Report of Waste Discharge

Application for Renewal of the Municipal NPDES Stormwater Permit NPDES Permit No. CAS618033

Submitted to:

Santa Ana Regional Water Quality Control Board

Submitted by:

Riverside County Santa Ana Region Stormwater Program

July 29, 2014

Principal Permittee

Riverside County Flood Control and Water Conservation District

Co-Permittees

County of Riverside
City of Beaumont
City of Calimesa
City of Canyon Lake
City of Corona
City of Eastvale
City of Hemet
City of Jurupa Valley
City of Lake Elsinore
City of Menifee
City of Moreno Valley
City of Norco
City of Perris
City of Riverside
City of San Jacinto

Prepared in collaboration with

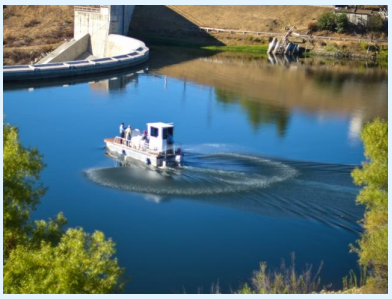
CDM Smith

RISK SCIENCES

RIVERSIDE COUNTY'S STORMWATER PROGRAM

The District is home to the award winning *Low Impact Development Testing and Demonstration Facility*

Our Mission: Protecting People, Property and the Natural Environment from Storm Flooding and Water Pollution



SIGNIFICANT PROGRAM

What We Manage . . .

- Residents protected: 1.6 million
- Total service area: 791,680 acres
- Underground storm drains: 720 miles
- Flood control channels: 293 miles
- Water quality tests: > 2,000/year
- Tons waste removed: 18,500/year

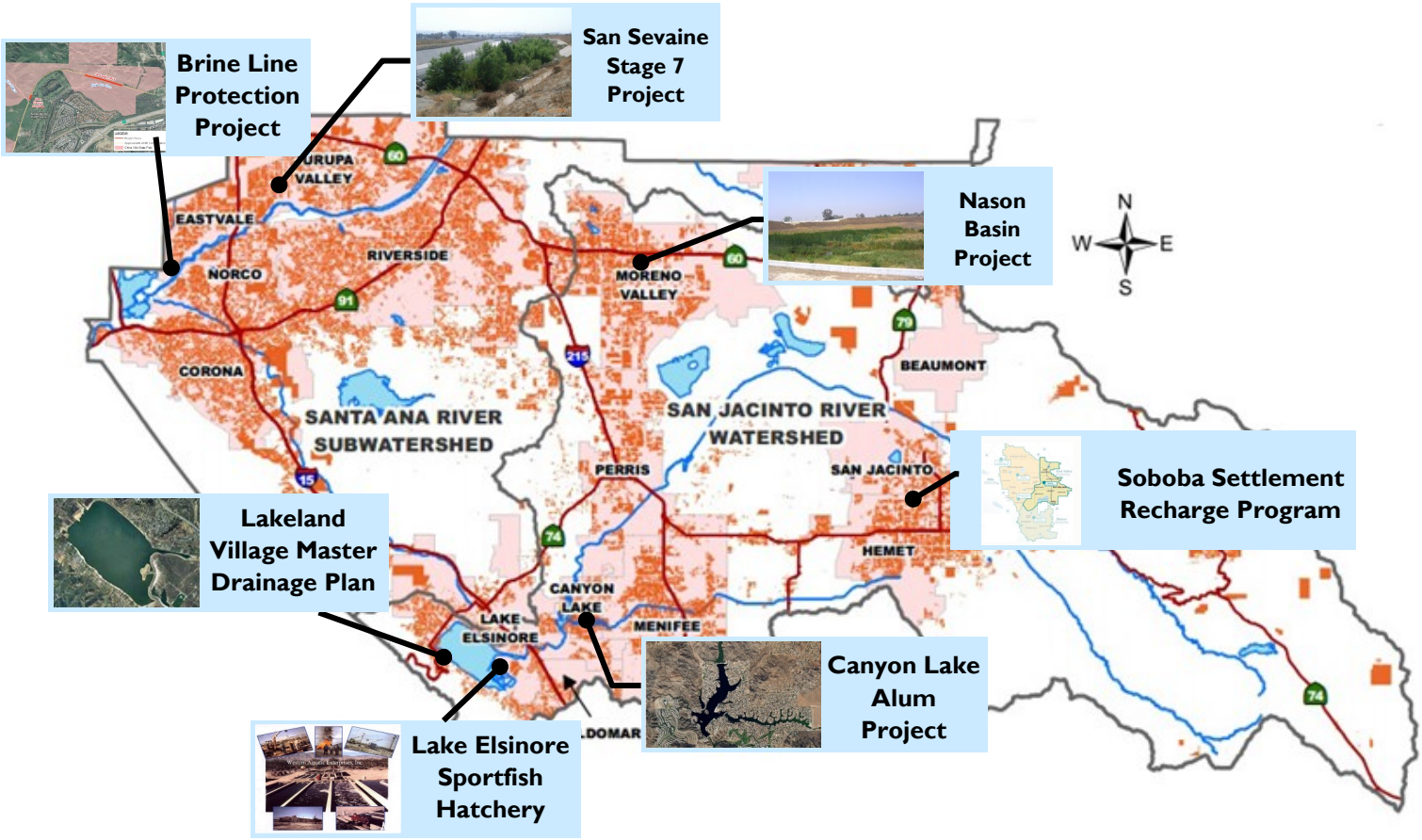
Major Water Quality Accomplishments (2010 - 2014):

