-4. Exceedance Volume Summary Statistics for USCR

Exceedance Volume Statistics (units of acre-feet)	RAA Assessment Area (at watershed mouth)								
	Bouquet Creek	Castaic Creek	Mint Canyon	Piru Creek	SCR at Reach 7	San Francisquito Creek	SCR at County Line	South Fork Santa Clara River	
	E. coli [1]								Zinc [2]
Number of non-zero Exceedance Volumes in dataset used to calculate 90th percentile	10	10	10	10	10	10	10	10	2,749
Average EV	216	437	75	14	441	238	1565	238	74
10th percentile EV	37	334	22	0.1	148	79	546	93	20
25th percentile EV	88	373	25	0.4	162	92	647	121	52
Median EV	120	437	35	1	179	119	895	210	110
75th percentile EV	162	502	84	4	290	265	1265	262	213
90th percentile EV	488	540	161	33	925	492	3102	415	648

1. For E. coli, the entire volume of runoff is assumed to be an Exceedance Volume. For the 10-year simulation, the 17th-wettest day in each year (a total of 10 values) is identified and the 2nd-ranked is the 90th percentile value (the 2nd highest of 10 values is the 90th percentile).
2. For zinc, the storm that generates the 90th percentile Exceedance Volume in the 10-year simulation is the critical condition (based on analyzing 87,660 rolling 24-hour periods in the 10-year simulation). Of the 87,660 24-hour periods, 2749 had a zinc Exceedance Volume greater than zero.

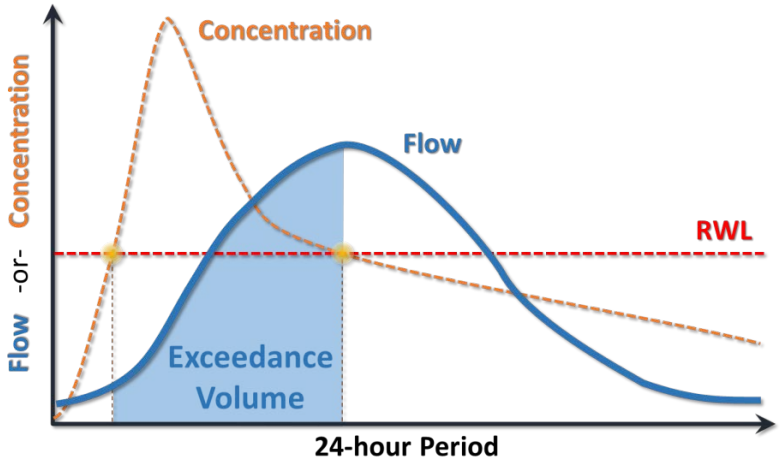


Figure 6-4. Illustration of How Metals Exceedance Volume is calculated for Critical Condition Determination

6.2.3.2 Dry Weather Critical Conditions

A separate RAA was performed for dry weather conditions to assure that control measures in the EWMP attain dry weather WQBELs / RWLs and address non-stormwater discharges that are effectively prohibited. This subsection summarizes the development of the non-stormwater model developed for the dry weather RAA. A detailed description of the dry weather RAA is provided in Appendix C-2.

The MS4 Permit effectively prohibits discharges of non-stormwater[17] and states that EWMPs shall "ensure that discharges…do not include non-stormwater discharges that are effectively prohibited." In addition, the MS4 Permit includes dry weather WQBELs for the Santa Clara River Bacteria, Nutrient and Chloride TMDLs. A baseline non-stormwater model was developed for the USCR EWMP based on the following components:

- **Simulation of non-stormwater sources that generate dry weather runoff:** the primary source of non-stormwater is outdoor water use. As such, the dry weather RAA is based on a simulation of non-stormwater whose *source* is outdoor water use[18] in each of the subwatersheds within the EWMP area and whose *sink* is evapotranspiration and retention by wet weather EWMP control measures.
- **Non-stormwater generated by outdoor water use based on extensive literature review:** the amount of non-stormwater generated in each USCR subwatershed was estimated as the product of [1] the estimated population based on U.S. census blocks and [2] the estimated per capita outdoor water use based on compilation of 25 estimates relevant to southern California **(see Figure 6-5).** The use of median historical outdoor

[17] Non-stormwater does not include all dry weather runoff. For example, permitted dry weather discharges (e.g., dewatering) and groundwater baseflow are exempted/allowed by the Permit.

[18] By focusing on the non-stormwater portion of dry weather runoff, the non-stormwater analysis and dry weather RAA are focused on the portion of dry weather runoff that is required to be controlled by MS4s. Non-stormwater volumes are not necessarily equal to dry weather runoff volumes in the EWMP area. Non-stormwater is the portion of dry weather runoff that is effectively prohibited by the Permit. Dry weather runoff would also include groundwater that is discharged through the MS4 system (if any), which is allowed by the Permit.

water use is likely conservatively high, as outdoor water use has likely fallen substantially during the recent drought periods.

- **Thirty (30) day simulation of critical dry period:** the period of the simulation was a critical dry period identified in the average water year (August 21, 2007 to September 20, 2007). This portion of the year (late August to September) historically receives the least amount of rainfall. The evapotranspiration during this period provides the weather boundary condition for the non-stormwater simulation.

While the critical conditions for dry and wet weather are uniquely defined, it is important that dry and wet weather conditions not be evaluated in separate silos – the EWMP includes a large network of wet weather BMPs that will eliminate a majority of non-stormwater discharges. The dry weather RAA quantifies the reduction of wet weather BMPs on non-stormwater discharges, and assures that TMDL milestones are attained on the required implementation timeline. The EWMP Implementation Plan for non-stormwater is presented in Section 7.

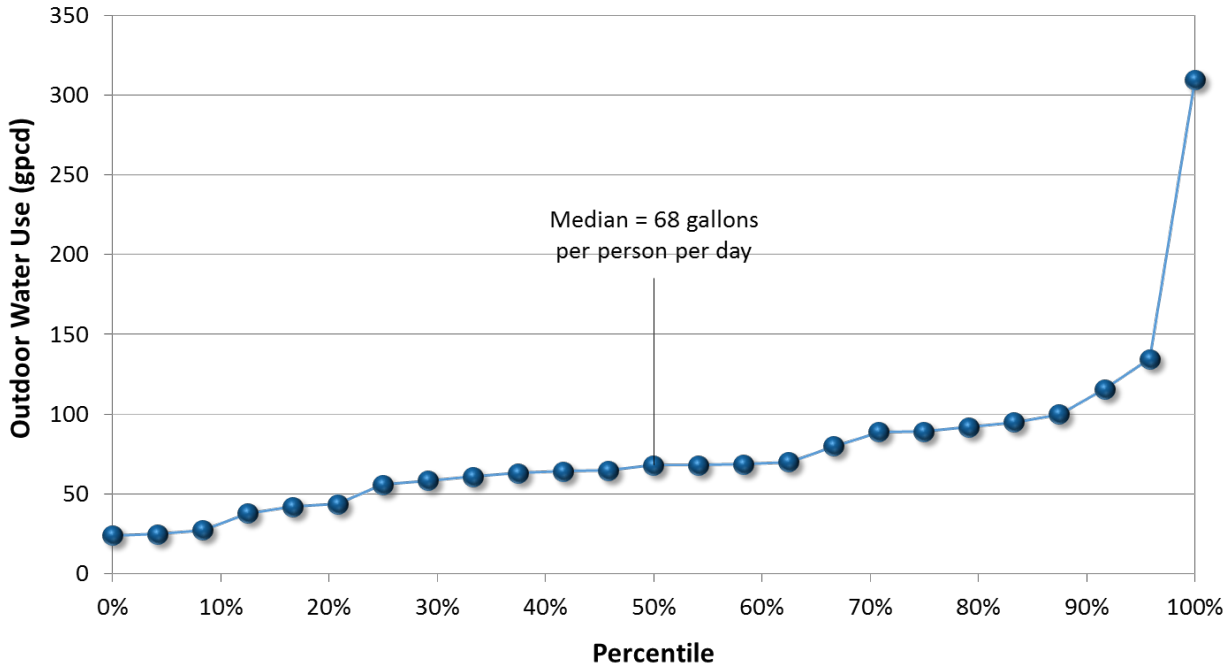


Figure 6-5. Outdoor Water Use Estimates from Literature Review

6.2.4 Limiting Pollutant Selection

The RAA Guidelines allow the EWMP to be developed with consideration of a "limiting pollutant", or the pollutant that drives BMP capacity (i.e., control measures that address the limiting pollutant will also address other pollutants). The detailed limiting pollutant selection and justification for each Water Quality Priority pollutant is provided in **Table 6-5**. The limiting pollutants are as follows:

- **Wet weather – zinc and *E. coli***: according to the Exceedance Volume analysis and review of monitoring data, control of zinc and *E. coli* requires BMP capacities that are the largest among the Water Quality Priority pollutants, and thus control of zinc and *E. coli* has assurance of addressing the other USCR wet weather Water Quality Priorities.

The RAA for USCR first identifies the control measures to attain bacteria WQBELs (through retention of the critical bacteria storm) and then identifies additional capacity, if any, needed to achieve zinc RWLs (during the zinc critical condition).

- **Dry weather – *E. coli***: among all the pollutants monitored during dry weather at mass emission stations in LA County, *E. coli* most frequently exceeds RWLs. Attainment of dry weather RWLs for *E. coli* in these waterbodies will require at least a 41% reduction[19] in *E. coli* loading, which is anticipated to require significant control measures and/or reductions in non-stormwater discharges. As such, control of *E. coli* during dry weather[20] has assurance of addressing the other USCR dry weather Water Quality Priorities.

As shown in **Figure 6-6**, the RAA sequentially addresses the limiting pollutants in stormwater and non-stormwater based on the limiting pollutant analysis.

It is important to distinguish between reasonable assurance and required implementation actions when considering limiting pollutants. While control of zinc and *E. coli* has reasonable assurance of addressing other Water Quality Priorities, it is not *necessary* to fully control zinc and *E. coli* to address the other Water Quality Priorities. For example, as shown in **Table 6-5**, exceedances of metals during dry weather are rare and thus existing MCMs and control measures have reasonable assurance of attaining metals RWLs during dry weather. As such, compliance with EWMP implementation should be determined separately for each constituent and condition (wet or dry) as described in Section 7.

[19] Based on data analysis of samples from SCR Reach 5 (n = 468 samples), the reduction of the 90th percentile *E. coli* concentration to achieve the RWL of 126 MPN per 100 mL is 41%.

[20] Chloride was evaluated as a potential limiting pollutant in USCR, but the data analysis found required reductions are relatively low compared to *E. coli*. In Reach 5 of the SCR, the 90th percentile chloride concentration was 137 mg/L (n = 476 samples), requiring a 20% reduction to achieve the RWL of 100 mg/L. In Reach 6 SCR, the chloride reduction from the 90th percentile concentration to achieve the RWL was 20% (n = 298 samples). In Reach 7, the 90th percentile concentration was less than the RWL (n = 7 samples). In comparison, in SCR Reach 5 the reduction of the 90th percentile *E. coli* concentration to achieve the RWL of 126 MPN per 100 mL is 41% (n = 468 samples). Additionally, the primary source of chloride (the wastewater treatment plants) are implementing control measures that will likely result in the receiving water meeting water quality objectives with only small reductions required from reducing non-stormwater discharges.

Table 6-5. Limiting Pollutant Selection and Justification for RAA

Pollutant Class	Pollutant	RAA approach to Addressing Pollutant			
		Wet Weather RWLs: Addressed by	Justification for control approach	Dry Weather RWLs: Addressed by	Justification for control approach
Bacteria	*E. coli*	*E. coli* controls	*E. coli* is one of two wet weather limiting pollutants.	*E. coli* controls	*E. coli* is the dry weather limiting pollutant.
Metals	Copper	Zinc controls	A large portion of copper loading is being phased out through brake pad replacement (AB346). The reduction will cause zinc to become limiting the limiting metal.	Existing MCMs and BMPs	Exceedances of metals during dry weather are rare. In both SCR Reach 5 and Reach 6 the 90th percentile dry weather concentration of copper, mercury, and iron is less than the RWL. (These are the reaches where most monitoring data are available, more than 450 samples in each reach),
	Zinc	Zinc controls	Zinc is one of two wet weather limiting pollutants. The volumes of stormwater to be managed for zinc control are greater than volumes for control of these other metals.		
	Iron				
	Mercury				
	Cyanide			Existing MCMs and BMPs	Exceedances of cyanide during dry weather are rare. In SCR Reach 6, the 90th percentile concentration is only 3% higher than the RWL
	Selenium			Existing MCMs and BMPs	Exceedances of selenium during dry weather are rare. In SCR Reach 6, the 90th percentile concentration is below the RWL.
Nutrients	Ammonia	Not applicable – not a Water Quality Priority for wet weather conditions.		Existing MCMs and BMPs	Nutrients are being met in the receiving water and do not require any additional controls.
	Nitrate+Nitrite				
Salts	Chloride	Not applicable – not a Water Quality Priority for wet weather conditions.		*E. coli* controls	Volumes of non-stormwater to be managed for *E.coli* control are greater than volumes for control of salts (if any is needed after implementation of controls at wastewater treatment plants).
	TDS				
Pesticides	Diazinon	Zinc controls	The volumes of stormwater to be managed for zinc control are greater than volumes for control of these pesticides.	*E. coli* controls	Volumes of non-stormwater to be managed for *E.coli* control are greater than volumes for control of these pesticides.
	Chlorpyrifos				

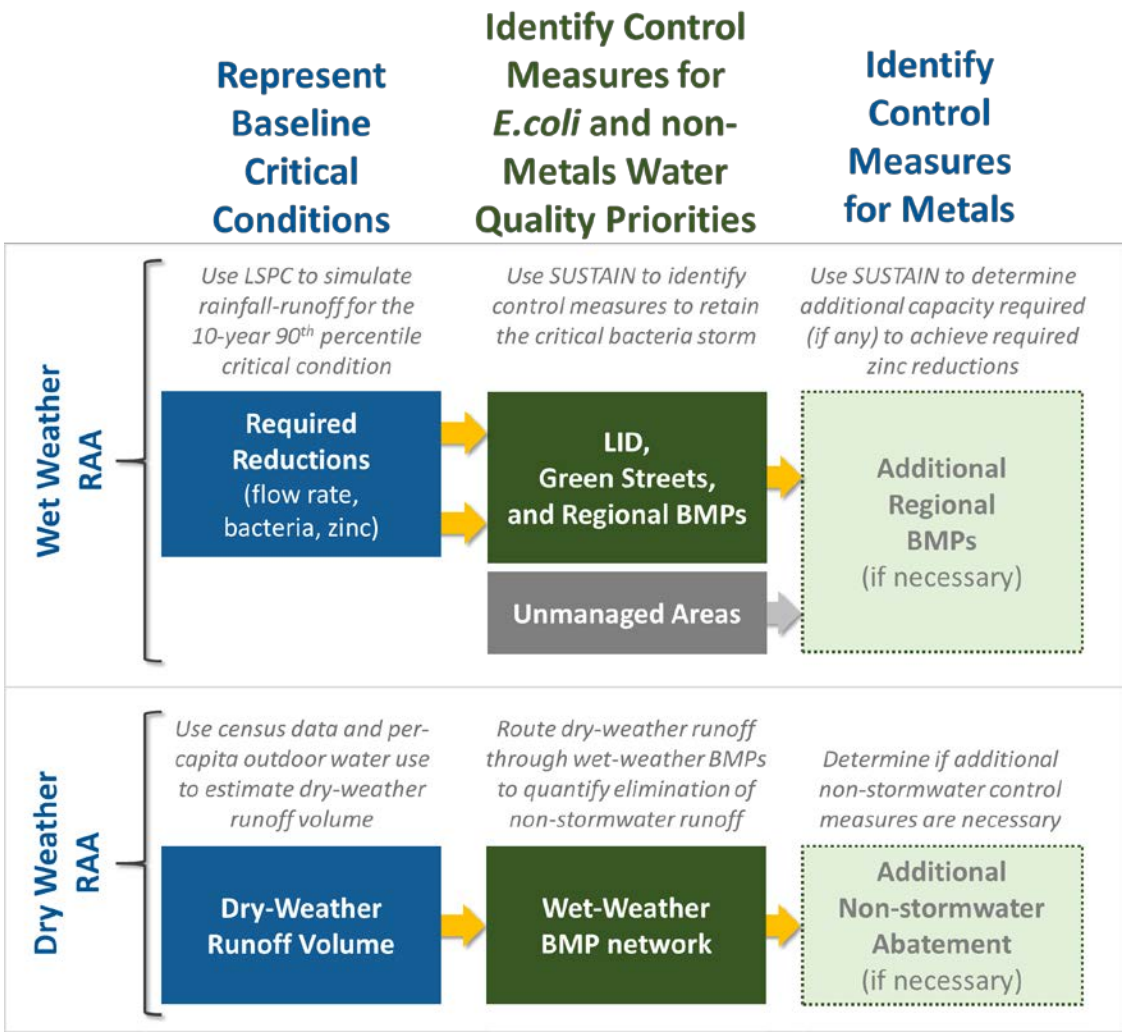


Figure 6-6. RAA Process for Establishing Critical Conditions and Addressing Water Quality Priorities in USCR

6.2.5 Required Interim and Final Pollutant Reductions

The RAA Guidelines specify that required pollutant reductions should be determined by comparing baseline/current pollutant loading to the allowable pollutant loading. With a set of defined critical conditions and identified limiting pollutants for USCR (as described in the previous two subsections) used to calculate the allowable pollutant loadings, the required pollutant reductions for USCR can be determined, as shown in **Table 6-6**. The control measures to be implemented by the EWMP are designed to achieve these reductions, and the RAA provides assurance the required reductions will be achieved by the selected control measures. Within those assessment areas where the City and County both have jurisdictional area, each is held to achieving the same percent reductions of their respective discharges for the receiving waters / assessment areas to which they discharge. The required reductions shown in **Table 6-6** determine the control measures ultimately selected for EWMP implementation (as described in Section 6.4)

Table 6-6. Required Pollutant Reductions for USCR RAA

Condition and Pollutant Addressed	Reduction Metric	RAA Assessment Area							
		SCR at County Line	SCR at R7	Bouquet Creek	Castaic Creek	Mint Cyn	Piru Creek	San Francis-quito Creek	South Fork SCR
Final Compliance with *E. coli* and non-Metals Water Quality Priorities[1]	Runoff volume to be retained	Runoff from critical bacteria storm is retained prior to discharge to receiving water (excluding open space subwatersheds)							
Final Compliance with Metals[2]	Critical Condition Load (lbs.)	447.0	53.7	105.2	137.5	36.2	0.2	38.5	270.0
	Allowable Load (lbs.)	353.1	50.5	85.2	122.4	29.7	0.2	36.9	91.8
	Required Load Reduction[3]	21%	6%	19%	11%	18%	0%	4%	66%
		E. coli control measures achieve these reductions							Additional control measures required for zinc

1. The control measures for *E. coli will also* address all other non-metals Water Quality Priorities – see the list of prioritized Water Quality Priorities in Table 4-8. *E. coli* control measures will address chloride, cyanide and TDS. Monitoring and the adaptive management process will be utilized to confirm that no additional control measures are necessary to address other water quality priorities.
2. The control measures for metals, based on the limiting pollutant zinc, address all metals Water Quality Priorities – see the list of prioritized Water Quality Priorities in Table 4-8. Metals control measures will address copper, iron, mercury, selenium, and zinc. In all assessment areas except South Fork SCR, the metals control measures are simply the *E. coli* control measures – no additional capacity is needed beyond *E. coli* control measures. In South Fork SCR, additional capacity is required to address zinc, and additional metals control measures are included in the EWMP Implementation Strategy.
3. Based on control of zinc during storm that generates the 90th percentile zinc Exceedance Volume

6.3 REPRESENTATION OF EWMP CONTROL MEASURES

Once the model is set up to accurately simulate baseline hydrology and water quality conditions, the targets have been calculated, and the required reductions estimated, the next stage of the RAA determines the optimal combination of BMP types to achieve applicable RWLs and WQBELs. This step requires a robust set of assumptions to define the watershed-wide extent and configuration of each of the types of control measures described in Section 5.

The representation of control measures in the model is an important element of the RAA, as it provides the link between future watershed activities, model-predicted water quality improvement, and, ultimately, compliance. Since the BMP modeling parameters will greatly

influence the outcome of the RAA, it is imperative that the suite of BMP assumptions are based on the best available data and represent the opportunity and limitations that will be faced by designers, contractors, and maintenance crews in the field as these BMPs are implemented over time. Further, the technical rigor of the analysis must be appropriately balanced with the resolution of the modeling system and the accuracy of the key datasets.

This section presents and reviews the following three primary elements for representing BMPs in the RAA model:

- ***Opportunity*** **–** Where can these BMPs be located and how many can be accommodated?
- ***System Configuration*** **–** How is the runoff routed to and through the BMP and what is the maximum BMP size?
- ***Cost Functions*** **–** What is the relationship between BMP volume/footprint/design elements and costs?

The following sections provide an overview of methods, summarize key assumptions, and highlight potential data limitations. Appendices F-3 through F-6, as summarized in the following subsections, contain additional information including details on how each type of control measure (LID, green streets, regional BMPs) was represented in the modeling system (SUSTAIN).

6.3.1 BMP Opportunities

BMPs can only feasibly be implemented at certain locations in the watershed. While physical constraints may limit implementation in some areas (e.g., high slopes, insufficient space), practical or preferential constraints are also an important consideration for each jurisdiction (e.g., parcel ownership, redevelopment rates). To ensure that the spatial and temporal extent of BMP opportunities were accurately accounted for in the model, a BMP opportunity assessment was customized for each individual BMP category and type. The best available data and GIS layers were specifically selected to screen out inappropriate opportunities and/or identify high priority project opportunities (e.g. regional projects on public parcels). A summary of these opportunities is provided in **Table 6-7** and detailed methods and screening results are provided in Appendix C-3.

Table 6-7. Summary of BMP Opportunities for Final Compliance RAA

BMP Category	Type	Opportunity Identified
Institutional	Institutional	Enhanced MCMs required in 2012 MS4 permit and proposed by City and County were assumed to achieve 5% reduction. [21]
Low Impact Development	Ordinance	Acreage subject to redevelopment based on growth rates reported by City of Santa Clarita.
	Planned	BMPs constructed after September 2011 were included based on list submitted in USCR EWMP Work Plan.
	on Residential	1% of residential parcels enrolled per year, starting in 2017.
	on Public	Parcels flagged as opportunities based on screening for slopes, soil contamination, and ownership (excluded parcels not owned by City, County, or FCD).
Green Streets	Green Streets	Available opportunity approximated for each subwatershed based upon street types and slopes.
Regional	Tier A projects on Public	Top 16 ranked parcels from regional BMP selection process.
	Tier B projects on Public	Parcels flagged as opportunities based on screening and prioritization conducted for regional project selection process.
	on Private	Control measures located on acquired private parcels to capture runoff near the subwatershed or jurisdiction outlet.

In addition to the spatial opportunity screening process, which highlighted potential roadblocks to BMP implementation, the preferences of the City and County were incorporated into the RAA, in order to allow the EWMP Implementation Plan to be customized to each jurisdiction. These preferences are summarized in **Table 6-8**.

[21] Identification of the potential effectiveness of MCMs and other source control measures in addressing water quality priorities usually cannot be measured by direct water quality measures as can be done for structural control measures. As a result, another method of developing estimated effectiveness information was used. Literature information was reviewed to develop an effectiveness rating for each enhanced MCM. The effectiveness ratings for the enhanced MCMs are presented in Appendix C-8. The effectiveness rating is approximately equivalent to the percent reduction that could be achieved by a structural BMP. In order to figure out how much the MCM will reduce the loading to the receiving water, the effectiveness rating can be multiplied by the loading to the receiving water. While specific source information is not available, the enhanced MCMs address a wide range of sources and it can be expected that most of the potential MS4 sources of pollutants will be addressed by an enhanced MCM in some capacity. Therefore, even using the low end of the effectiveness ranges it is expected that a 3-8% reduction in loads to the receiving water will be achieved by enhanced MCMs. Because several of the MCMs have much higher effectiveness ratings, the load reductions from implementing enhanced MCMs are expected to be higher and it is reasonable to expect that a 5% reduction in loadings to receiving waters can be achieved through implementing enhanced MCMs. Estimates of potential load reductions based on modeled land use loads are included in Appendix C-8.

Table 6-8. Summary of BMP Preferences for USCR EWMP

Jurisdiction	Institutional	LID Ordinance	Residential LID	LID on Municipal Parcels	Permeable Pavement w/Green Streets	Tier A and B Regional	Regional/ LID on Schools
City of Santa Clarita	5%	Yes	Yes	Yes	Yes	Yes	No [1]
Unincorporated LA County	5%	Yes	Yes	Yes	Yes	Yes	No

1. Select school parcels in the City of Santa Clarita were considered as potential, lower-priority candidates for regional projects due to their location. Schools were not considered candidates for LID.

6.3.2 BMP Configuration

BMP configuration is determined by a combination of [1] physical watershed properties that are generally unchangeable (e.g., location of parcels or streets, soil types, drainage areas, space available for BMPs) and [2] BMP design assumptions which are at the discretion of the responsible agency (e.g., standard BMP profiles, underdrain configurations, soil media mixes). **Table 6-9** provides a brief overview of BMP configuration assumptions and Appendix C-4 provides details on how variables were defined for each BMP category/type, including the following:

Drainage Area – Determined by the physical characteristics of the watershed and the placement of the BMP, drainage area ultimately defines how much water and pollutant load could possibly arrive at the site. A typical (or specific, where possible) drainage area is estimated for each category of BMP in Appendix C-3 and Appendix C-4.

Infiltration Rate – Determined by the soil types in the area, infiltration rate defines the rate at which water exits the BMP into the soil. Appendix C-3 provides details for how infiltration rates were spatially estimated.

Routing – Determined by the drainage network in the local area, the runoff conveyance method is critical to determining how much of the runoff and associated pollutants are accessible by the BMP. Conveyance systems that are underground or well below-grade often require pumping to lift the runoff to a BMP. **Table 6-9** provides details on when pumping is assumed.

BMP Design – Determined by the physical space available at the site and the standard profile assumed, BMP design defines the spatial footprint, depth, and internal hydraulic routing of runoff through the BMP. Appendix C-4 provides BMP design details for each individual BMP category and type.

BMP Efficacy – Determined by the BMP type selected, BMP efficacy defines the pollutant removal rates for overflow or underdrain effluent from the BMP. Appendix C-4 provides BMP efficacy details.

Careful analyses were performed to specifically tailor each of the above variables for every individual BMP category and type. This required a thorough understanding of the watershed setting (to determine common available BMP footprints, typical drainage areas, and conditions that warranted pumping), innovative use of existing datasets to estimate spatially varied infiltration rates, familiarity with local codes and standard BMP design practices to set design profiles, and access to a large database of BMP performance metrics to estimate pollutant load removal effectiveness. The results of these analyses have yielded a robust and defensible suite of BMP configuration assumptions that reasonably represent future BMP implementation in the watershed.

6.3.3 Cost Functions

To support BMP optimization, cost functions were developed for each type of structural BMP. A summary of the BMP cost functions, expressed as a function of BMP geometry is presented in **Table 6-10.** It is important to note the cost functions are based on 20-year life cycle costs including operations and maintenance (O&M).

Table 6-9. Summary of BMP Design Assumptions for Final Compliance RAA

BMP Category	Type	Key Design Parameters
Institutional	Institutional	None, not modeled explicitly.
Low Impact Development	Ordinance	Bioretention/Biofiltration sized to capture 85th percentile runoff from parcel. Underdrains required if subsoil infiltration rate less than 0.3 in/hr.
	Planned	Bioretention/Biofiltration sized to capture 85th percentile runoff from parcel. Underdrains required if subsoil infiltration rate less than 0.3 in/hr.
	on Residential	Bioretention sized to approximately 4% of parcel area (typical sizing to capture 85th percentile runoff)
	on Public	Bioretention/Biofiltration sized to capture 85th percentile runoff from parcel. Underdrains required if subsoil infiltration rate less than 0.3 in/hr.
Green Streets	Green Streets	Bioretention/biofiltration is 4-ft wide. Permeable pavement/subsurface storage is 5-ft wide and used in tandem with bioretention/biofiltration. 50% of street length retrofittable. Underdrains required if subsoil infiltration rate less than 0.3 in/hr.
Regional	Tier A projects on Public	BMP footprint delineated and ponding depth specified based on site configuration, topography, depth to groundwater, and infrastructure. Pump specified if greater than 100 ft from major storm drain using optimum diversion rate (0.04 cfs/ac).
	Tier B projects on Public	Same as Tier A except ponding depth was assumed to be 3 ft (rather than based on site-specific configuration). Also, drainage areas and footprints are coarser due to the large number of these projects.
	on Private	Assumed 3-ft-deep infiltration basin at subwatershed outlets. Pumping assumed with no diversion limitations. Maximum footprint = 5% of contributing area.

Table 6-10. Summary of BMP Cost Functions for Final Compliance RAA (20-year, including O&M)

BMP Category	BMP types	Functions for Estimating Total Costs [1]
LID and Green Streets	Bioretention with Underdrain	*Cost = 64.908 (A) + 2.165 (Vt) + 2.64 (Vm) + 3.3 (Vu)*
	Bioretention without Underdrain	*Cost = 56.658 (A) + 2.165 (Vt) + 2.64 (Vm)*
	Residential LID	*Cost = 4.000 (A)*
	Permeable Pavement with Underdrain	*Cost = 65.849 (A) + 3.3 (Vu)*
	Permeable Pavement without Underdrain	*Cost = 57.599 (A)*
Regional BMPs	Pump	*Cost = 56,227*(Pump Capacity$_{cfs}$) + $1,207,736*
	Regional Project on Public Parcel	*Cost = 45.42 (A) + 2.296 (Vt) + 2.8 (Vm)*
	Regional Project on Private Parcel	*Cost = 45.42 (A) + 2.296 (Vt) + 2.8 (Vm) + 129 (A)*

1. Functions describe 20-year life cycle costs including O&M using the following variables: (A) is the area of the BMP footprint in square feet, (Vt) is the total volume of the BMP in cubic feet, (Vm) is the volume of the BMP soil media in cubic feet, and (Vu) is the volume of the BMP underdrain in cubic feet.

6.4 SELECTION OF CONTROL MEASURES FOR EWMP IMPLEMENTATION

The RAA process is an important tool for assisting EWMP agencies with selection of control measures for EWMP implementation. A major challenge associated with stormwater planning is the multitude of potential types and locations of control measures and the varying performance and cost of each scenario. This subsection describes the process for selecting the control measures for the EWMP Implementation Plan by the City and County. Appendix C-10 provides additional RAA outputs with pre- and post-BMP runoff and loads for bacteria, zinc, and lead. Outputs are presented for both end-of-pipe and instream locations. In addition, Appendix C-10 presents a representative "validation" example to demonstrate the RAA approach results in RWL attainment on 90% of wet days.

6.4.1 Selection of Control Measures for Final Wet Weather Compliance

The SUSTAIN model within WMMS provides a powerful tool for considering millions of scenarios of control measures and recommending a solution based on cost-effectiveness. The cost functions described in the previous subsection are used to weigh the cost of different BMP scenarios with benefits in terms of pollutant load reduction. As shown in **Figure 6-6**, the RAA process for USCR first determines the control measures to retain the critical bacteria storm and then determines the additional capacity (if any) to achieve zinc RWLs under critical conditions. Because the bacteria goal is retention, the cost-optimization process is based on volume reduction. The optimization modeling is conducted stepwise to determine the control measures for final compliance that are selected for the EWMP Implementation Plan, as follows:

1. **Determine the cost-effective BMP solutions for each subwatershed in the EWMP area:** an example set of "BMP solutions" is shown in **Figure 6-7**, which shows thousands of scenarios considered for an individual subwatershed in the EWMP area. The scenarios are based on the available opportunity (e.g., the available footprints for regional BMPs and length of right-of-way for green streets) and predicted performance for volume reduction if BMPs were implemented at those opportunities with varying sizes. The most

cost-effective BMP solutions for each of the 260 subwatersheds in the EWMP area provide the basis for cost optimization.

2. **Determine the cost-effective scenarios <u>for each jurisdiction</u> in the EWMP Group:** by rolling up the BMP solutions at the subwatershed level, the most cost-effective scenarios for each jurisdiction can be determined. These "cost optimization curves" provide a potential EWMP Implementation Plan for a range of volume reductions. **Figure 6-8** shows example cost optimization curves for City and County areas in the South Fork Santa Clara River. Each scenario is a "recipe for compliance," based on the information available today, for all the subwatersheds in the jurisdictional area (for a given volume reduction). The complete set of cost optimization curves for the USCR EWMP is presented in Appendix C-7.
3. **Extract the cost-effective scenario for 100% retention of the critical bacteria storm:** the RAA approach for *E. coli* is retention of the critical bacteria storm, and thus percent volume reduction for the critical bacteria storm is 100%. Optimization is used to select the most cost-effective scenario for retaining the critical bacteria storm in each subwatershed, which becomes the basis of the EWMP Implementation Plan. **Figure 6-9** illustrates the process for extracting the control measures to achieve bacteria WQBELs from the cost optimization curve. The extracted control measures comprise a detailed recipe for compliance with WQBELs for *E. coli*.
4. **Route the metals critical conditions through the control measures in the extracted scenario:** the effectiveness of the selected control measures for achieving required reductions of zinc is evaluated (see **Table 6-6**). The additional control measure capacity (if any) to attain zinc RWLs (if any) is determined for each assessment area and incorporated into the EWMP Implementation Plan.

The resulting EWMP Implementation Plan for final compliance is presented in Section 7.