1. Received several prestigious design awards for innovative and effective BMP projects
2. Won $500,000 state grant and initiated successful algae control project in Canyon Lake
3. Implemented large-scale bacteria source reduction program using DNA tracking
4. Revised standards to protect water recreation approved by the State Water Board
5. Established Low Impact Development (LID) requirements for new construction
6. Developed and implemented the Comprehensive Nutrient Reduction Plan (CNRP)
7. Developed and implemented the Comprehensive Bacteria Reduction Plan (CBRP)
8. Prepared and adopted 15 Local Implementation Plans (LIPs)
9. Installed web-enabled database to promote water quality/water conservation planning
10. Updated two regional flood control plans to incorporate water quality elements

Permit Partners:

Riverside Co. Flood Control & Water Conservation District
County of Riverside
City of Beaumont
City of Calimesa
City of Canyon Lake
City of Corona
City of Eastvale
City of Hemet
City of Jurupa Valley
City of Lake Elsinore
City of Menifee
City of Moreno Valley
City of Norco
City of Perris
City of Riverside
City of San Jacinto

MAJOR WATER QUALITY PROJECTS (2015 - 2019)



NEW WATER QUALITY INITIATIVES (2015 - 2019)

- Establish a Regional Bacteria Monitoring Program to protect urban water recreation
- Implement regional projects to divert dry weather urban runoff away from lakes and streams
- Provide water quality monitoring data to remove several waterbodies from the 303(d) list
- Update water quality models and revise the nutrient TMDLs for Lake Elsinore and Canyon Lake
- Partner with local water agencies to reduce urban runoff from inefficient landscape irrigation

Improved Water Quality Brings Families Back to the Santa Ana River

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Acronyms & Abbreviations

µg/L	micrograms per liter
2010 Permit	Regional Board Order No. R8-2010-0033 (NPDES Permit CAS618033)
ADP	Lake Mathews Area Drainage Plan
AFY	acre-feet per year
Basin Plan	Santa Ana Regional Water Quality Control Plan
BMP	Best Management Practice
BPA	Basin Plan Amendment
CAP	Compliance Assistance Program
CASQA	California Stormwater Quality Association
CBRP	Comprehensive Bacteria Reduction Plan
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CMP	Coordinated Monitoring Plan
CNRP	Comprehensive Nutrient Reduction Plan
Co-Permittees	County of Riverside and the cities of Beaumont, Calimesa, Canyon Lake, Corona, Eastvale, Hemet, Jurupa Valley, Lake Elsinore, Menifee, Moreno Valley, Norco, Perris, Riverside, San Jacinto
CWA	Clean Water Act
DAMP	Drainage Area Management Plan
DEH	Riverside County Department of Environmental Health
District	Riverside County Flood Control & Water Conservation District
DNA	Deoxyribonucleic acid
DWQMP	Lake Mathews Drainage Water Quality Master Plan
EVMWD	Elsinore Valley Municipal Water District
HMP	Hydromodification Monitoring Plan
IBD	International BMP Database
IC/ID	Illicit Connection/Illegal Discharge
IDDE	Illicit Discharge Detection and Elimination
LA	Load Allocation
LE/CL	Lake Elsinore/Canyon Lake
LESJWA	Lake Elsinore and San Jacinto Watersheds Authority
LID	Low Impact Development
LIP	Local Implementation Plan
MDP	Master Drainage Plan
mg/L	milligrams per liter
mL	milliliters
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
MSAR	Middle Santa Ana River
N:P	Nitrogen:Phosphorus
NGO	Non-Governmental Organization
NPDES	National Pollutant Discharge Elimination System
OAL	Office of Administrative Law
OWOW	One Water One Watershed Initiative
PCBs	polychlorinated biphenyls
PEO	Public Education and Outreach
Permittees	Co-Permittees and the Principal Permittee

POTW	Publicly-Owned Treatment Works
Principal Permittee	Riverside County Flood Control and Water Conservation District
QAPP	Quality Assurance Project Plan
RCB	Reinforced Concrete Box
RCFC&WCD	Riverside County Flood Control and Water Conservation District
REC-1	Water Contact Recreation
REC-2	Non-contact Water Recreation
Regional Board	Santa Ana Regional Water Quality Control Board
RMA	Reduced Maintenance Area
RMP	Regional Monitoring Plan
ROWD	Report of Waste Discharge
San Diego Regional Board	San Diego Regional Water Quality Control Board
SAR	Santa Ana Region
SAWPA	Santa Ana Watershed Project Authority
SBC	San Bernardino County
SCCWRP	Southern California Coastal Water Research Project
SCWC	Southern California Water Committee
SMC	Stormwater Monitoring Coalition
State Water Board	State Water Resources Control Board
SWQSTF	Stormwater Quality Standards Task Force
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TIN	Total Inorganic Nitrogen
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VNS	Visited Not Sampled
WAP	Watershed Action Plan
WLA	Wasteload Allocation
WMWD	Western Municipal Water District
WQIS	Lake Mathews Watershed Water Quality Improvement Study
WQMP	Water Quality Management Plan

Executive Summary

ES.1 Introduction

The Riverside County Permittees under Order No. R8-2010-0033 are pleased to submit this Report of Waste Discharge (ROWD) in compliance with Part XXII of the Order.

The Santa Ana Regional Water Quality Control Board (Regional Board) issued the first Municipal Separate Stormwater Sewer System (MS4) Permit to Riverside County in 1990. The area regulated by the MS4 Permit issued by the Regional Board is referred to as the Santa Ana Region (SAR). When the SAR MS4 Permit is renewed in 2015, it will coincide with the program's silver anniversary and mark 25 years of successful urban runoff management.

Estimated Population Change In the Santa Ana Region Since Adoption of First MS4 Permit in 1990

Year	Data Source	Population	% Change
1990	2013 County Progress Reports	835,415[1]	--
1995	January 3, 1995 Report of Waste Discharge (ROWD)	930,590	11%
2000	August 30, 2000 ROWD	1,013,000	9%
2006	April 27, 2007 ROWD	1,237,388	22%
2013	County Permittees	1,600,274	29%
Estimated Percent Population Increase (1990 – 2013)			**+92%**

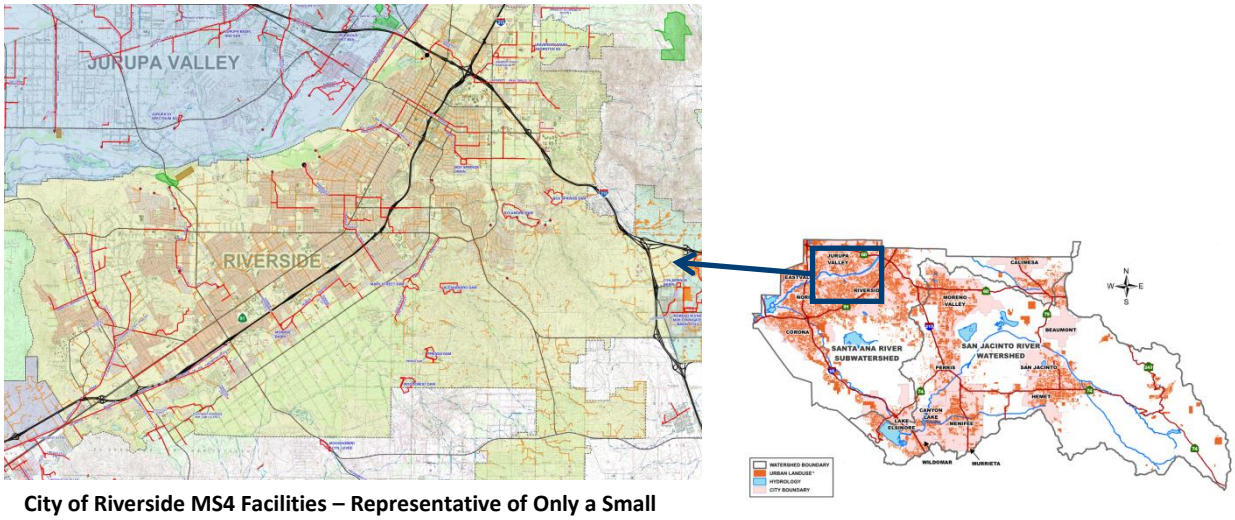
[1] Unincorporated Riverside County portion estimated based on combination of 1995 ROWD data and County Progress Reports

During the last two and a half decades, western Riverside County has experienced tremendous growth and development. Since the first MS4 Permit was adopted in 1990, population in the SAR has almost doubled. Tens of thousands of new homes and businesses have been built on land that once was open space and citrus groves.

To protect the lives and property of residents from flooding in Riverside County's urbanizing landscape, the Riverside County Flood Control and Water Conservation District (District), the County of Riverside and the Cities of Beaumont, Calimesa, Canyon Lake, Corona, Eastvale, Hemet, Jurupa Valley, Lake Elsinore, Menifee, Moreno Valley, Norco, Perris, Riverside, and San Jacinto (collectively, Permittees) maintain a significant storm drain infrastructure. The County and the Cities maintain approximately 600 miles of underground storm drains and 170 miles of channels in the SAR, while the District maintains approximately 120 miles of underground storm drains and 123 miles of channels. Over the last 25 years, the management of the storm drain network has expanded from simply providing and maintaining drainage infrastructure to promoting environmental stewardship and implementing integrated water resource management. The SAR, which comprises the largest part of Riverside County's urbanized area, has benefited from the application of modern Best Management Practices (BMP) implemented by the Permittees under the MS4 Permits issued by the Regional Board. The work performed by the Permittees has helped to maintain water quality and prevent new impairments in the face of incredible growth.