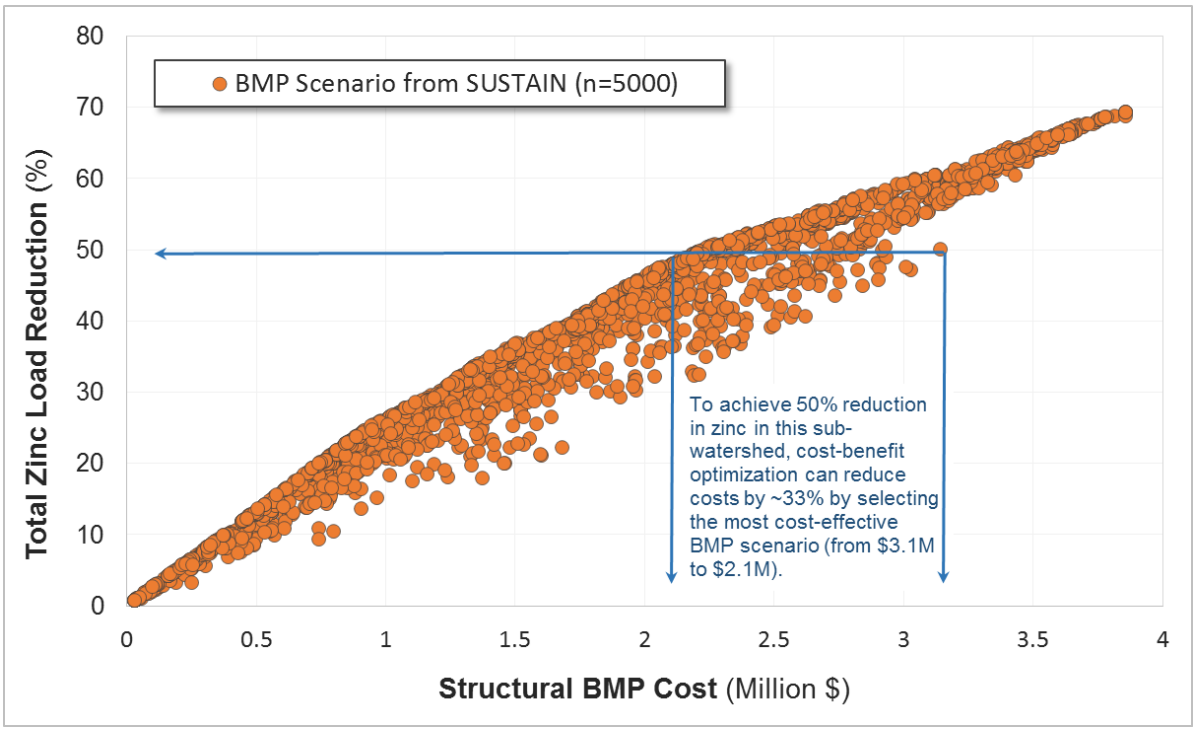


Figure 6-7. Example BMP Solutions for a Selected Subwatershed and Advantage of Cost-Benefit Optimization

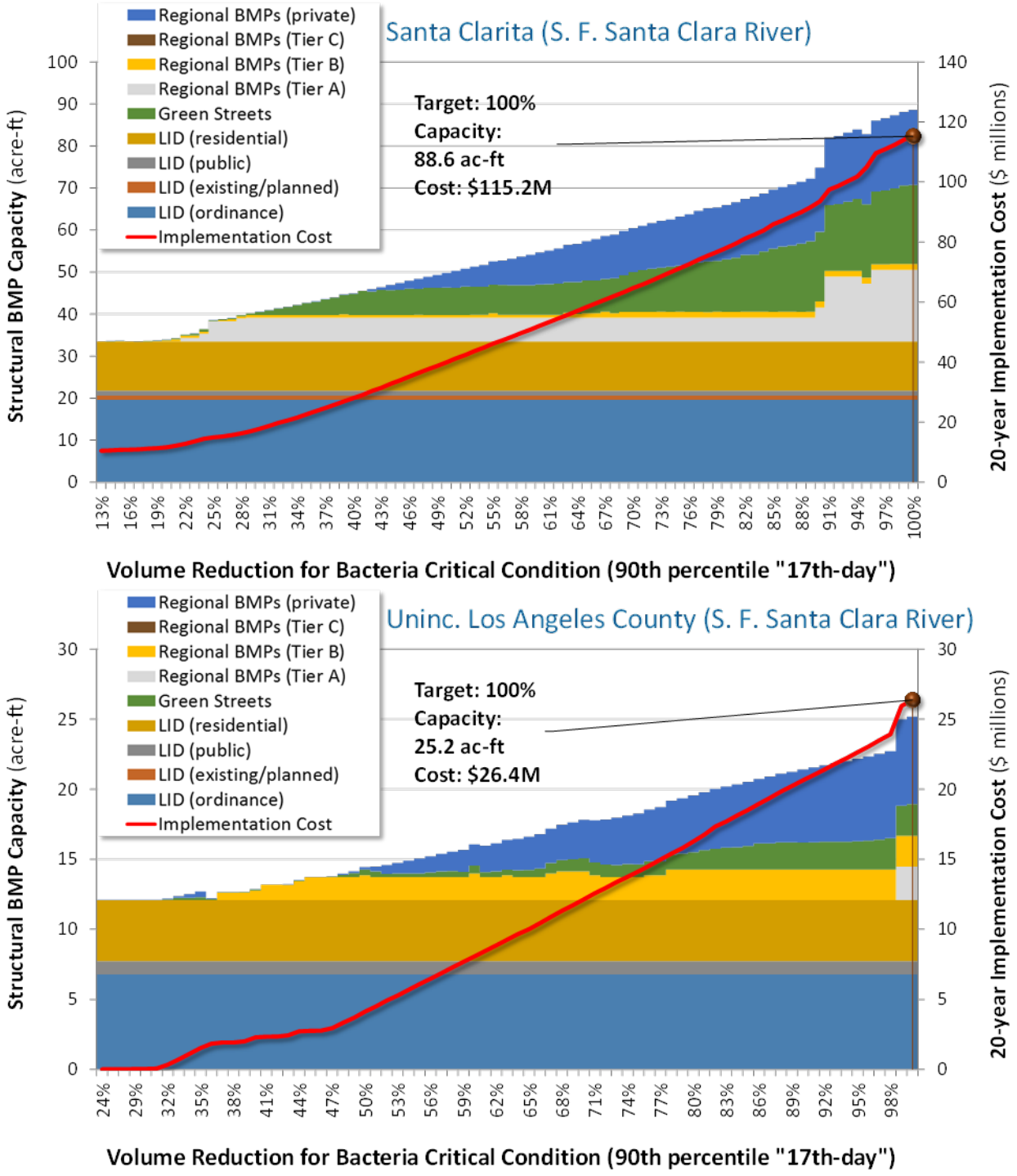
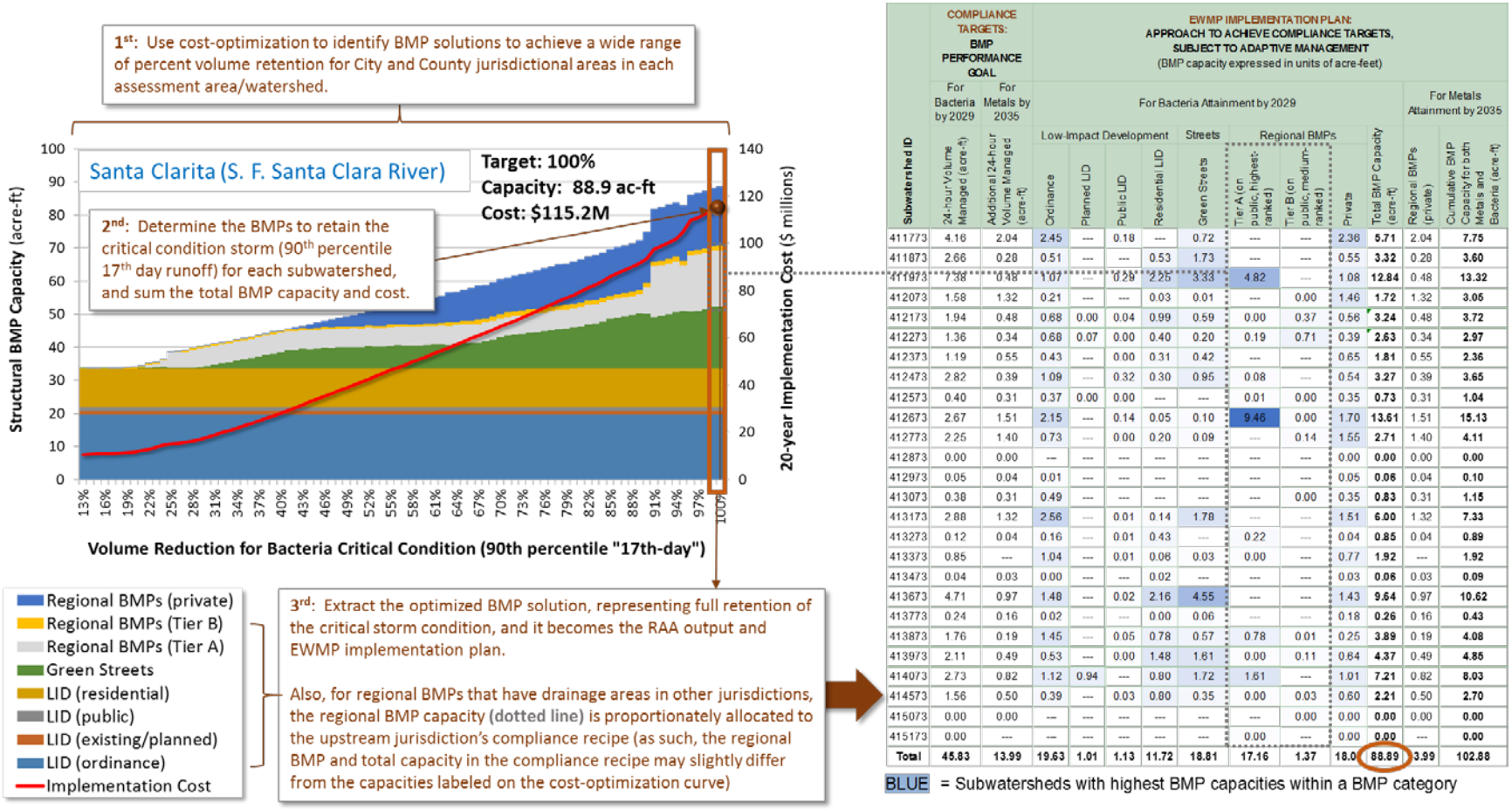


Figure 6-8. Example Cost Optimization Curves for a Watershed: South Fork Santa Clara River
This example for South Fork Santa Clara River shows the progression of optimized BMP solutions (up to 100% retention of the critical bacteria storm) for City and County areas in the watershed. Each optimization curve represents over 1 million BMP scenarios that were evaluated for cost-effectiveness. See Appendix C-7 for the complete set of cost optimization curves.



Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL: For Bacteria by 2029 — 24-hour Volume Managed (acre-ft)	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL: For Metals by 2035 — Additional 24-hour Volume Managed (acre-ft)	EWMP IMPLEMENTATION PLAN: For Bacteria Attainment by 2029: Low-Impact Development — Ordinance	Planned LID	Public LID	Residential LID	Streets — Green Streets	Regional BMPs — Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	Total BMP Capacity (acre-ft)	For Metals Attainment by 2035 — Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
411773	4.16	2.04	2.45	---	0.18	---	0.72	---	---	2.36	**5.71**	2.04	**7.75**
411873	2.66	0.28	0.51	---	---	0.53	1.73	---	---	0.55	**3.32**	0.28	**3.60**
411973	7.38	0.48	1.07	---	0.29	2.25	3.33	4.82	---	1.08	**12.84**	0.48	**13.32**
412073	1.58	1.32	0.21	---	---	0.03	0.01	---	0.00	1.46	**1.72**	1.32	**3.05**
412173	1.94	0.48	0.68	0.00	0.04	0.99	0.59	0.00	0.37	0.56	**3.24**	0.48	**3.72**
412273	1.36	0.34	0.68	0.07	0.00	0.40	0.20	0.19	0.71	0.39	**2.63**	0.34	**2.97**
412373	1.19	0.55	0.43	---	0.00	0.31	0.42	---	---	0.65	**1.81**	0.55	**2.36**
412473	2.82	0.39	1.09	---	0.32	0.30	0.95	0.08	---	0.54	**3.27**	0.39	**3.65**
412573	0.40	0.31	0.37	0.00	0.00	---	---	0.01	0.00	0.35	**0.73**	0.31	**1.04**
412673	2.67	1.51	2.15	---	0.14	0.05	0.10	9.46	0.00	1.70	**13.61**	1.51	**15.13**
412773	2.25	1.40	0.73	---	0.00	0.20	0.09	---	0.14	1.55	**2.71**	1.40	**4.11**
412873	0.00	0.00	---	---	---	---	---	---	---	0.00	**0.00**	0.00	**0.00**
412973	0.05	0.04	0.01	---	---	---	---	---	---	0.05	**0.06**	0.04	**0.10**
413073	0.38	0.31	0.49	---	---	---	---	---	0.00	0.35	**0.83**	0.31	**1.15**
413173	2.88	1.32	2.56	---	0.01	0.14	1.78	---	---	1.51	**6.00**	1.32	**7.33**
413273	0.12	0.04	0.16	---	0.01	0.43	---	0.22	---	0.04	**0.85**	0.04	**0.89**
413373	0.85	---	1.04	---	0.01	0.06	0.03	0.00	---	0.77	**1.92**	---	**1.92**
413473	0.04	0.03	0.00	---	---	0.02	---	---	---	0.03	**0.06**	0.03	**0.09**
413673	4.71	0.97	1.48	---	0.02	2.16	4.55	---	---	1.43	**9.64**	0.97	**10.62**
413773	0.24	0.16	0.02	---	---	0.00	0.06	---	---	0.18	**0.26**	0.16	**0.43**
413873	1.76	0.19	1.45	---	0.05	0.78	0.57	0.78	0.01	0.25	**3.89**	0.19	**4.08**
413973	2.11	0.49	0.53	---	0.00	1.48	1.61	0.00	0.11	0.84	**4.37**	0.49	**4.85**
414073	2.73	0.82	1.12	0.94	---	0.80	1.72	1.61	---	1.01	**7.21**	0.82	**8.03**
414573	1.56	0.50	0.39	---	0.03	0.80	0.35	0.00	0.03	0.60	**2.21**	0.50	**2.70**
415073	0.00	0.00	---	---	---	---	---	---	0.00	0.00	**0.00**	0.00	**0.00**
415173	0.00	---	---	---	---	---	---	0.00	---	0.00	**0.00**	---	**0.00**
Total	**45.83**	**13.99**	**19.63**	**1.01**	**1.13**	**11.72**	**18.81**	**17.16**	**1.37**	**18.0**	**88.89**	**3.99**	**102.88**

BLUE = Subwatersheds with highest BMP capacities within a BMP category

Figure 6-9. Illustration of how the EWMP Implementation Plan is Extracted from a Cost Optimization Curve

This illustration uses the City of Santa Clarita jurisdictional area within South Fork Santa Clara River as an example. Three steps are shown for RAA development: cost-optimized BMP solutions are developed for a wide range of % volume reductions (1st, uppermost text box), followed by determination of the BMP solution that would completely retain the critical storm condition (2nd, middle text box), and then the corresponding BMP solution is extracted to complete the RAA and determine the EWMP implementation plan (3rd, bottom text box). The detailed RAA output and EWMP implementation plan (the table on the right side of the figure is one example) is presented in Section 7. Note that some subwatersheds in the watershed are nearly 100% open space (see rows with zero runoff retained) and thus no structural BMPs were included for those areas, other than BMPs implemented due to the LID ordinance, if applicable.

6.4.2 Selection of Control Measures for Final Dry Weather Compliance

As shown in **Figure 6-6**, selection of control measures for final dry weather compliance is based on the wet weather control measure selection process. Dry weather non-stormwater discharges are routed through the wet weather BMPs to determine if additional dry weather control measures are needed. No additional dry weather control measures were determined to be necessary as the wet weather control measures will address the non-stormwater discharges.

6.4.3 Selection of Control Measures for Interim Compliance

With the EWMP Implementation Plan for final compliance determined, the remaining step for the RAA is scheduling of control measures *over time* to achieve interim milestones. For the USCR EWMP area, the primary TMDL is the SCR Bacteria TMDL, which does not specify milestones that require reductions over time[22]. As such, the USCR EWMP Group has developed BMP-based milestones by identifying the high priority projects and leveraging available financial resources. The BMP-based milestones are described in the next section.

[22] The SCR Bacteria TMDL includes interim milestones to assure that current conditions are maintained. Since adoption of the TMDL, there is reasonable assurance that conditions have been maintained or improved for the following reasons: [1] MCM requirements have increased in the 2012 Permit, and [2] structural controls measures have been implemented in the watershed including control measures due to the LID ordinance.

7 EWMP Implementation Plan and Milestones

The EWMP Implementation Plan is the "recipe for compliance," based on the information available today, for the City and County to address Water Quality Priorities and comply with the provisions of the MS4 Permit. The recipe may change over time through adaptive management as modeling information is reassessed based on new data. Through the RAA, a series of quantitative analyses were used to identify the capacities of LID, green streets and regional BMPs that comprise the EWMP Implementation Plan and assure those control measures will address the Water Quality Priorities per the milestones/compliance schedules. The EWMP Implementation Plan includes individual recipes for each jurisdiction and each watershed/assessment area – Santa Clara River main stem, South Fork Santa Clara River, Bouquet Creek, Castaic Creek, Mint Canyon, San Francisquito Creek, and Piru Creek (see **Figure 6-1** for a map of these assessment areas). Implementation of the EWMP Implementation Plan will provide a BMP-based compliance pathway for the City and County under the MS4 Permit. This section describes the EWMP Implementation Plan and the pace of its implementation, through the following subsections:

- Elements of the EWMP Implementation Plan (7.1)
- Stormwater control measures to be implemented by 2035 for final compliance (7.2)
- Scheduling of stormwater control measures for EWMP milestones (7.3)
- Non-stormwater control measures to be implemented (7.4)

7.1 ELEMENTS OF THE EWMP IMPLEMENTATION PLAN

The EWMP Implementation Plan is expressed in terms of [1] the volumes[23] of stormwater and non-stormwater to be managed by each jurisdiction to address Water Quality Priorities and [2] the control measures that will be implemented to achieve those volume reductions. The two primary elements of the Pollutant Reduction are as follows:

- **Volume Targets**: While the implementation plan outlines categories of control measures to be implemented, the actual control measures will be designed and implemented to prioritize the best locations, sizes, and types of BMPs for pollutant reduction and will consider not only the interactions between BMPs and their environmental factors, but also consider synergies and integration with concurrent drinking water, wastewater, and other engineering programs. As a result, the implementation plan also identifies the volume of stormwater to be managed by implemented control measures. The stormwater volume to be managed[24] provides an equivalency target for implementation if control

[23] Volume is used rather than pollutant loading because volume reduction is more readily tracked and reported by MS4 agencies. As described in Section 6.2.3, the volume reductions are actually a *water quality* improvement metric based on required pollutant reductions.

[24] The volume is determined by reporting the amount of water that would be retained (infiltrated) by BMPs over the course of a 24-hour period under the critical conditions. Additional volume would be *treated* by these BMPs, but that additional treatment is *implicit* to the reported Compliance Targets. For final bacteria compliance, the volume of runoff generated by the critical bacteria storm should be retained to assure achievement of bacteria WQBELs. For metals, the stormwater volume can be retained or treated, as long as control measure effluent achieves RWLs.

measures evolve through adaptive management. Volume managed can also be utilized as a measurable and enforceable goal for the EWMP. To support future compliance determination and adaptive management, the EWMP Implementation Plan reports volume of stormwater to be managed along with the capacities of control measures[25] to be implemented by each jurisdiction.