Today, the Permittees in Riverside County oversee a state-of-the-art program that is proud of its past accomplishments, willing to be measured by results (not just efforts), and ready to accept future challenges. It is a Comprehensive, Effective and Focused Urban Runoff Management Program.

Before turning to a discussion of that Program, the Permittees wish to thank the Regional Board and its staff for being partners in the successes that will be discussed in the ROWD. Unlike the case in other Southern California counties, the Permittees have never challenged an MS4 permit issued by the Regional Board. Instead, the Permittees have worked, and continue to work, collaboratively with the Regional Board and its staff on achieving improvements in urban runoff quality. The Permittees look forward to working with staff in the development of the fifth-term Permit.



City of Riverside MS4 Facilities – Representative of Only a Small Portion of the MS4 Facilities within the Permit Area

ES.2 A Comprehensive and Mature Urban Runoff Management Program

The history of MS4 permitting in Riverside County can be divided into three distinct phases. Phase 1, which began when the first MS4 Permit was issued in 1990, was dedicated to establishing the program's foundation and framework. This included management agreements, cost-sharing arrangements and funding mechanisms needed to assure long-term success. During these formative years, all essential implementation elements were developed: (a) the first Drainage Area Management Plan (DAMP); (b) permitting and inspection procedures; (c) public education initiatives; and (d) comprehensive water quality monitoring programs.

CASQA Resources

- BMP Handbooks
  - Construction BMP Online
  - Industrial and Commercial
  - Municipal
  - New Development and Redevelopment
- Guidance Documents
  - Fact Sheets SE-2 (support Construction BMP Handbook)
  - Hydromodification
  - Effectiveness Assessment Guide
- Low Impact Development Portal
- QSP/QSD Training Support

Phase 2, which began with the 1996 MS4 permit, saw a shift from initial program development to program implementation as well as coordination efforts with third parties. In the ensuing decade, the Permittees worked to assure a high level of awareness and compliance by the regulated community. The Permittees also joined with other MS4 Permittees across the state to form the California Association of Stormwater Quality Agencies (CASQA), an organization dedicated to developing technical implementation tools to enhance urban runoff management program expertise.

During the first two phases, program success was largely evaluated based on the processes and procedures that the Permittees had developed. Since compliance depended on reducing pollutants in MS4 discharges "to the maximum extent practicable," considerable emphasis was placed on documenting the level of effort expended to achieve this end.

This changed in Phase 3. Phase 3 began with the adoption of the third-term permit in 2002 and the subsequent adoption of the first TMDLs, and continues the emphasis shifted from program development to program implementation. The fourth-term permit, adopted in 2010 (the 2010 Permit), built on that changing emphasis. With comprehensive and mature urban runoff management

procedures in place, the Permittees are now called upon to develop and implement programs intended ultimately to achieve Water Quality Standards. Managing discharges from several hundred MS4 outfalls receiving urban runoff from 1,237 square miles of urbanized landscape presents a formidable challenge to the Permittees and to the program. It is a challenge, however, that is being met.

ES.3 An Effective and Active Urban Runoff Management Program

Collectively, the 16 Permittees employ hundreds of staff and officially spend more than $20 million dollars annually to implement the Urban Runoff Management Program in the SAR. The Permittees believe that these costs are underestimated by a factor of at least two, as the Permittees typically do not include in the Annual Reports Public Works project BMP costs, inspection program costs, or the time of staff needed to implement controls on maintenance projects at existing facilities. Additionally, these staff members receive thousands of hours of training to keep them up to date on urban runoff management techniques and legal requirements. Under any analysis, this is a serious commitment.

Permittee Staff Trained in Urban Runoff Management Requirements

MS4 Program Area	Fiscal Year			
	2009-10	2010-11	2011-12	2012-13[1]
Construction	351	233	224	119
Industrial/ Commercial	124	73	190	19
Municipal	288	307	366	147
WQMP	212	224	173	82
CAP	53	76	85	81
Total	1073	913	1038	448

[1] MS4 Program training requirements were reduced in 2012-2013.

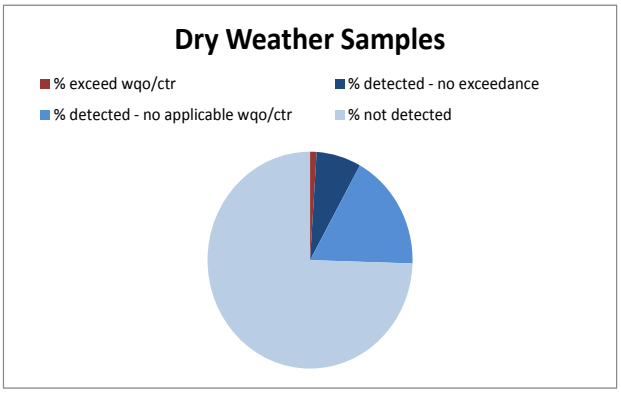
Over the last 25 years, a large number of water quality improvement tools have been developed and deployed in the SAR. These tools include an array of BMP manuals, the Geodatabase (discussed further in Section 3.1, below), award-winning demonstration projects, and public education strategies designed to prevent pollution from entering urban runoff in the first place. These efforts are backed by an aggressive inspection program to promote compliance. For example, in the fiscal year ending in June 2013, more than 1,300 inspections were completed at construction sites across the SAR. The benefits of this on-the-ground effort to manage urban runoff pollutant sources can be seen in the results from regional monitoring data collection.