- **EWMP Implementation Plan**: the network of control measures that has reasonable assurance of achieving the Compliance Targets is referred to as the EWMP Implementation Plan. The identified BMPs (and BMP preferences) represent a defined set of control measures that could be implemented to achieve the WQBELs and RWLs. While the BMPs identified for implementation through 2017 are clearly defined and the BMPs to be implemented by 2022 have been identified, the identified BMPs will likely evolve over the course of implementation and will be modified through the adaptive management process in response to "lessons learned".

7.2 CONTROL MEASURES TO BE IMPLEMENTED BY 2035 FOR FINAL COMPLIANCE

The EWMP will guide stormwater management for the coming decades, and the control measures to be implemented have the potential to transform communities to incorporate widespread green infrastructure. The EWMP Implementation Plan identifies the targeted capacity, location and type of control measures to be implemented by the City and County for final compliance by 2035, which includes addressing all Water Quality Priorities including the limiting pollutants *E. coli* and zinc (as described in Section 6.2.4). The EWMP Implementation Plan for final compliance is presented as the following components:

- **Summary of total capacity of control measures to be implemented by each jurisdiction across the entire EWMP area:** shown in **Figure 7-1** are the bar graphs that detail the various sub-categories of control measures to be implemented by each jurisdiction across the entire EWMP area by 2035. *E. coli* will be addressed by 2029.
- **Summary of total capacity of control measures to be implemented in each assessment area:** the control measures to be implemented within each watershed/assessment are shown in **Figure 7-2**, organized by jurisdiction.
- **Detailed recipe for compliance including volumes of stormwater to be managed and control measure capacities:** the EWMP Implementation Plan is detailed for each subwatershed in the EWMP area (generally 1 to 2 square mile drainages). Shown in **Figure 7-3** is a map of the "density" of control measure capacities to be implemented to address E. coli and non-Metals Water Quality Priorities (through retention of the critical bacteria storm) and **Figure 7-4** shows the additional capacity to address metals *(*by

[25] While the EWMP Implementation Plan reports the *total* BMP capacity to be implemented, that capacity is not a compliance target because some BMP capacities are sized to reflect a BMP program rather than sized to achieve the required reduction. For example, the BMPs implemented by the LID ordinance and the residential LID program were sized to retain the 85th percentile, 24-hour storm but that volume may be larger than is needed to achieve zinc RWLs. If those BMPs were replaced by a different type of BMP (e.g., regional BMP), the total BMP capacity may be smaller but just as effective.

managing the zinc critical condition). The maps are in a tabular form in Appendix D-1, which presents for each jurisdiction the volumes of stormwater to be managed in each subwatershed (Compliance Targets) and the control measures to achieve those volume reductions (EWMP Implementation Plan). Compliance Targets and EWMP Implementation Plans are provided for *E. coli* and non-Metals Water Quality Priorities with additional implementation actions identified for metals where needed.

- **Enhancements to Minimum Control Measures.**
- **Installation of full capture devices for conveyances to Lake Elizabeth[26].**

The network of control measures in the EWMP Implementation Plan is extensive and its implementation would represent a significant change in how stormwater will be managed in the USCR. The next subsection describes the timeline/sequencing for implementing the EWMP Implementation Plan. The costs and financial strategy for the EWMP are presented in Section 8.

[26] The TMDL requires 100% full capture by 2016, so the installation of full capture devices will be complete before the Regional Water Board approves the EWMP.

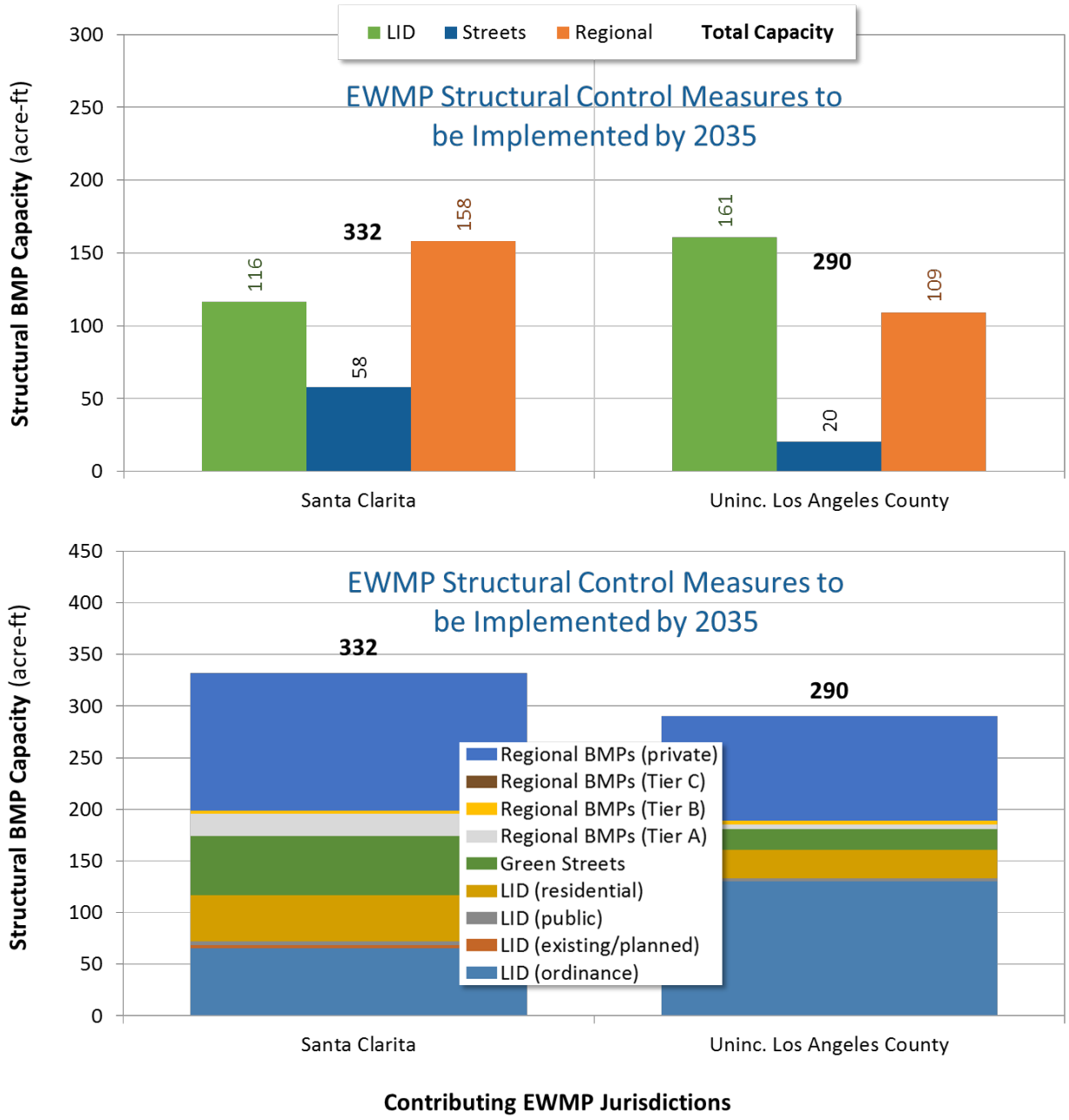


Figure 7-1. USCR EWMP Implementation Plan for Final Compliance by 2035

The two panels show the total structural BMP capacity required for each USCR EWMP jurisdiction to attain RWLs. The top panel groups the BMP types into LID, green streets and regional BMPs, while the bottom panel provides more resolution for the BMP subcategories.

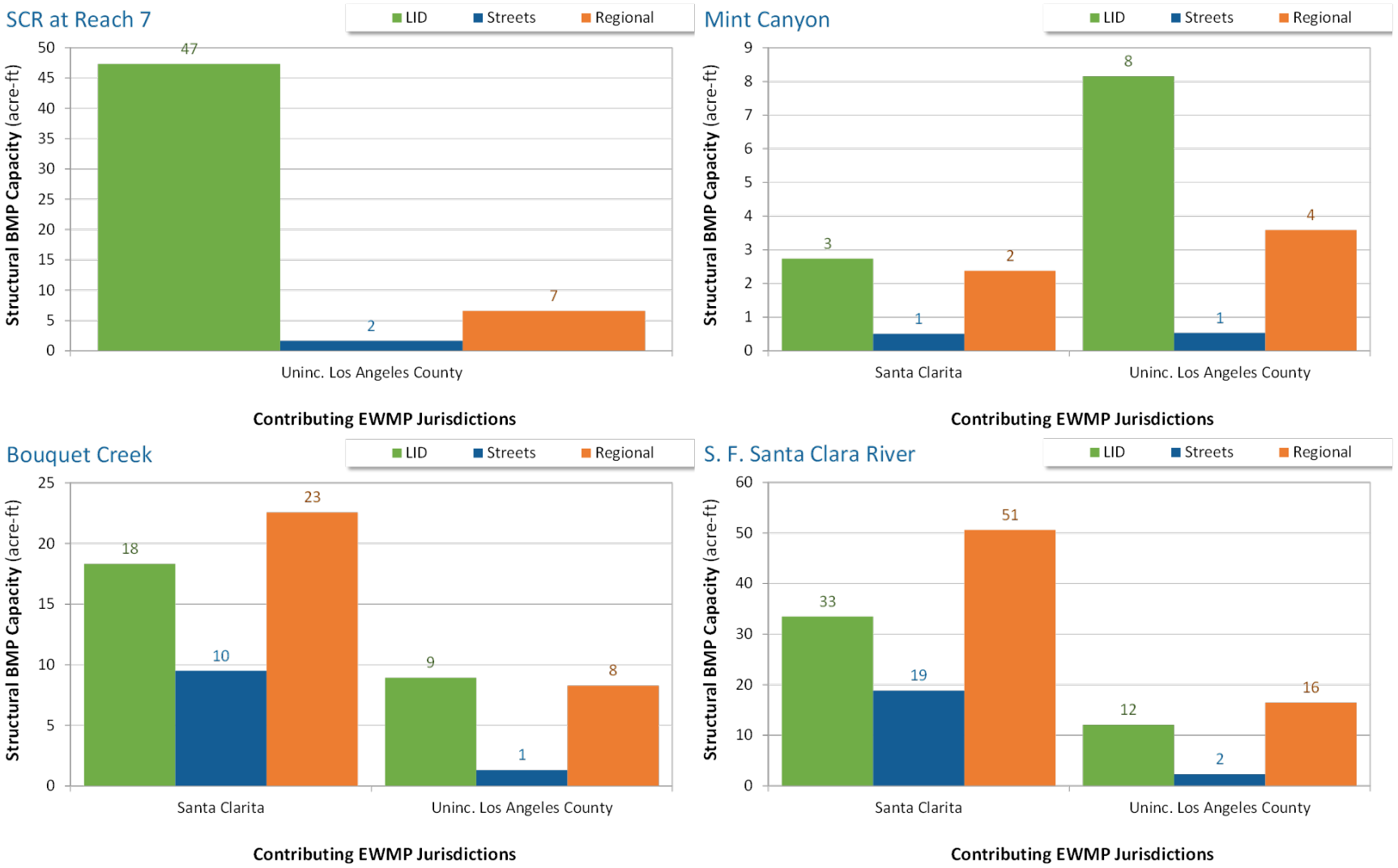


Figure 7-2. EWMP Implementation Plan for each Watershed / Assessment Area in the USCR
This panel shows SCR at R7 (top left), Mint Canyon (top right), Bouquet Creek (bottom left) and South Fork Santa Clara River (bottom right)

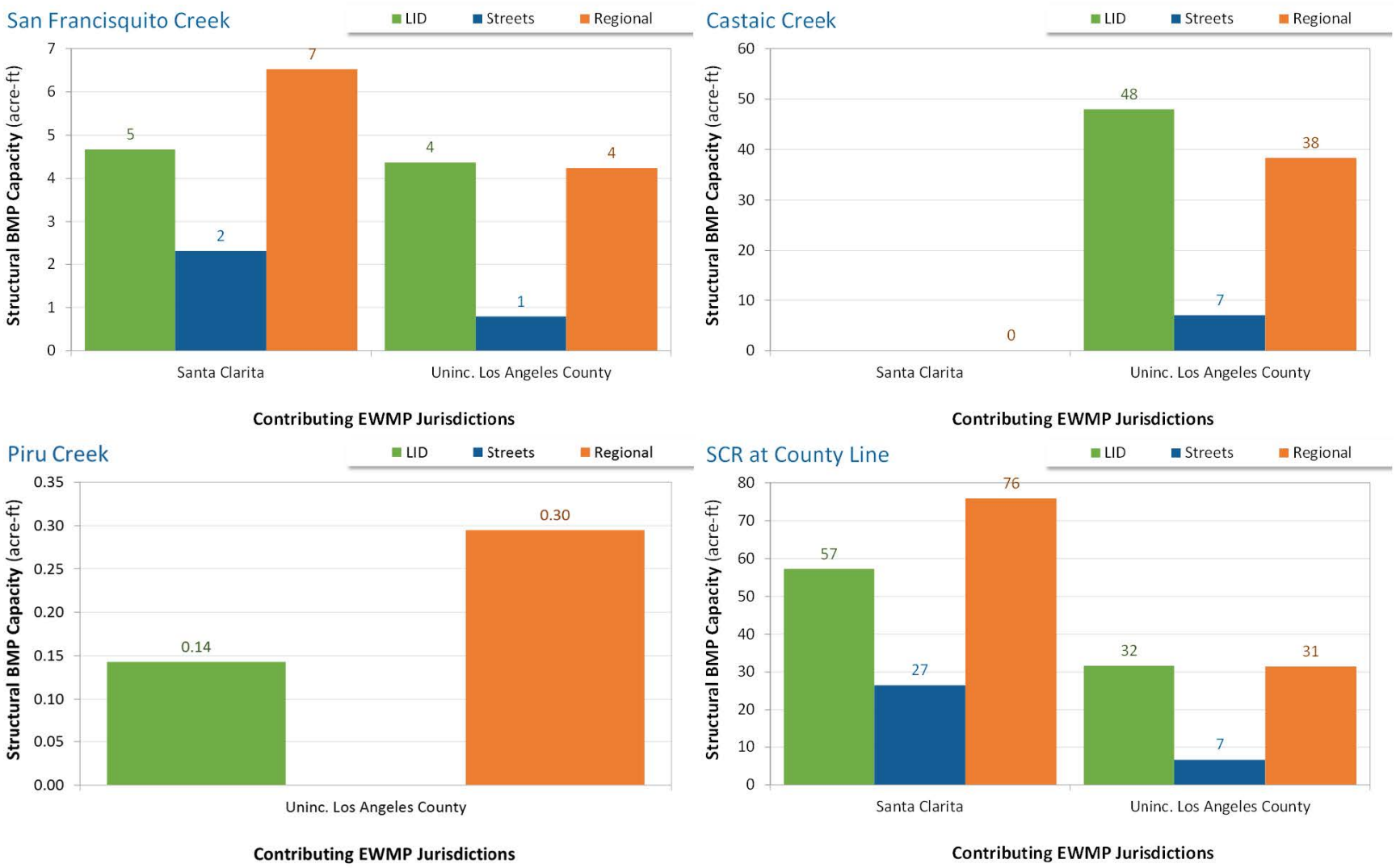


Figure 7-2 (continued). EWMP Implementation Plan for each Watershed / Assessment Area in the USCR
This panel shows San Francisquito Creek (top left), Castaic Creek (top right), Piru Creek (bottom left) and SCR at County Line (bottom right).

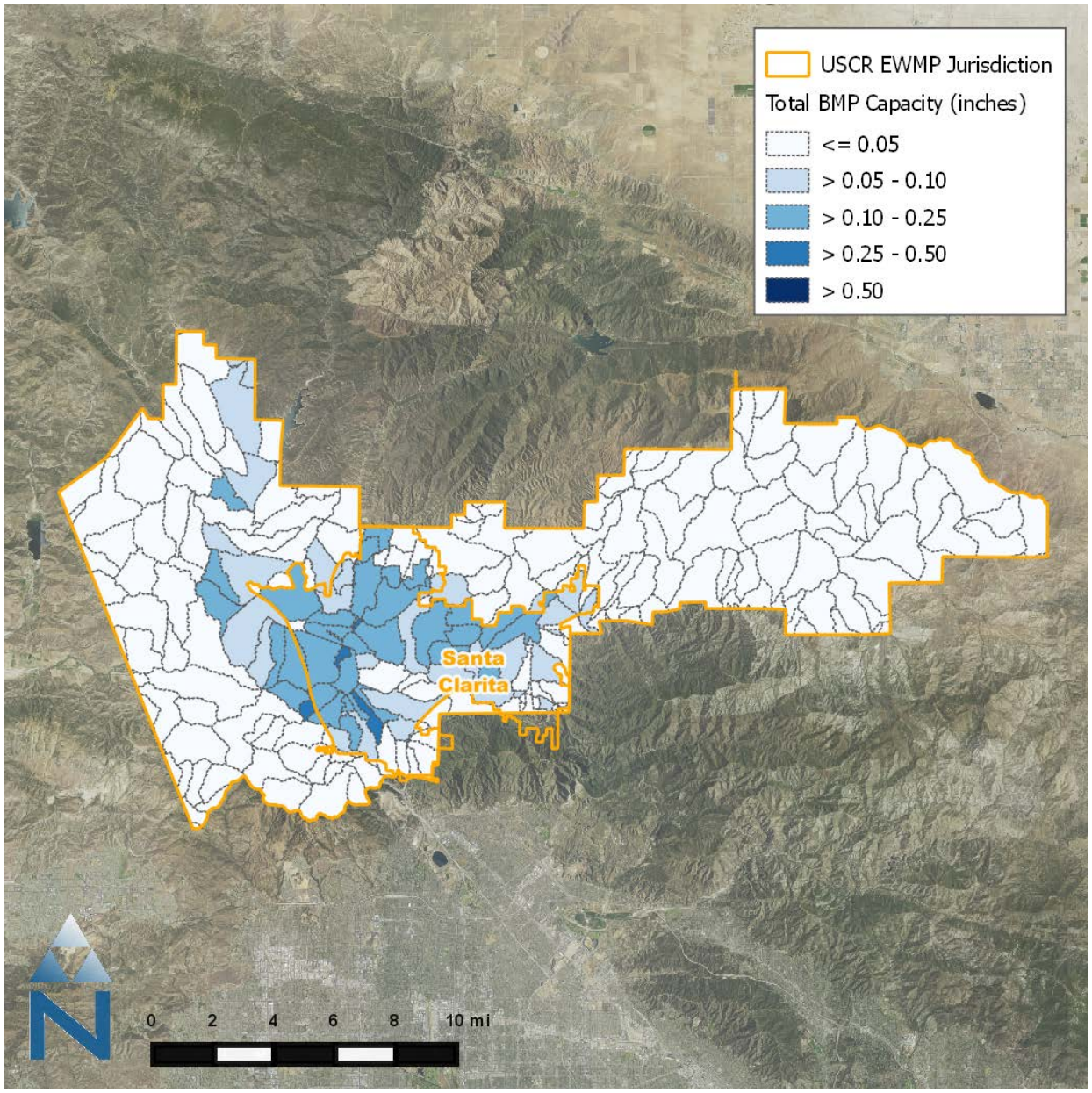


Figure 7-3. EWMP Implementation Plan by Subwatershed for Addressing *E. Coli* and non-Metals Water Quality Priorities

This map presents the EWMP Implementation Plan to achieve E. coli WQBELs as control measure "density" by subwatershed. The BMP density is higher in some areas because the critical bacteria storm produces more runoff. The BMP capacities are normalized by area (i.e., the BMP capacity for each subwatershed [in units of acre-feet] was divided by the subwatershed area [in units of acres] to express the BMP capacity in units of depth [inches]). The tabular version of this map is presented in Appendix D-1. Note that some open space subwatersheds are subject to zero runoff retention because they are open space and the RAA predicted zero bacteria exceedances over the 10-year simulation.