Each year, the Urban Runoff Management Program collects approximately 21 Wet Weather water quality samples at seven Core Outfall sites and four Wet Weather samples at three Receiving Water sites. The result is 178 to 234 constituent analyses per sample event from 10 monitoring stations located throughout the SAR. The samples undergo laboratory analysis for a full range of potential pollutants, including trace metals, pesticides, nutrients, and bacterial indicators. The great majority of these analyses show compliance with federal and state Water Quality Standards. Analysis of this extensive dataset also indicates that the volume of Dry Weather urban runoff has diminished significantly and that pollutant loads are holding steady or declining, despite large increases in population and urban development. These results confirm that the Urban Runoff Management Programs is working effectively to control

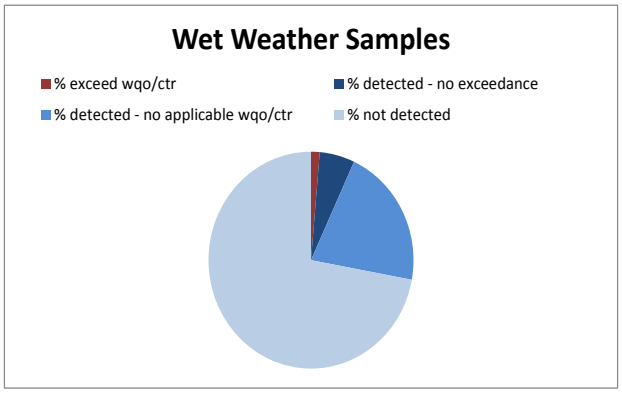
Urban Runoff Management Program Water Quality Improvement Tools

- Riverside County Design Handbook for Low Impact Development (LID) BMPs
- Drainage Area Management Plan
- Water Quality Management Plan Guidance for New Development and Redevelopment
- Transportation Project Guidance
- Watershed Action Plan
- Hydromodification Management Plan
- Stormwater and Water Conservation Tracking Geodatabase
- LID BMP Monitoring Facility
- TMDL Implementation Plans for Middle Santa Ana River and Lake Elsinore/

anthropogenic pollutants.



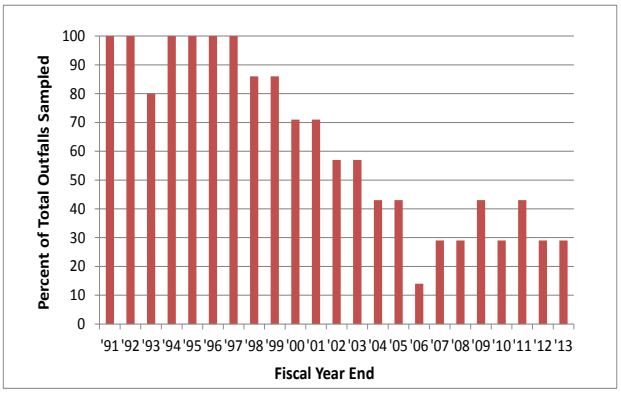
Frequency of Exceedances of Water Quality Objectives - Dry Weather Condition (2010 – 2013)



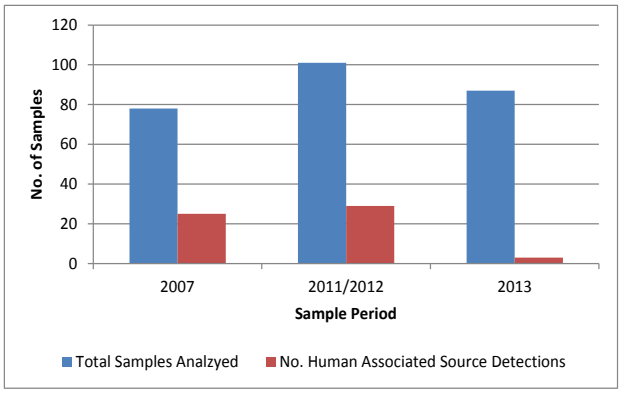
Frequency of Exceedances of Water Quality Objectives - Wet Weather Condition (2010 – 2013)

The regional water quality monitoring data indicate that elevated bacterial indicator levels and nutrient concentrations are the most significant remaining pollutant concerns in the SAR. These pollutants were addressed by the Regional Board in the adoption of the Middle Santa Ana River (MSAR) Bacterial Indicators TMDL and the Lake Elsinore Canyon Lake (LE/CL) Nutrients TMDL. Permittees have responded to these TMDLs, pursuant to the requirements of the current 2010 Permit, with the Comprehensive Bacteria Reduction Plan (CBRP) and the Comprehensive Nutrient Reduction Plan (CNRP). In keeping with the 2010 Permit's Phase 3 focus on outcomes over process, most of the resources earmarked for source control and pollution remediation have been concentrated on projects to address these resulting water quality impairments. We believe that these efforts will also ultimately address other pollutants of concerns as flow diversions and regional treatment efforts expand.

The Permittees' intensive source investigation program has identified and reduced bacterial indicator loads from cross-connected sewers, transient encampments, and improper disposal of pet waste into MS4 facilities. The result of these efforts can be seen in the most recent bacterial indicator source assessment, which showed that the percentage of samples with detectable human-associated bacterial indicators has declined dramatically compared to previous years.

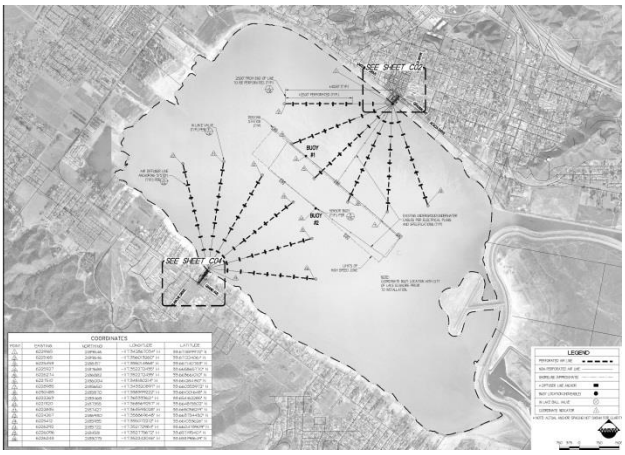


Percent of Outfalls Sampled with No Dry Weather Flow



Number of Human Associated Bacteria Detections Observed in MSAR Watershed

In Lake Elsinore and Canyon Lake, where elevated nutrient concentrations have historically aggravated the growth of nuisance algae, the Permittees have, through implementation of the CNRP, sponsored two far-reaching remediation projects designed to improve water quality. The first, a large-scale aeration/mixing system, has significantly improved dissolved oxygen levels and is effectively controlling nitrogen levels in Lake Elsinore; the second, a long-term alum application project in Canyon Lake, has reduced in-lake phosphorus concentrations by over 90%.



Schematic of the Lake Elsinore Aeration/Mixing System

These projects exemplify a collaborative spirit among the Permittees when implementing solutions within the SAR. The projects were possible due to collaboration between the Regional Board and Permittees, which allowed for pooling of resources and prioritizing of response actions. Given the scale of the projects, it would have been impossible for an individual Permittee to implement one, let alone both of them. The Permittees are utilizing these collaborative principles to develop similar diversion strategies at other locations in the SAR as part of their focus on implementation projects to achieve TMDL compliance. For example, the Lakeland Village Master Drainage Plan along the west bank of Lake Elsinore is being updated to incorporate several regional water quality basins. The District is also partnering with Elsinore Valley Municipal Water District (EVMWD) to construct a surface water recharge project along Elsinore Line A.

This is AMAZING! It appears those alum treatments are starting to pay off. Dennis Bickers sent this picture of the Main Lake saying, "Something has happened to Canyon Lake in the past week. The water in the Main Lake has become amazingly clear. You can easily see the bottom at a depth of 10 to 15 feet. In the clear water picture, that is not the tree's reflection but the sandy bottom from about 4-6 foot depth."

--- Friday Flyer Facebook Page, March 31, 2014

ES.4 A Focused Urban Runoff Management Program

To continue achieving demonstrable improvements in water quality, the Permittees believe that it is necessary to maintain a focus on urban runoff water quality priorities and BMP implementation. The Permittees believe that this is a realistic and reasonable strategy because it reflects the organization and priorities of the Urban Runoff Management Program. Resources previously budgeted for program development and planning are being redirected to priority pollutant issues and to support greater BMP implementation.

The Permittees are committed to intensifying their efforts to reduce controllable sources of bacterial indicators in the SAR. These efforts include implementing watershed-wide compliance monitoring to evaluate the safety of water quality at popular swimming locations in the SAR. Additionally, these efforts include continued use of modern DNA-tracking tools to guide source

investigations. Based on the progress recorded to date, the Permittees subject to the MSAR Bacterial Indicator TMDL believe that the CBRP programs are addressing controllable urban sources as required by the 2010 Permit's effluent limits.

Ongoing Search for Controllable Bacterial Indicator Sources

The Permittees plan to increase their efforts to identify where uncontrollable bacterial indicator sources are causing non-compliance. This effort will include consideration of where the Regional Board authorizes *De Minimus* discharges (e.g., water transfers, well blow-offs, groundwater dewatering activities, and fire hydrant testing) to the MS4 system under Regional Board General Order R8-2009-0003. Although these discharges may exhibit acceptable water quality at the point of discharge, they have the potential to create conditions that cause downstream pollution, e.g., through stimulating bacteria growth and/or mobilizing nutrients in the sediment. The Permittees will notify the Regional Board where it is determined that such discharges are causing non-compliance in the MS4 system.