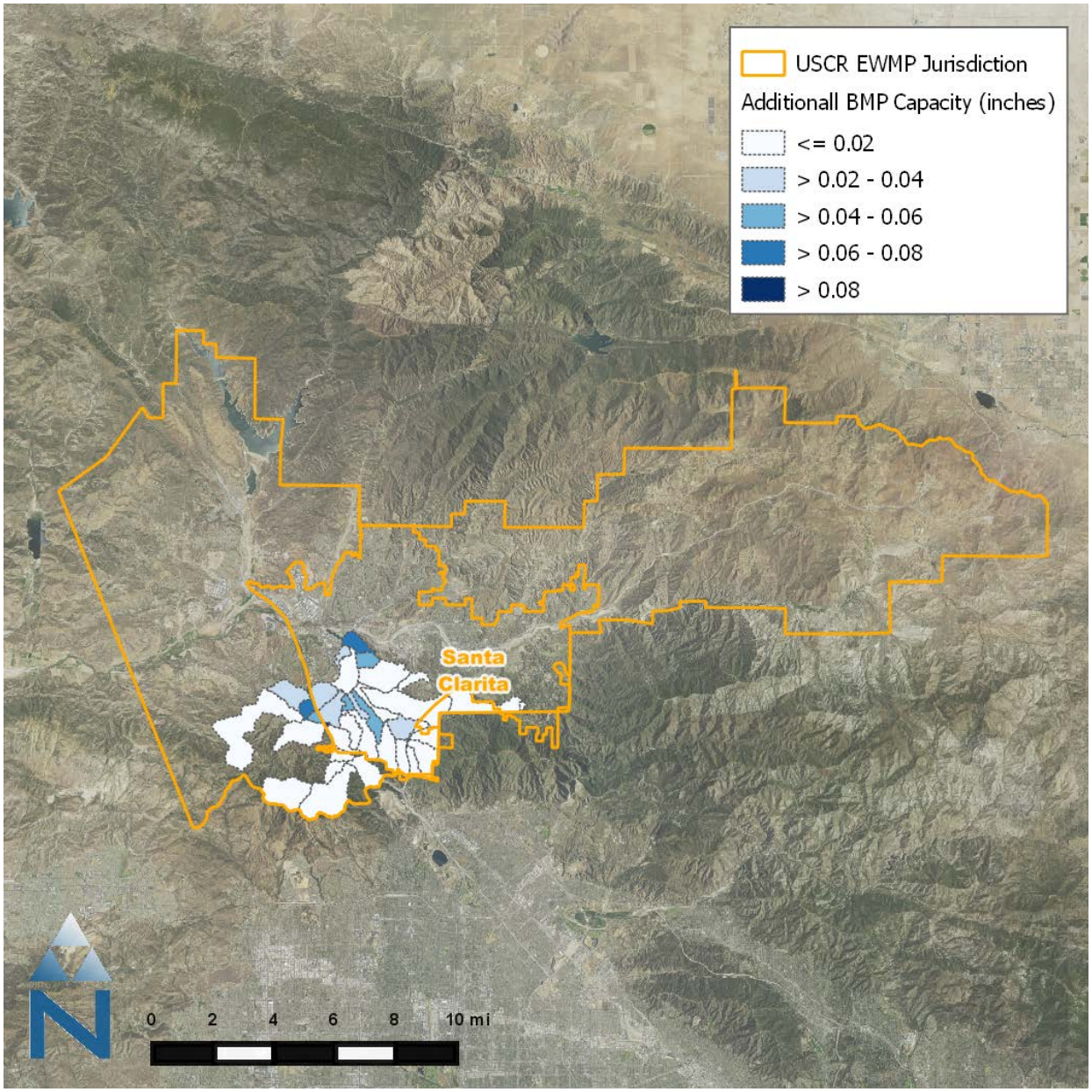


Figure 7-4. Additional Control Measures in EWMP Implementation Plan to Address Zinc

This map uses the same approach as **Figure 7-3** to present the additional capacity in the EWMP Implementation Plan to address metals (beyond the control measures to address *E. coli*). Only subwatersheds within the South Fork assessment area require additional capacity beyond what was presented in the previous figure. The tabular version of this map is presented in Appendix D-1.

7.2.1 Enhanced MCMs

The 2012 Permit includes requirements for new MCMs that require efforts above the City and County's, and LAFCD's current level of implementation, and will result in additional pollutant load reductions when implemented. These MCMs are therefore considered enhancements to the City and County's current programs. Additionally, the City has identified a number of additional enhancements that will be implemented as part of the EWMP. The MCM enhancements that are considered part of the EWMP implementation plan are summarized in **Table 7-1.** Appendix B-2 shows the Water Quality Priorities that the MCM enhancements are expected to address.

Table 7-1. Enhanced MCMs included in EWMP Implementation Plan

MCMs New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement	City of Santa Clarita	County of Los Angeles	Los Angeles County Flood Control District
D.2. Progressive Enforcement (Applies to D.4.d, D.6, D.7, D.8, and D.10)			
• Develop and maintain a Progressive Enforcement Policy	✓	✓	✓
• Conduct follow-up inspection within 4 weeks of date of initial inspection	✓	✓	✓
• Provide education program in conjunction with enforcement program.	✓		
D.4.a and D.5. Public Information and Participation Program (PIPP)			
Residential Outreach (Individually or with group):			
• Develop/Modify public education materials to focus on watershed priorities. Subject matter may include: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes	✓	✓	✓
• Distribute public education materials at points of purchase that will provide focus on sources of pollutants related to watershed priorities. Distribution may include: automotive parts stores, home improvement centers, landscaping/ garden centers, and pet shops/feed stores, as appropriate	✓	✓	✓
• Keep California Beautiful participation	✓		
• Rain Barrel artist decoration, Kids Water Art, Street Fair	✓		
• Residential Rain Barrel Program	✓		
• Homeowners Association Outreach Program	✓		
• Advertise National Wildlife Foundation Backyard Habitat Certification program	✓		
• Work with Community College Santa Clarita Environmental Education Consortium (SCEEC) to find opportunities for water quality related education	✓		

MCMs New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement	City of Santa Clarita	County of Los Angeles	Los Angeles County Flood Control District
D.6. Industrial/Commercial Facilities[a]			
• Educate - notify critical sources of BMP requirements; focus outreach material content and distribution based on potential to contribute to pollutants identified as water quality priorities	✓	✓	
• Track the location of critical sources - including nurseries/nursery centers and other facilities determined to contribute substantial pollutant load	✓	✓	
• Make accessible water quality training related to businesses through local business organizations (i.e. Chamber of Commerce, etc.)	✓	✓	
• Conduct inspection program with frequencies based on potential for facility to be a source of pollutants identified as water quality priorities	✓	✓	
D.7. Planning and Land Development[b]			
• Update ordinance/design standards to conform with new requirements (LID and Hydromodification)	✓	✓	
• Plan Review process - check LID and BMP sizing, etc.	✓	✓	
• Establish internal agreements with structure for communication and authority for departments overseeing plan approval and project construction	✓	✓	
• Require O&M plan for LID, treatment and hydromodification BMPs	✓	✓	
• Implement tracking and enforcement program for LID, treatment and hydromodification BMPs	✓	✓	
• Inspect all development sites upon completion and prior to occupancy certificates	✓	✓	
• Verify O&M of BMPs operated by Permittee through inspection	✓	✓	
• Develop maintenance inspection checklist	✓	✓	
• Require private parties that operate BMPs to document O&M; enforce as needed	✓	✓	
D.8. Development Construction[c]			
• Update erosion and sediment control ordinance/procedures to conform with new requirements	✓	✓	
• Require operators of public and private construction sites to select, install, implement, and maintain BMPs that comply with the updated erosion and sediment control ordinance	✓	✓	
• Sites < 1 acre; inspect based upon water quality threat	✓	✓	

MCMs New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement	City of Santa Clarita	County of Los Angeles	Los Angeles County Flood Control District
• Establish priority inspection process based on the potential for a site to be a source of pollutants identified as water quality priorities	✓	✓	
• Develop/implement SOPs/inspection checklist	✓	✓	
• For sites 1 acre or more, maintain inventory of grading, encroachment, demolition, building, or construction permits (and any other applicable authorization to move soil or disturb land)	✓	✓	
• For sites 1 acre or more, require submittal and approval of an Erosion and Sediment Control Plan (ESCP) prior to land disturbance.	✓	✓	
• For sites 1 acre or more, implement technical standards for the selection, installation, and maintenance of construction BMPs	✓	✓	
• For sites 1 acre or more, implement inspections program at frequencies per Table 17 to include subsequent inspection requirements in Part VI.D.8.j.	✓	✓	
D.4.c and D.9 Public Agency Activities			
• Maintain an updated inventory of all Permittee-owned or operated facilities within its jurisdiction that are potential sources of stormwater pollution	✓	✓	✓
• Implement activity specific BMPs (Table 18 of Permit) or equivalent BMPs for all applicable facilities and field activities (municipal and contracted activities)	✓	✓	✓
• Integrated Pest Management Program	✓	✓	✓
• Develop retrofit opportunity inventory; evaluate and rank using EWMP structural control measure selection process	✓	✓	
• Where opportunities arise, cooperate with private land owners to encourage site specific retrofitting; includes pilot projects and outreach	✓	✓	
• Develop procedures to assess impact of flood management projects on water quality of receiving waters; evaluate to determine if retrofitting is feasible using EWMP structural control measure selection process	✓	✓	✓
• Evaluate existing structural flood control facilities to determine if retrofitting facility to provide additional pollutant removal is feasible using EWMP structural control measure selection process	✓	✓	

MCMs New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement	City of Santa Clarita	County of Los Angeles	Los Angeles County Flood Control District
• Evaluate existing structural flood control facilities during planning phases of major maintenance or rehabilitation projects to determine if retrofitting the facility to provide additional pollutant removal from storm water is feasible			✓
• Update list of catch basins or map, add GPS locations and update priority	✓	✓	✓
• Maintain an up-to-date and accurate electronic map of the MS4			✓
• Develop and implement Adopt-a-Creek Program to include posting signs at access points to water bodies (open channels, creeks; lakes)	✓		
• Implement controls to limit infiltration of seepage from sanitary sewers to the storm drains	✓	✓	✓
• Implement routine preventative maintenance for both systems - survey sanitary sewer and MS4. May use SSO General WDR to fulfill this requirement	✓	✓	
• Add PACE Sewer to program - property assessments or low cost loans on parcel to pay for transition from septic to sewer systems	✓		
• Implement inspection and maintenance program for Permittee owned BMPs	✓	✓	✓
• Manage residual water in treatment control BMPs removed during maintenance	✓	✓	✓
• Enhance current street sweeping program with advanced sweeping technology in areas that require additional pollutant reduction	✓	✓	
• Implement road construction maintenance BMPs (e.g., restrict paving activity to exclude periods of rain)	✓	✓	
• Open space conservation/acquisition	✓		
• Install satellite based irrigation controllers for public spaces	✓		
• River and creek restoration projects (e.g., invasive species removal, reforestation)	✓		
• Add contractors to existing training program	✓	✓	✓
D.10 Illicit Connections and Illicit Discharges Elimination			
• Written procedures for receiving and tracking reports and conducting investigations and eliminations	✓	✓	✓
• Implement an illicit discharge and spill response plan for all spills that may discharge to the MS4		✓	✓

MCMs New 2012 Permit Requirement or Enhancement from 2001 Permit Requirement	City of Santa Clarita	County of Los Angeles	Los Angeles County Flood Control District
• Signage adjacent to prioritized open channels provide info re: public reporting	✓	✓	✓
• Work with the SCV Family of Water Providers to address over irrigation	✓		
• Create list of relevant staff and contractors for training; provide enhanced training to a subset of field staff	✓	✓	✓

a. The LACFCD does not operate, or have authority over, any facility(ies) identified in Part VI.D.6.b, Should this change, the LACFCD will comply with requirements under Part VI.D.6 as applicable.

b. Although not often applicable, the LACFCD will implement and comply with the Planning and Land Development Program requirements in Part VI.D.7 of the Order at LACFCD-owned or operated public construction projects that are categorized under the project types identified in Part VI.D.7 of this Order.

c. Although not often applicable, the LACFCD will implement and comply with the appropriate Development Construction Program requirements in Part VI.D.8 of the Order at LACFCD-owned or operated construction projects as applicable.

7.2.2 Non-Stormwater Control Measures

The MS4 permit effectively prohibits non-stormwater discharges and the EWMP implementation plan is designed to achieve that requirement along with the dry weather USCR Bacteria TMDL requirements. The non-stormwater EWMP implementation includes the following components:

1. Wet weather structural control measures will also reduce non-stormwater flows with a 100% reduction in effectively prohibited non-stormwater flows by 2035 **(See Figure 7-6).**
2. An aggressive non-stormwater screening, investigation, and abatement program implemented in accordance with the CIMP and Illicit Connection/Illicit Discharge requirements in the permit. This program will address all identified significant non-stormwater flows by the dry weather bacteria TMDL deadline of 2023.
3. Support for efforts to continue water conservation outreach, education and incentive programs to reduce outdoor water use.

7.3 SCHEDULING OF CONTROL MEASURES AND EWMP MILESTONES

As described in Section 6.4.3, the scheduling of control measures for the EWMP Implementation Plan is based on the BMP-based milestones created by the USCR EWMP Group. The SCR Bacteria TMDL, which is the primary TMDL for this EWMP, does not have reduction milestones or a schedule of interim requirements. As a result, the Group defined a set of milestones based on aggressive yet realistic implementation of enhanced MCMs, high priority regional projects and green streets over the next two Permit terms. Three interim milestone dates were set to correspond approximately with the requirement to evaluate progress on a watershed scale every two years: (1) 2017 to reflect the end of the current permit term, (2) 2020 to reflect the middle of the second permit term, and (3) 2022 to reflect the end of the second permit term. Additional interim milestones during the current permit term were identified where appropriate. To reflect final EWMP compliance milestones, the dry and wet weather final TMDL compliance deadlines for the Bacteria TMDL are used (2023 and 2029 respectively) for all constituents except metals. A final deadline of 2035 is included for any additional control measures needed to address metals after the controls to address bacteria and other constituents are implemented. This final date of 2035 was determined to be as soon as possible based on the following considerations:

- Additional monitoring data will need to be collected and assessed to determine if metals are still exceeding water quality objectives and if additional BMPs are necessary (approximately 2-3 years).
- Time is needed to secure funding, complete the planning process, and construct additional BMPs (approximately 4-5 years).

The final date was determined to be as soon as possible given the time needed to confirm additional structural control measures are needed and design and construct those additional facilities.

7.3.1 Scheduling of Control Measure Implementation

The following approach was used to develop the schedule for USCR EWMP implementation:

- The pacing of structural control measure implementation was based on available financial resources for regional BMPs and green streets, assumed to be $10M by 2020 and $12M by 2022 *each* for City and County. The rationale behind selecting these levels of available financial resources is presented in Section 8. Completed implementation actions and interim milestones for structural BMPs within this Permit term, where applicable, are shown in **Table 7-2.**
- The preferred BMP type for capital investment in early years is Tier A regional BMPs. The Tier A regional BMPs in the EWMP anticipated to be implemented by each proposed milestone are shown in **Table 7-6** along with their assumed design characteristics and anticipated schedule for completion.
- Because LA County areas are largely undeveloped and have fewer regional BMP opportunities, green streets were also used to achieve interim milestones for County areas.
- Implementation of BMP capacity associated with programs for residential LID (rain cistern incentive program) and the LID ordinance (redevelopment) was assumed to have a consistent pacing throughout the implementation period to address final wet weather compliance for *E. coli* (which equates to 100% of final capacity by 2029), as follows:
    - The residential LID program will begin in 2017 and enroll 1% of the residential parcels per year until 2029. Thus, 25% of the final capacity of residential LID will be achieved in 2020, and 42% of the final capacity will be achieved in 2022.
    - The LID ordinance program will implement BMPs according to constant redevelopment rates, which equates to 36% of the final capacity achieved in 2020, and 50% of the final capacity achieved in 2022.
- Enhanced MCMs (described in Section 7.2.1) will be implemented by 2017. Completed implementation actions and interim milestones for enhanced MCMs within this Permit term, where applicable, are shown in **Table 7-2.** The County and the LACFCD are already implementing the enhanced requirements and will complete them by the due date.
- Installation of full capture devices for discharges to Lake Elizabeth was completed in 2015.
- Non-stormwater controls to address identified significant flows will be implemented by 2023.
- The remaining regional BMPs and green streets identified in the EWMP Implementation Plan may be scheduled for implementation after 2022 if the data evaluation and revised modeling continue to support those projects are necessary to meet water quality standards. However, these future milestones are subject to revision if the data evaluation or revised modeling shows some projects are not necessary to meet water quality standards or if schedule modifications are warranted based on new information. Proposed schedule modifications will be provided for approval to the Regional Board Executive Officer for all non-TMDL constituents.