The use of BMPs is also a key compliance strategy for nutrients (described in the CNRP) for developments in the watershed tributary to Lake Elsinore and Canyon Lake. The Program's prior investments in tools to identify and catalog cost-effective BMPs will make it easier for developers to incorporate such BMPs into their Priority Development Projects. The benefits to water quality will multiply as the local economy continues to improve and the number of new development/significant redevelopment projects, which will be required to incorporate LID BMPs, increase in the SAR. Once fully implemented, these BMP projects are expected to reduce the nutrient loads from urban runoff in the SAR by at least 15%.

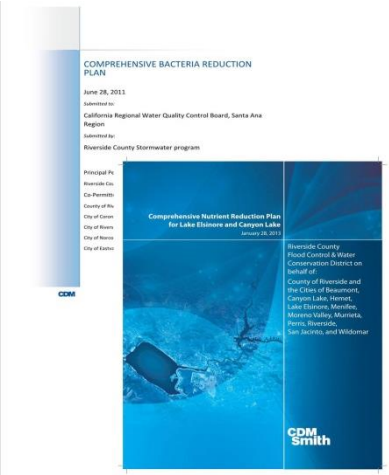
Alum Application in Canyon Lake

Finally, the severe drought now plaguing California has reinforced the need for better long-term integrated water resource management. The Permittees will continue to aggressively seek opportunities to partner with local water supply agencies and water conservation districts to implement joint projects with multiple benefits. On-site retention and off-channel diversion ponds can both increase groundwater storage and reduce pollutant loadings in urban runoff. A number of these multi-benefit projects are underway, including the

Habitat Created by San Sevaine Stage 7 Urban Runoff Management Project

Lincoln/Cota Street Recharge Project, the Arlington Basin Desalter Expansion Project (with the Western Water Municipal District), the Coldwater Sub-basin Recharge Program and the Bautista Creek Channel – Recharge Basins. EVMWD, the Lake Hemet Municipal Water District and the Cities of Hemet and San Jacinto have also entered into a stipulated judgment to recharge 7500 acre feet per year into the Hemet/San Jacinto Basin. The Permittees are also supporting landscape conversion programs implemented by local water agencies and proposed by the Santa Ana Watershed Project Authority. As discussed in Section 4.2.6, the fifth-term permit should facilitate collaborative efforts to implement regional integrated water resource management.

Considerable time and effort was expended by the Permittees and the Regional Board in developing the 2010 Permit. In that process, the Permittees committed themselves to develop and obtain Regional Board approval for the CBRP, the CNRP, and the plans required by that permit, such as the WQMP guidance document. The plans are elegant and innovative; however, they are no better than the quality of the program charged with executing them. In the short time in which the Permittees have had the opportunity to implement the plans, they have achieved significant successes. However, the Permittees need stable administrative permit requirements to continue their successful CBRP/CNRP implementation. Changes to the 2010 Permit framework would severely impede BMP implementation and divert program resources from compliance to administrative obligations, a regression to the Phase 1 and 2 programs of the early MS4 permits.



Approved CBRP and CNRP TMDL Plans for the Santa Ana Region

Although the Permittees have had many successes to date in addressing pollutants in urban runoff, full compliance with Water Quality Standards obviously has not been attained. The 2010 Permit recognized this fact, but recent court opinions suggest that liability could apply if Water Quality Standards are not immediately achieved, despite the substantial efforts of the Permittees (efforts which are discussed in this ROWD). In addressing urban runoff, the Permittees are required to manage an extraordinarily complex issue with multiple variables in sources, flows and other parameters, and with finite financial and staff resources. Accordingly, the fifth-term Permit must contain Receiving Waters Limitation (RWL) language that fully enables the Permittees to prioritize, innovate, and make needed "course corrections" in their Urban Runoff Management Program.

Such language will enable the Permittees to focus their program on the most important urban runoff management issues in the SAR without worrying that every random exceedance of a non-priority pollutant must be chased down on penalty of a possible lawsuit. This adaptive management approach rewards good faith efforts to comply with Permit requirements and ensures that the Permit effectively addresses high priority water quality concerns. The Permittees are not asking for a Permit that allows them to end or even to relax their efforts to improve urban runoff quality. They are asking for a Permit which provides them with a path to compliance with Water Quality Standards and to allow them the freedom to develop the strategies needed to attain that compliance.

ES.5 Regional Permit

The Permittees are seeking a Permit that:

- Continues the basic programs established by the innovative 2010 Permit, thus avoiding the diversion of Permittee resources from implementing programs with proven effectiveness to developing new Permit requirements;
- Continues the successful administrative structures established by the 2010 Permit;
- Continues to support (and enhance, where appropriate) regional collaboration, implementation, innovation, and iteration; and
- Contains reformed RWL language to enable Permittees to focus on key Permit requirements.