The resulting BMP implementation schedule, as presented in **Figure 7-5** and **Table 7-6**, represent significant capital expenditure in the near-term and, perhaps more importantly, they represent specific, near-term commitments by the City and County. The financial strategy for achieving these commitments and increasing revenue to complete SCR Bacteria TMDL implementation requirements between 2022 and 2029 is presented in Section 8.

Table 7-2. Interim Milestones within the Current Permit Term (includes already completed items)

Structural BMP or MCM	Description of Interim Milestone or Implementation Action	Status
Structural BMPs		
Full-capture devices for discharge to Lake Elizabeth	20% Drainage area covered by full capture systems	Completed In 2011
	40% Drainage area covered by full capture systems	Completed In 2011
	60% Drainage area covered by full capture systems	Completed In 2011
	80% Drainage area covered by full capture systems	Completed In 2011
	100% Drainage area covered by full capture systems	Completed June 1, 2015
Full Capture Systems in High Trash Generation Areas	Installation of full capture systems in 215 catch basins located in high trash generation areas.	Completed June 1, 2015
Hasley Canyon Park	Planning	To be completed in 2016
	Design	To be completed in 2018
	Construction	To be completed in 2019
Pico Canyon Park	Planning	To be completed in 2016
	Design	To be completed in 2018
	Construction	To be completed in 2019
Enhanced MCMs		
D.4.a and D.5. Public Information and Participation Program (PIPP)		
Residential Outreach (Individually or with group):		
Develop/Modify public education materials to focus on watershed priorities. Subject matter may include: vehicle fluids; household waste; construction waste; pesticides, fertilizers, and integrated pest management (IPM); green wastes; and animal wastes	Currently implementing vehicle fluids, household hazardous waste, pesticides (Got Ants?), animal waste management, and green waste management	Complete

Structural BMP or MCM	Description of Interim Milestone or Implementation Action	Status
Work with Community College Santa Clarita Environmental Education Consortium (SCEEC) to find opportunities for water quality related education	The group has been on hiatus to re-organize and re-vision. One overall vision is complete, City's participation will resume	Currently participate, but on hiatus for visioning
D.7. Planning and Land Development[b]		
Update ordinance/design standards to conform with new requirements (LID and Hydromodification)	In progress/Implemented. LID Ordinance updated SUSMP to include LID standards adopted May 26, 2015	Complete January 1, 2016 (implementation)
Plan Review process - check LID and BMP sizing, etc.	In progress/Implemented. Development Services has LID plan-review sheet with required tracking info for database	In Progress
Establish internal agreements with structure for communication and authority for departments overseeing plan approval and project construction	Implemented. Development Services has plan-review sheet with required tracking info for database	Complete
Require O&M plan for LID, treatment and hydromodification BMPs	Implemented. As part of USMP approval, a Maintenance Covenant is required for each project for property owner to maintain BMPs	Complete
Implement tracking and enforcement program for LID, treatment and hydromodification BMPs	In progress/Implemented. Accela database program will incorporate Development Services' LID plan-review info and provide info for ICID inspectors to track and inspect development with LID and SUSMP	July 1, 2015 started. But Accella database is in progress (June 2016 start)
Inspect all development sites upon completion and prior to occupancy certificates	Implemented. Development Services ensures proper installation of BMPs	Complete
Verify O&M of BMPs operated by Permittee through inspection		Complete
Develop maintenance inspection checklist		Complete
Require private parties that operate BMPs to document O&M; enforce as needed		Complete
D.8. Development Construction[c]		
Update erosion and sediment control ordinance/procedures to conform with new requirements	Completed	Complete
Require operators of public and private construction sites to select, install, implement, and maintain BMPs that comply with the updated erosion and sediment control ordinance	On-going as part of the grading approval	Complete
Sites < 1 acre; inspect based upon water quality threat	On-going as part of the grading approval and inspections	Complete

Structural BMP or MCM	Description of Interim Milestone or Implementation Action	Status
Establish priority inspection process based on the potential for a site to be a source of pollutants identified as water quality priorities	On-going as part of the grading inspections	Complete
Develop/implement SOPs/inspection checklist	This is a standard table in the SWPPP document already required	Complete
For sites 1 acre or more, maintain inventory of grading, encroachment, demolition, building, or construction permits (and any other applicable authorization to move soil or disturb land)	City staff currently use Tidemark (since 2003) to track permits during the plan check process. The City is replacing Tidemark with Accella into this process over the next two years.	Complete
For sites 1 acre or more, require submittal and approval of an Erosion and Sediment Control Plan (ESCP) prior to land disturbance.	Part of the SWPPP approval that is required prior to grading permit issuance	Complete
For sites 1 acre or more, implement technical standards for the selection, installation, and maintenance of construction BMPs	City has adopted the CASQA standard SWPPP document which covers this.	Complete
For sites 1 acre or more, implement inspections program at frequencies per Table 17 to include subsequent inspection requirements in Part VI.D.8.j.	This is completed as part of the grading inspection and required as part of the approved SWPPP	Complete
D.4.c and D.9 Public Agency Activities		
Integrated Pest Management Program	Currently implementing – Most landscape maintenance is completed via contractors. The City has incorporated language requiring IPM of contractors into landscape maintenance contracts specifications. Will be working with Parks Division to update their efforts.	Complete
Implement routine preventative maintenance for both systems - survey sanitary sewer and MS4. May use SSO General WDR to fulfill this requirement	This is part of the SSO WDR program	Complete
Add PACE Sewer to program - property assessments or low cost loans on parcel to pay for transition from septic to sewer systems	Sewer Reimbursement Districts available for customers with cash to build connections, but want to get partially reimbursed by people who hook up within 20 years.	In Progress
Implement inspection and maintenance program for Permittee owned BMPs	City Stormwater field staff inspect City CDS units	Complete
Enhance current street sweeping program with advanced sweeping technology in areas that require additional pollutant reduction	The City of Santa Clarita has an ongoing contract until 2017 (with potential for extension) for street sweeping. This item will be addressed when the contract is out to bid.	In Progress

Structural BMP or MCM	Description of Interim Milestone or Implementation Action	Status
Open space conservation/acquisition	In July 2007, City of Santa Clarita property owners voted in favor of creating the Open Space Preservation District. The District is designed to expand the City's existing Open Space, Park and Parkland Program in order to preserve natural land from development, create more parks for community usage, and protect rare biological and geological regions. The City currently owns approximately 8,000 acres of open space.	Complete
Install satellite based irrigation controllers for public spaces	The City Special Districts has 675 smart controllers, almost 100% of all the controllers, where the City is responsible for the landscaping irrigation. The Parks Department also includes smart irrigation systems at all City owned parks. There are many locations that have precision fertilizing through the same smart system.	Complete
River and creek restoration projects (e.g., invasive species removal, reforestation)	The City has been removing invasive plants from the Santa Clara River since 2005. This includes mostly Arundo donax and Salt Cedar Tamarisk. The City has appropriated $100,000 for FY 15-16 to continue the program.	Complete
D.10 Illicit Connections and Illicit Discharges Elimination		
Work with the SCV Family of Water Providers to address over irrigation	Currently participating and coordinating with SCV Family of Water Providers through www.scvh2o.org	Complete

7.3.2 EWMP Interim and Final Milestones

The Permit provides for four options for complying with WQBELs and RWLs:

1. Monitoring data demonstrating water quality objectives are being met in the receiving waters at the compliance monitoring locations outlined in the CIMP.
2. Monitoring data demonstrates water quality objectives are being met at the outfall monitoring locations specified in the CIMP.
3. Monitoring and screening data demonstrates that no discharges are occurring from MS4 outfalls.
4. For interim TMDL requirements and RWL violations, implementing an approved WMP or EWMP.

The compliance pathways are independent, meaning that demonstration of compliance with any of the pathways is considered to be compliance with the Permit requirements. As discussed previously, implementation of control measures (per the schedule in Section 7.3.1) will by necessity evolve over time as more information is obtained and lessons are learned through implementation of control measures. Therefore, it is important to have multiple interim and final milestones that can be utilized for determining compliance with the Permit requirements.

For the interim milestones, approaches have been identified to correspond to three of the four Permit compliance options. Each of these approaches represents an independent compliance

approach and meeting any of the identified milestones for a given constituent will demonstrate compliance for that constituent. For the four compliance options listed above, the following metrics were used to develop compliance milestones for the USCR EWMP:

1. Percent reduction in the receiving water concentrations at each interim milestone date **(see Table 7-3)**
2. Percent reduction in the outfall loads or concentrations at each interim milestone date **(see Table 7-4).**
3. None identified
4. EWMP implementation is described in terms of (a) identified control measures implemented or (b) Total volume managed, as shown in **Table 7-5, Table 7-6** and **Figure 7-5**. In addition, the EWMP Implementation Plan for final compliance is presented in Appendix D-1.

For Category 2 and Category 3 constituents without recent exceedances, and salts, selenium and cyanide, the milestones and schedule are based on the implementation of control measures to address *E. Coli* and metals. As the reduction requirements for these Category 2 and 3 constituents are lower than the requirements for bacteria and metals, it is anticipated that compliance with the receiving water limitations will be based on implementing a subset of the control measures necessary to address bacteria and metals. The proposed interim milestones in the following tables represent the anticipated control measures and schedule that will achieve the receiving water limitations as soon as possible. However, given the sporadic nature of many of these exceedances and the fact that many are limited in geographic scope, implementation of control measures that address a specific subwatershed with exceedances may occur later in the implementation period. As a result, the final compliance dates will be concurrent with the wet weather bacteria TMDL compliance schedule of 2029.

Table 7-3. Milestone Option #1: Receiving Water Reductions Measured at Reach 5 Monitoring Location

Constituent	Milestone Date					
	2017	2020	2022	2023[1]	2029[1]	2035[1]
E. Coli-dry	5%	17%	25%	41%		
E. Coli-wet	5%	17%	25%		50%	
Metals-dry	5%	10%				
Metals-wet	5%	15%	21%		50%	66%
Salts	5%		10%		27%	
Selenium	5%					
Cyanide	5%					

Blank cells indicate milestone is not anticipated to be needed because final RWLs are likely to be achieved by the interim date. However, monitoring data will be utilized to refine later milestones for these constituents if further reductions are needed.

1. The projects anticipated for these milestones are contingent on continued need to implement these projects to meet water quality objectives as identified through the adaptive management process. However, these future milestones are subject to revision if the data evaluation or revised modeling shows some projects are not necessary to meet water quality objectives or if revised milestones are appropriate based on new information. Proposed revisions to the milestones will be submitted to the Regional Water Board Executive Officer for approval.

Table 7-4. Milestone Option #2: Outfall Reductions Measured at Designated Outfall Monitoring Locations

Constituent	Milestone Date					
	2017	2020	2022	2023[1]	2029[1]	2035[1]
E. Coli-dry	5%	17%	25%	41%		
E. Coli-wet	5%	17%	25%		50%	
Metals-dry	5%	10%				
Metals-wet	5%	15%	21%		50%	66%
Salts	5%	10%	27%			
Selenium	5%					
Cyanide	5%					

Blank cells indicate milestone is not anticipated to be needed because final RWLs are likely to be achieved by the interim date. However, monitoring data will be utilized to refine later milestones for these constituents if further reductions are needed.

1. The projects anticipated for these milestones are contingent on continued need to implement these projects to meet water quality objectives as identified through the adaptive management process. However, these future milestones are subject to revision if the re-modeling shows some projects are not necessary to meet water quality objectives or if revised milestones are appropriate based on new information. Proposed revisions to the milestones will be submitted to the Regional Water Board Executive Officer for approval.

Table 7-5. Milestone Option #3: Overview of Control Measures Implemented

<table>
<tr><th rowspan="2">Constituent</th><th colspan="6">Milestone Date</th></tr>
<tr><th>2017</th><th>2020</th><th>2022</th><th>2023[1]</th><th>2029[1]</th><th>2035[1]</th></tr>
<tr><td>E. Coli-dry</td><td rowspan="8">Enhanced MCMs</td><td rowspan="8">Control measures shown in Table 7-5 (including Tier A regional BMPs detailed in Table 7-6).</td><td rowspan="3">Control measures shown in Table 7-5 (including Tier A regional BMPs detailed in Table 7-6).</td><td>Address all significant NSW per permit procedures</td><td></td><td></td></tr>
<tr><td>E. Coli-wet</td><td></td><td>Control Measures identified in Appendix D-1</td><td></td></tr>
<tr><td>Metals-dry</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Metals-wet</td><td rowspan="5">Control measures shown in Table 7-5 (including Tier A regional BMPs detailed in Table 7-6).</td><td></td><td>Control Measures identified in Appendix D-1</td><td>Additional Metals control measures identified in Appendix D-1</td></tr>
<tr><td>Salts</td><td></td><td></td><td></td></tr>
<tr><td>Selenium</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Cyanide</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Trash</td><td>Full capture devices installed on all discharges to Lake Elizabeth (2016)[2]</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Blank cells indicate that additional control measures are not anticipated to be needed to meet the WQBELs and RWLs.

1. The projects anticipated for these milestones are contingent on continued need to implement these projects to meet water quality objectives as identified through the adaptive management process. However, these future milestones are subject to revision if the re-modeling shows some projects are not necessary to meet water quality objectives or if revised milestones are appropriate based on new information. Proposed revisions to the milestones will be submitted to the Regional Water Board Executive Officer for approval.
2. Interim deadlines/WQBELs of March 6 2012, 2013, 2014 and 2015 have been met, and all full capture devices are installed.

Table 7-6. Details on Control Measure Capacities by Milestones to be Achieved by USCR EWMP [1]

Jurisdiction	EWMP Milestone		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)								
			Low-Impact Development				Streets	Regional BMPs			Total BMP Capacity
			Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Tier A (on public, highest-ranked)	Tier B (on public, medium-ranked)	Private	
Santa Clarita	BMP-based EWMP Milestones	2017	Implemented Enhanced MCMs								0.0
		2020	23.6	0.0	0.0	11.0	0.0	6.0	0.0	0.0	40.9
		2022	32.8	0.0	0.0	18.6	0.0	8.5	0.0	0.0	59.8
	Final Bacteria and other WQ Priorities (2029)[2]		65.6	2.8	3.9	44.2	57.6	21.6	2.7	119.7	318.0
	Metals (2035)[2]		65.6	2.8	3.9	44.2	57.6	21.6	2.7	133.7	332.0
Uninc. Los Angeles County	BMP-based EWMP Milestones	2017	Implemented MCMs from 2012 Permit								0.0
		2020	46.8	0.0	0.0	6.8	7.2	0.0	0.0	0.0	60.7
		2022	65.0	0.0	0.0	11.4	11.6	0.0	0.0	0.0	88.0
	Final Bacteria and other WQ Priorities (2029)[2]		129.9	0.0	3.6	27.1	20.3	4.6	3.7	95.5	284.7
	Metals (2035)[2]		129.9	0.0	3.6	27.1	20.3	4.6	3.7	101.0	290.2
Total			**195.5**	**2.8**	**7.5**	**71.3**	**77.9**	**26.2**	**6.4**	**234.7**	**622.2**

1. Compliance can be demonstrated through meeting individual control measure targets or through using a different combination of control measures to achieve the same Total BMP capacity by the milestone date, or by implementing alternative control measures that are shown to be equivalent in terms of stormwater volume managed or load reduction.
2. The projects anticipated for these milestones are contingent on continued need to implement these projects to meet water quality objectives as identified through the adaptive management process. However, these future milestones are subject to revision if the re-modeling shows some projects are not necessary to meet water quality objectives or if revised milestones are appropriate based on new information. Proposed revisions to the milestones will be submitted to the Regional Water Board Executive Officer for approval.

Table 7-7. Details and Implementation Schedule for Tier A Regional BMPs to be Implemented to Achieve BMP-based EWMP Milestones

Regional BMP Number	Capacity (ac-ft)	% Drainage area in City	% Drainage area in County	To be Implemented by [1]
5	0.39	100%	0%	**2020**
7	4.9	0%	100%	**2020**
8	0.6	100%	0%	**2020**
12	1.6	100%	0%	**2020**
17	0.8	11%	89%	**2020**
19	0.9	100%	0%	**2020**
13	0.11	100%	0%	**2020**
25	2.8	100%	0%	**2020**
26 (Pico Canyon Park)	0.6	0%	100%	**2020**
11	2.0	100%	0%	**2022**
3b	10	100%	0%	**2029**
14	2.8	100%	0%	**2029**
18	0.15	100%	0%	**2029**
26 (Jake Kuredjian Park)	8.0	0%	100%	**2029**
X	18	100%	0%	**2029**

1. Selection and scheduling of regional BMP implementation based on rough estimates of capital costs.

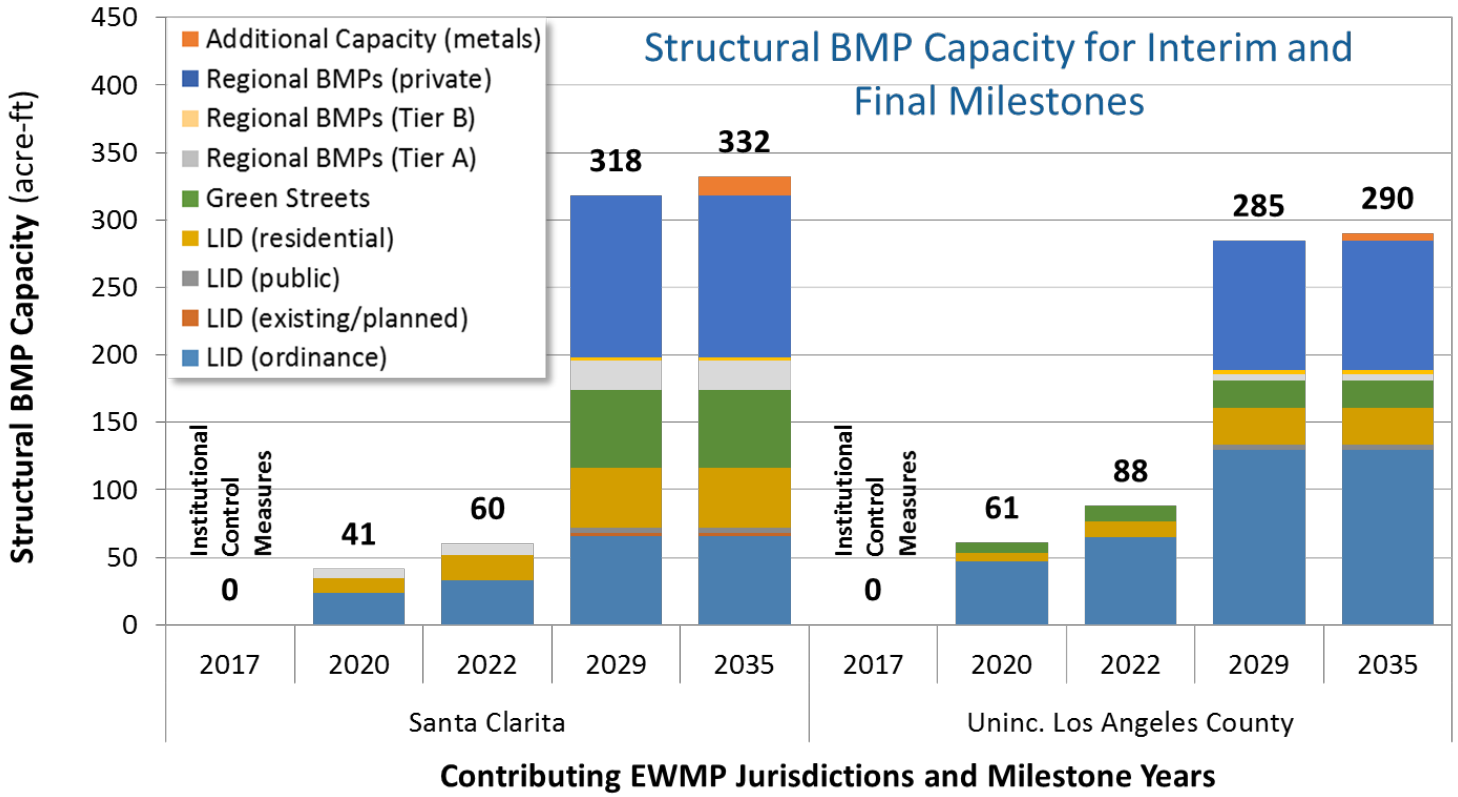


Figure 7-5. Scheduling of EWMP Implementation Plan to Achieve EWMP Milestones
This figure presents the schedule for EWMP implementation including BMP-based milestones for 2020 and 2022.

7.4 NON-STORMWATER CONTROL MEASURES SCHEDULE

The MS4 permit effectively prohibits non-stormwater discharges and the USCR Bacteria TMDL has a final dry weather compliance date of 2023. The EWMP Implementation Plan provides reasonable assurance of eliminating non-stormwater discharges, through implementation of the network of wet weather control measures and non-stormwater abatement programs. As shown in **Figure 7-6**, the EWMP Implementation Plan achieves 100% elimination of non-stormwater flows by 2035. However, because the wet weather control measures will not all be in place by the 2023 dry weather bacteria TMDL[27] compliance deadline, the proposed wet weather milestones were evaluated to ensure the dry weather compliance deadline will be achieved.

1. The structural control measures to be implemented according to the EWMP milestones will achieve reduction in non-stormwater flows by 18% to 30% by 2023. Details on the wet weather control measures that correspond to each of the EWMP milestones are provided in section 7.4.
2. In order to achieve the 41% reduction estimated as required to achieve the RWLs for the SCR Bacteria TMDL (see Section 6.2.4), the remaining reduction (23% for City and 11% for County[28]) will be achieved through the non-stormwater screening, investigation and abatement programs being conducted under the CIMP for the USCR EWMP Group. These programs require source identification for all outfalls identified as exhibiting significant non-stormwater discharges by 2017. Based on the source investigations, identified illicit discharges would need to be abated. As a result, the program will be targeting the highest and most persistent non-stormwater flows. Given the extensive requirements for these programs under the MS4 Permit, it is reasonable to assume they will be able to achieve 11% reduction in non-stormwater discharges for County and 23% for City over the course of eight years.
3. An additional margin of safety will be provided by wide-scale reductions in outdoor water use. The non-stormwater volumes in the non-stormwater analysis were based on *existing median* outdoor water use rates (Appendix C-2). Most water supply agencies have initiatives to significantly reduce outdoor water use in the coming years and thus the rate of elimination of non-stormwater flows should be more rapid than shown in **Figure 7-6**. Regional outdoor water use reductions would provide even more assurance that the structural control measures in the EWMP milestones and the non-stormwater abatement programs will be able to achieve the necessary *E. coli* load reductions.

Overall, the combination of enhanced MCMs, structural control measures to be implemented according to the EWMP milestones, and the ongoing non-stormwater abatement programs provide assurance of achieving WQBELs and RWLs for *E. coli* and other dry weather Water Quality Priorities by the TMDL deadline of 2023. By the end of the wet weather implementation period, all non-stormwater discharges (beyond what is necessary to achieve the final dry weather

[27] As described in Section 6.2.4, achieving bacteria RWLs during dry weather assures RWLs for other Water Quality Priorities will also be addressed. Also, during dry weather, exceedances of metals RWLs are rare, as described in, and thus existing MCMs and control measures have reasonable assurance of attaining metals RWLs (see Table 6-5).

[28] This assumes a 1:1 relationship between non-stormwater volume reduction and non-stormwater bacteria loading, which is reasonable given the ubiquity of bacteria in urban areas.

E. Coli WQBELs and RWLs) will be controlled by the implementation of the wet weather control measures.

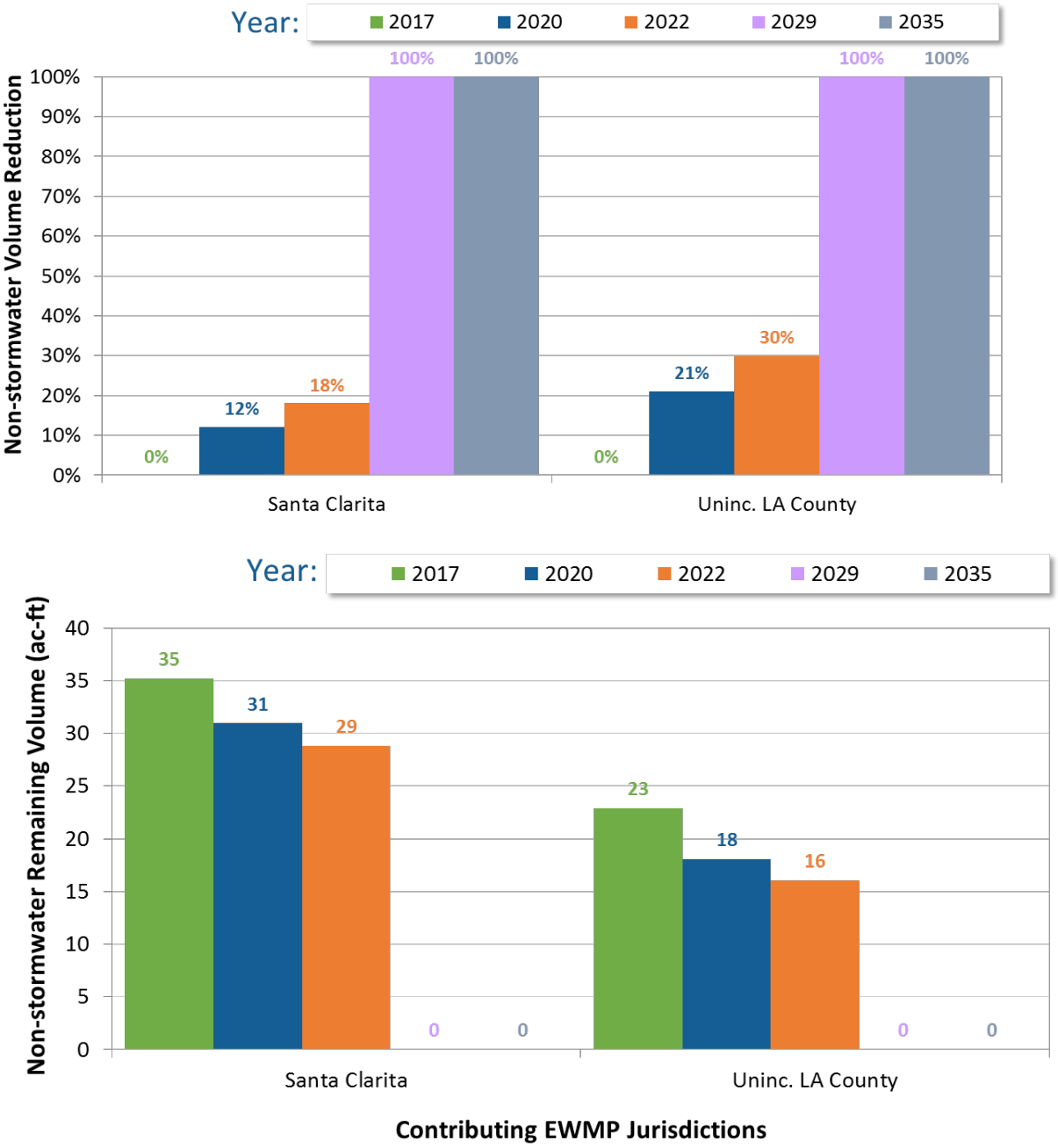


Figure 7-6. Schedule for Eliminating Non-stormwater Discharges in USCR
The figure shows the effect of the EWMP Implementation on non-stormwater discharges in USCR. The top panel shows the schedule for volume reductions in non-stormwater discharges, while the bottom panel shows the non-stormwater volumes remaining. Over time, the wet weather control measures will eliminate effectively prohibited non-stormwater discharges.

8 Costs and Financial Strategy

8.1 COST ESTIMATE

The cost analysis estimates BMP-related costs associated with planning, design, permits, construction, operation and maintenance, for the selected WCMs. Funding sources identified for the selected WCMs are aligned with the BMP construction schedule. The cost estimate includes an evaluation of the overall economic impact the proposed projects and programs may have on the community.

The cost analysis meets the following permit requirements:

- Maximize the effectiveness of funds through analysis of alternatives and the selection and sequencing of actions needed to address human health and water quality related challenges and non-compliance;
- Ensure that a financial strategy is in place.

The Permit requires that a financial strategy be established to support the EWMP. To determine the financial commitments of the program, a capital cost estimate was first prepared for all structural control measures prescribed in Section 7 (costs associated with the implementation of institutional control measures and MCMs were not considered in the estimate). This section presents a financial strategy to manage existing funds while pursuing additional future funding based on the cost estimates provided below.

8.1.1 Structural Control Measure Cost Estimate

Planning-level construction capital costs for each milestone and for final compliance were developed from unit costs for individual construction components. The components of green infrastructure and regional BMPs were priced out on a line-item-basis using the typical geometries and materials discussed in Appendix C-4 (for example, the cost estimates are customized to the actual excavation volumes, soil media, and aggregate depths of each modeled BMP configuration). Unit costs, including mobilization, were collected from the LACDPW Bid History and local vendors that serve the Los Angeles area (detailed assumptions are listed in County of Los Angeles 2012 and Tetra Tech, Inc., 2011). Additional cost assumptions included the following:

- Planning, permitting, bond, and insurance costs and design fees were also added to the capital cost (at respective rates of 10% and 40% of construction costs).
- Capital costs for ongoing residential LID programs were estimated as an incentive-based program, to be paid at a rate of $4.00/square foot of retention BMP installed (roughly based on similar turf conversion and rain barrel incentive programs in Southern California). These costs were added to the $10M and $12M in regional BMP and green street implementation costs (each for City and County) in 2020 and 2022, respectively, to account for the modeled pace of 1% adoption per year. It is assumed that the additional residential program fees will be secured through grants and other financial strategies outlined in following subsections.
- Due to uncertainty surrounding the diversion configuration for regional control measures on private property, it was assumed that pumps will be needed commensurate with the

frequency of pump necessity for the assessed Tier A and Tier B projects; a 10-cfs pump station was therefore assumed for 17% of subwatersheds where private regional control measures were prescribed.

Table 8-1 reports the planning-level estimates and **Table 8-2** tracks capital spending over time (control measure scheduling and pacing was discussed in Section 7).

Table 8-1. Cumulative Capital Cost Estimates for EWMP Structural BMPs[1,2]

Agency	Year/ Milestone	LID/Green Infrastructure Cost ($M)			Regional BMP Costs ($M)			Total Per Jurisdiction ($M)
		Public	Residential	Green Streets	Tier A[3]	Tier B	Private	
Santa Clarita	2020	---	$ 1.3	---	$ 8.5	---	---	$ 9.8
	2022	---	$ 2.2	---	$ 11.6	---	---	$ 13.8
	2029	$ 2.6	$ 5.3	$ 42.5	$ 27.9	$ 0.7	$ 258.3	$ 337.3
	2035	**$ 2.6**	**$ 5.3[4]**	**$ 42.5**	**$ 27.9**	**$ 0.7**	**$ 288.5**	**$ 367.5[5]**
Uninc. Los Angeles County	2020	---	$ 0.8	$ 5.7	$ 3.4	---	---	$ 9.9
	2022	---	$ 1.4	$ 9.2	$ 3.4	---	---	$ 14.0
	2029	$ 2.4	$ 3.3	$ 16.0	$ 3.4	$ 0.9	$ 217.7	$ 243.7
	2035	**$ 2.4**	**$ 3.3**	**$ 16.0**	**$ 3.4**	**$ 0.9**	**$ 230.2**	**$ 256.2**
EWMP Total		$ 5.0	$ 8.6	$ 58.5	$ 31.3	$ 1.6	$ 518.7	**$ 623.7[6]**

1. Operations and maintenance costs are not included in these planning-level estimates.
2. Costs are distributed proportional to contributing drainage areas, consistent with Appendix D-1.
3. These capital costs are rough estimates prepared prior to any effort on conceptual design; they represent *minimum* investments to attain the budgetary milestones discussed in Section 7. Note that more detailed estimates presented in Appendix C-9 may exceed these minimum milestone requirements due to variations in design assumptions, and represent situations where costs may be shared with partnering agencies to achieve concurrent benefits.
4. **Bolded** numbers are the cumulative costs for each agency. For example, the Residential LID/Green Infrastructure cumulative cost for the City of Santa Clarita is $1.3M + 0.9M = $2.2M (2022); $2.2M + 3.1M = $5.3M (2029); $5.3M + 0 = $5.3M (2035).
5. The bolded numbers in the row for 2035 are added to get the total cost per jurisdiction.
6. $623.7 is the total cost for EWMP Structural BMPs.

The cost analysis estimates BMP-related costs associated with planning, design, permits, and construction for the selected WCMs. The limitations of these estimates include:

- Time value of money was not considered (e.g. inflation, interest, or discount rates were not applied).
- Operation and maintenance of structural facilities was assumed to be managed with existing resources and was not included in these estimates.
- Unit costs were applied under the assumption that "typical" BMPs will be constructed individually over time; economies of scale associated with efficient, programmatic implementation were not considered, but could potentially reduce the total capital cost burden.

8.2 FINANCIAL STRATEGY

The financial strategy for implementing the EWMPs consists of the identification of existing funding sources and a process for identifying future funding sources for the estimated costs that are not covered by existing funding sources. Implementation of actions in the EWMP will be dependent on the availability of funds.

8.2.1 Existing Funding Sources

The City of Santa Clarita has an existing stormwater fee that funds the Stormwater Utility Fund, providing all funding for the existing stormwater program. The fee includes a provision for increases for inflation that has not been utilized to date. The fee generates approximately $3,500,000 per year, the majority of which is utilized for the existing stormwater program. The remainder is placed into a reserve that is currently approximately $4,475,000. The Stormwater Utility Fund's current fund balance will be used to implement some of the new Permit requirements. Consideration will need to be given to the opportunity costs that would preclude the City of Santa Clarita from spending substantial funds on other important social needs in the City when identifying future funding. [29]

The County and Flood Control District utilize general funds to support the stormwater program. The EWMP assumes that approximately $1,000,000 to $2,000,000 per year will be available to fund USCR EWMP projects, but the actual amount of funding available is uncertain due to the competing uses of general funds (e.g. police, fire, etc.).

8.2.2 Potential Funding Sources

A number of potential funding sources have been identified that will be considered by the USCR EWMP Group to supply the remaining funding estimated to be necessary to meet the final cost estimates for the EWMP. The potential funding strategies, potential uses, and constraints on the use of the strategy are included in **Table 8-2**.

[29] As noted in the State Water Resources Control Board order on the petitions on the Permit, adopted on June 16, 2015, technical infeasibility or substantial hardship, which as noted in the meeting includes financial hardship, may be considered in determining whether modifications to an EWMP schedule is warranted.

Table 8-2. Potential Funding Strategies

Type	Background	Potential	Process	Conditions	Challenges
Enhanced Infrastructure Financing Districts (EIFD)s	Government entity created by City or County to construct or improve infrastructure, governed by a public financing authority (PFA) to use a portion of property taxes from the participating jurisdictions or other fees or investments to fund regional infrastructure projects	Signed into law in Fall 2014, will allow cross jurisdictional projects to collaboratively fund improvements affecting water problems which don't follow jurisdictional boundaries	• Determine if the prerequisites are met • ID projects, stakeholders, district members • Establish PFA • Formalize EIFD • Develop Infrastructure Financing Plan (IFP) • Review with public • Adopt IFP and begin work	• Receive Finding of Completion (FOC) • Certify no SA assets under litigation will benefit • Comply with State Controller's asset transfer review	New concept which will need time to become standard practice. Will require educating local decision makers of the benefits of EIFDs
State Revolving Fund (SRF) Loans	Funding source for any city county or district to fund projects including stormwater treatment, water reclamation and wastewater treatment systems	Continuously available for application	Application available online on SWRCB site,	Limitations apply to types of projects eligible	Limited supply of funds
Bonds	Traditional infrastructure bonds	Vary by project funding needs and jurisdiction	Traditional bond development and approval processes	Vary by type of bond and details	Lack of public support from lack knowledge of infrastructure funding shortcomings Timelines of bond issuance process don't always match project timelines

Type	Background	Potential	Process	Conditions	Challenges
Prop 1. Grants	The bond measure approved by voters in fall of 2014 will enact the Water Quality, Supply, and Infrastructure Improvement Act of 2014	$7.5 billion law to be enacted, funds generated by the act will become available under a variety of programs and through various agencies and timelines	Prop 1 Water Bond contained: • $520 million to improve water quality for "beneficial use," for reducing and preventing drinking water contaminants • $1.495 billion for competitive grants for multibenefit ecosystem and watershed protection and restoration projects • $810 million for expenditures on, and competitive grants and loans to, integrated regional water management projects • $2.7 billion for water storage projects, dams and reservoirs • $725 million for water recycling and advanced water treatment technology • $900 million for competitive grants and loans for groundwater contamination cleanup • $395 million for flood management projects	Will vary by program, information about availability will be arriving from different agencies administering funds in 2015. Governor's budget calls for spending $532 million in 2015 of Prop 1 funds	Will vary by program

Type	Background	Potential	Process	Conditions	Challenges
IRWM Grants	Grant funding program for projects related to all aspects of water resources, including multi-jurisdiction projects	Stormwater management projects are eligible for funding	• Application process overseen by DWR. • Applications for the current round of Prop 84 funding will be due in fall of 2015, draft program guidelines to be released in spring 2015 • $1.1 billion in spending from the 2006 flood bond Prop 1E proposed in Governor's 2015 budget	To be outlined in guidelines	Limited supply of funds
Climate Change/ Greenhouse Gas Emission Funding	AB32 established a comprehensive emission reduction program, including a "cap and trade" program that will auction emission credits creating up to $3billion annually, investment of these funds will be potential funding source	Emission trading funds investment plan does include "water use and supply" projects that reduce GHG as eligible	Emission trading market still developing	Still to be determined	Role of stormwater projects in the cap and trade program and quantification of associated emission reduction is still to be determined
Stormwater Fees	Standard utility type fee assessed on a parcel basis included as part of property tax or sewer service bill, varies in %	Already in place in the City of Santa Clarita	Varies by jurisdiction, ordinance development and approval process typically included	Various exemptions and exceptions related to sizing and type of surface/storm water management systems and requirements	Lack of public support from lack knowledge of infrastructure funding shortcomings

Type	Background	Potential	Process	Conditions	Challenges
Collaborative opportunities with Other Agencies	Mutually beneficial program partnerships to share resources and meet regulatory requirements	Will be well suited to be developed via the EIFD process above	Varies on type of jurisdictions or entities included	Varies on type of jurisdictions or entities included	Case by case management can be resource intensive
Public/Private Partnerships	Synergistic partnerships to develop funding opportunities	Vary by jurisdictions, smaller scale projects may be more attainable or allow proof of concept	Vary by project type and scale	Vary by project	May not be repeatable or of sufficient scale to justify public resource expenditure

8.2.3 Process for Obtaining Additional Funding

The USCR EWMP Group members will utilize the following process to maximize opportunities to obtain the necessary funding. As noted in **Table 8-2**, constraints and challenges exist for all of the potential funding strategies. As a result, while the USCR EWMP Group will implement the following process to attempt to gather the needed funding resources, the implementation of the actions outlined in the EWMP after 2022 is dependent on obtaining the additional resources. Additionally, to the extent additional funding is obtained earlier in the implementation schedule, those resources will be utilized to implement additional actions.

Step 1. Implement procedures to maximize water quality benefits from existing maintenance and public agency processes. Examples of this include incorporating green streets into all major new roads projects and incorporating consideration of water quality benefits into all new flood control projects.

Step 2. Increase opportunities for collaboration on multi-benefit projects. For this step, the USCR EWMP Group will work closely with local water agencies to identify projects that can be jointly funded or supported to enhance local water supplies.

Step 3. Pursue grant funding opportunities. The USCR EWMP Group will incorporate identified EWMP projects into the Integrated Regional Water Management Plan and any other planning documents necessary to make them eligible for state grant funding. Additionally, the agencies will evaluate opportunities to obtain other types of grants for funding projects.

Step 4. The City of Santa Clarita will consider obtaining a loan in the amount that can be serviced from the existing fees.

Step 5. If additional funds are needed, the USCR EWMP Group will begin a process of evaluating options for increasing the existing stormwater fees in the City of Santa Clarita and initiating a stormwater fee for the County and Flood Control District and/or developing an Enhanced Infrastructure Financing District (EIFD). This evaluation could be utilized by the City Council and Board of Supervisors to make decisions on approaches for obtaining additional funding for the EWMP through increased or new fees. For the City of Santa Clarita, this step would not be initiated before 2020.

8.2.4 Affordability Assessment

The cumulative capital costs estimated to be needed to meet the WQBELs and RWLs represent a significant burden to the agencies in the USCR EWMP Group. While the USCR EWMP Group is committed to following the financial strategy to try to obtain the funds necessary to implement the EWMP, obtaining additional funds through grants, loans, and collaboration opportunities is uncertain. As a result, much of the cost burden of implementing the EWMP may fall on the residents of the USCR EWMP area. Therefore there is a need to evaluate whether implementation of the EWMP will result in widespread economic harm.

In accordance with USEPA Guidance on assessing the economic impacts of Clean Water Act programs (EPA 2014) and the Affordability Assessment Tool (United Council of Mayors, 2013), a preliminary assessment of the affordability of the EWMP was conducted. The intent of this

section is not to provide a full economic analysis, but rather to demonstrate the potential economic impacts of implementation of the EWMP. EPA guidance provides a two-step process for assessing affordability.

1. Compare the cost of compliance to the median household income (MHI) for the area. If the cost of compliance is less than 1% of the MHI, then the cost is considered to not have an impact. If the cost is greater than 2% of the MHI, then the cost is considered to have potential widespread economic impacts. Between 1% and 2% requires further evaluation to determine if widespread economic impacts will occur.
2. Evaluate six economic factors to determine the financial capability of the community.

Only step 1 was conducted for this analysis. In addition, alternative measures of affordability outlined in the Affordability Assessment Tool were evaluated to show the disproportionate impact of the costs on lower income residents. The analysis was conducted for the City of Santa Clarita, using information from the US Census Fact Finder website as recommended in the Affordability Assessment Tool and the worksheets provided by that tool were used for the analysis.

The assumptions used for the analysis were as follows (based on 2013 information):

1. Number of households is 58,825
2. Only costs for implementing the remaining EWMP after 2022 were used for the analysis as existing funding sources will be utilized to fund the first portion of the EWMP. A full affordability analysis would take into account the existing funding cost burden and costs of other water programs including wastewater and drinking water costs.
3. The annual cost per household for implementation of the EWMP after 2022 is $750 per year.
4. The MHI is $82,607.

Based on these assumptions, the additional costs of EWMP implementation above and beyond the current stormwater fee is just under 1% of the MHI. However, when the income distribution of the City is accounted for, the EWMP will account for more than 2% of the household income for over 20% of the City's residents. This indicates that while the costs of implementing the EWMP may not have significant widespread economic impacts based on the EPA guidance thresholds, it could significantly impact lower income residents. Additionally, if all water and wastewater costs were to be considered, the impacts would be more significant. Just including the cost of the existing stormwater program and wastewater fees means that over 35% of City residents would have more than 2% of the annual household income dedicated to stormwater and wastewater treatment.

While the City and County are committed to implementation of control measures to cost-effectively improve water quality, consideration of the economic impacts on the community will need to be considered during the later phases of EWMP implementation when additional funding sources need to be identified.

9 Assessment and Adaptive Management

Adaptive management is a critical component of the EWMP implementation process, and EWMP updates are required at two-year cycles by the Permit. The CIMP will gather additional data on receiving water conditions and stormwater/non-stormwater quality. These data will support adaptive management at multiple levels, including (1) generating data not previously available to support model updates and (2) tracking improvements in water quality over the course of EWMP implementation. Furthermore, over time the experience gained through intensive BMP implementation will provide lessons learned to support modifications to the control measures identified in the EWMP.

The adaptive management process also includes a schedule for developing and reporting on the EWMP updates, the approach to conducting the updates, and the process for implementing any modifications to the RAA and EWMP to reflect the updates.

The adaptive management approach for USCR is designed to address the EWMP planning process and the relationship between monitoring, scheduling, and BMP planning. The adaptive management process outlines how the EWMP will be modified in response to monitoring results, updated modeling results, and lessons learned from BMP implementation. The adaptive management process for USCR is designed to accomplish three goals:

1. Clarify the short-term and long-term commitments of the USCR EWMP Group agencies within the EWMP.
2. Provide a structured decision-making process for modifications to the EWMP based on the results of monitoring data.
3. Propose a structure for evaluating compliance with water-quality based permit requirements within an adaptive structure.

As outlined in Section 7.3, the schedule and milestones for the EWMP have been designed around meeting the interim and final TMDL requirements based on the financial strategy for the EWMP. The EWMP milestones are structured around Permit terms and describe the actions to be taken by the Group. While the EWMP is a long-term planning document that identifies a pathway to compliance with the final TMDL targets and receiving water limitations, the long timeframe of the document (through 2035) prevents the identification of specific actions to be taken for the entire implementation period. Additionally, it is likely that monitoring data collected under the CIMP will provide information that will modify the assumptions and analysis used to develop the EWMP. As a result, the proposed process for developing commitments and implementation of the EWMP is as follows:

1. This proposed EWMP includes specific interim milestones and mechanisms to achieve the targets for the remainder of the 2012 permit term. For the next Permit term (through 2022), this EWMP includes specific interim milestones that could *potentially* be modified. For the remainder of the implementation period (beyond 2022), milestones are specified in this EWMP (including control measure capacities) but they are *expected* to be modified as CIMP results and implementation lessons are compiled. All modifications will be proposed for Regional Water Board Executive Officer approval.

2. At the beginning of each future permit term, when the ROWD is submitted, the USCR EWMP Group will evaluate data information, and input received from stakeholders obtained through the public participation process and propose revised schedules, milestones, and control measures for the EWMP if needed. The control measures, milestones and schedule applicable to the upcoming permit term will be clearly defined. Implementation of the proposed permit term control measures and milestones will be the mechanism by which compliance with the permit will be determined for the EWMP implementation compliance pathway.

3. Actions necessary to meet milestones outside the current permit term will be considered modifiable and will not need to be committed to until the beginning of the next permit term.

4. The adaptive management process will also include consideration of any applicable regulatory changes that could influence the interim and final milestones and schedule. For example, the Statewide Bacteria Amendments have the potential to provide opportunities for incorporating a high flow suspension into the USCR Bacteria TMDL, which could significantly reduce the wet weather control measures. For zinc, special studies could be conducted to develop translators or site-specific objectives that could modify the final targets for zinc. As part of the adaptive management process, any new regulatory requirements will be considered and if warranted, the evaluation of progress towards achieving RWLs and WQBELs will be based on the revised values.

5. Monitoring data will be utilized to measure progress towards achieving RWLs and WQBELs. The evaluation of the monitoring data will be done on an annual basis in accordance with **Figure 9-1** to determine if modifications to the EWMP are necessary. Modifications that are warranted because final milestones are achieved *more quickly* than anticipated can be done at any time (i.e. no more actions are needed if fewer control measures result in meeting RWLs and/or WQBELs). Modifications that are warranted because insufficient progress is being made will be noted every two years and a schedule for implementation will be provided. Full updates to the EWMP and the RAA and a consolidation of the proposed modifications into future milestones and schedules will only occur during the ROWD development for the next permit term to allow for resource planning.

The process outlined in **Figure 9-1** applies during the implementation period for the Bacteria TMDL and for all non-TMDL constituents. At the end of the implementation period for the Bacteria TMDL, if the final RWL and/or WQBELs are not being met, either the TMDL must be modified to adjust the schedule or the permittees will need to apply for a Time Schedule Order or other mechanism to get an extension of the implementation period. Since the final limits for the Bacteria TMDL are not applicable for several permit terms, evaluation of the exact mechanism for addressing a situation where the final limits will not be met can be addressed in a future EWMP modification.

During EWMP implementation, revisions to the EWMP and RAA may be needed to ensure that the long term EWMP achieves relevant water quality goals. However, updating the EWMP and RAA is a significant and costly undertaking that should only be required if conditions have changed significantly such that they would alter the model results. For example, if water quality monitoring data demonstrates that progress towards meeting the water quality goals is being

achieved at a rate equal to or faster than predicted by the initial analysis, the monitoring data should be sufficient evidence that sufficient progress towards meeting water quality goals is occurring. Refining the RAA would be appropriate in cases where progress is not being achieved as anticipated, significant changes to the proposed control measures have been identified as part of the adaptive management process, or monitoring has revealed that initial assumptions were incorrect. Based on the analysis of data and changing conditions, the RAA may be updated at any time and will be conducted by June 30, 2021 unless a waiver is requested from the Executive Officer.

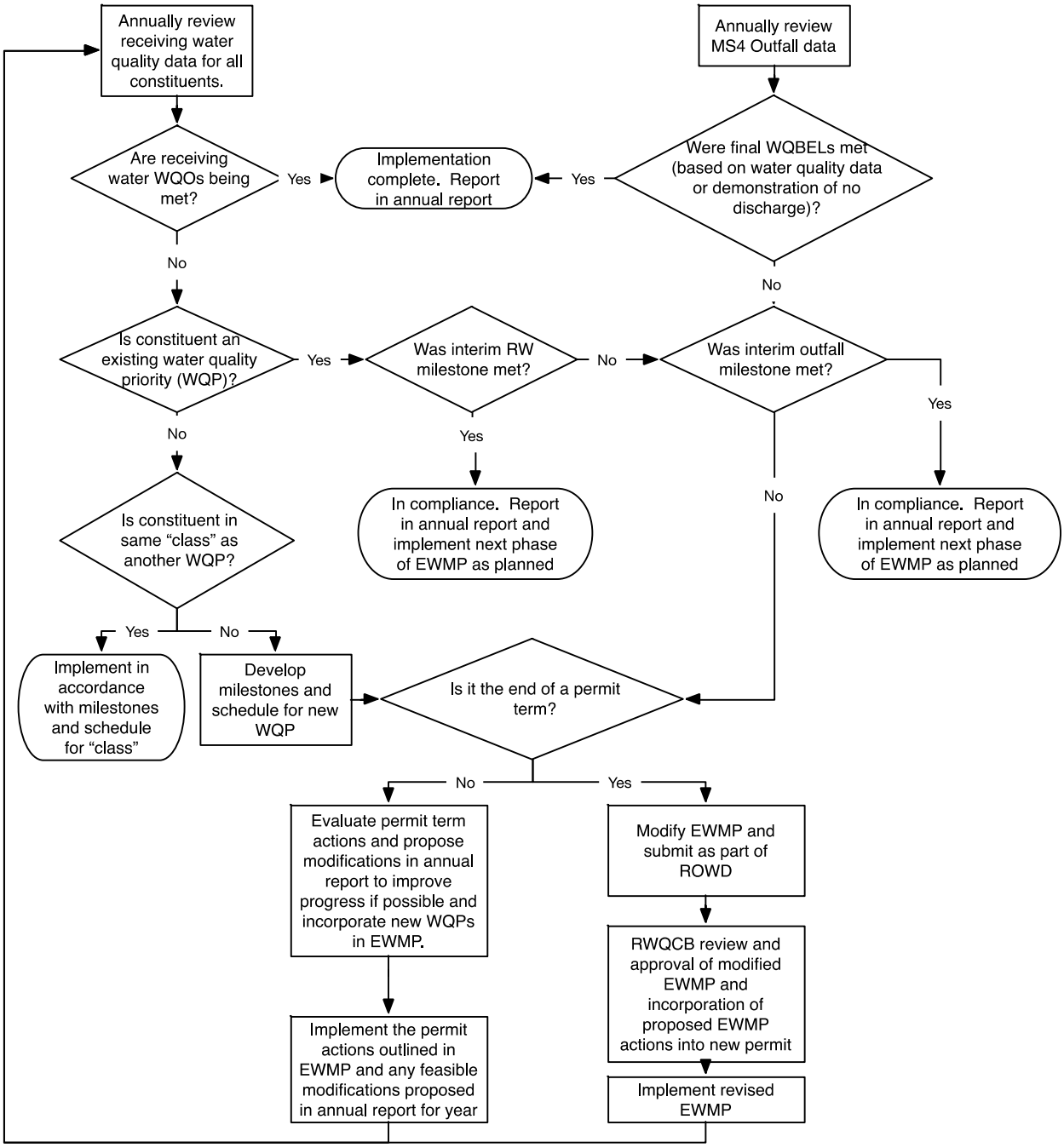


Figure 9-1. Adaptive Management Approach

10 References

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