The Permittees believe that a regional permit, one covering both the Riverside and San Bernardino County Urban Runoff Management Programs, would impede efforts to attain most of these goals. The Regional Board should instead adopt an individual fifth-term Permit for the Riverside County Permittees. Given the progress made under the 2010 Permit, this would be the most efficient path for Permittees and the Regional Board, as well as the type of permit most likely to allow the Permittees to continue the successes achieved under the 2010 Permit.

If the Regional Board adopts a single NPDES permit or separate permits with the same language for both Riverside and San Bernardino County, Permittee resources currently earmarked to support project implementation would have to be reassigned to developing new management and funding agreements and implementation documentation. This added administrative burden could stall the implementation of existing programs. This ROWD demonstrates that the Permittees are already working collaboratively with each other and with other agencies. This high level of collaboration takes a great deal of time and effort to achieve, especially in crafting implementation agreements and funding arrangements. If a regional permit were to be adopted, the DAMP and other compliance documents needed to support the program would have to be overhauled. Staff from almost three dozen municipalities across two different counties would have to be retrained in processes and procedures. Even the time and expense required to review the terms and conditions of a proposed regional permit would create a major diversion of programmatic focus away from addressing water quality issues in the SAR.

Awards for Establishment of the District's Low Impact Development Testing and Demonstration Facility

The Permittees have established a 25-year record of success that reflects their serious commitment to be excellent watershed stewards and to effectively manage urban runoff. The record of the last dozen years, in particular, demonstrates clearly that the Permittees are willing to be measured by outcomes rather than effort. Honoring that promise requires a Permit that values performance over process. The Permittees therefore ask that the Regional Board continue the programs established with the 2010 Permit, which still are being implemented, and make the

adjustments discussed in this ROWD. Doing so will assure that Urban Runoff Management Programs implemented over the next 25 years are even more effective.

Section 1
Introduction

On January 29, 2010, the Santa Ana Regional Water Quality Control Board (Regional Board) adopted Order No. R8-2010-0033 (National Pollutant Discharge Elimination System [NPDES] Permit CAS618033), the area-wide Municipal Separate Storm Sewer System (MS4) Permit for the Santa Ana Region (SAR) of Riverside County (2010 Permit). The 2010 Permit was the fourth permit issued to the Permit Area[1] since 1990. The 2010 Permit expires on January 29, 2015. This Report of Waste Discharge (ROWD) serves as an application for renewal of this Order and is filed on behalf of the Riverside County Flood Control and Water Conservation District (District), the County of Riverside, and the incorporated cities of Riverside County within the SAR and subject to this Order (collectively, the Permittees).

1.1 MS4 Program Overview

The 2010 Permit designates the District as the Principal Permittee and the County of Riverside and the Cities of Beaumont, Calimesa, Canyon Lake, Corona, Eastvale, Hemet, Jurupa Valley, Lake Elsinore, Menifee, Moreno Valley, Norco, Perris, Riverside, and San Jacinto, as Co-Permittees. The Permittees work cooperatively on the implementation of the Urban Runoff Management Program through their collective Implementation Agreement.

The 2010 Permit is the fourth permit issued to the Permittees since 1990. Over that time, the expectations and emphasis associated with each of these MS4 permits has evolved. Three distinct phases are apparent. In the first phase, which began with the issuance of the 1990 Permit, the Permittees focused on laying the foundation for the Urban Runoff Management Program to manage urban runoff within the Permit Area, including the establishment of the management framework essential program reporting structures, management agreements, cost-sharing arrangements, and funding mechanisms. Programmatic development activities included preparing the first Drainage Area Management Plan (DAMP), adopting ordinances to manage urban runoff within the jurisdiction of each Permittee, establishing inspection procedures, evaluating 1990 Permit compliance, conducting public education, and initiating runoff quality monitoring activities.

Phase 2 began with issuance of the second permit in 1996. This phase saw the Urban Runoff Management Program begin a shift from program development to program implementation, combined with development of collaborative efforts with third parties. During this phase, the Permittees worked diligently to assure a high level of awareness and compliance within the regulated community and joined with other Permittees across the state to work collaboratively on permit implementation, e.g., through the California Association of Stormwater Quality Agencies (CASQA).

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[1] Per the 2010 Permit, Permit Area is defined as: *In the Santa Ana Region, the portion of the Santa Ana River Watershed that is within Riverside County and regulated under the MS4 Permit. The Permit Area is further identified in Appendix 1 of the MS4 Permit as "Permittee Urban Area" and those areas under the Permittee's jurisdictions designated as "Agriculture" and "Open Space" in Appendix 1 that will convert to Permittee Urban Area when developed to industrial, commercial, or residential use during the term of the Order.*

Issuance of the third and fourth MS4 Permits in 2002 and 2010, respectively, constitutes the third permit phase. During this period, program emphasis shifted to full implementation of urban runoff management practices to ensure compliance with the DAMP, provide objective criteria to evaluate the effectiveness of programs, and address high priority water quality concerns. Important in this shift was an increased focus on applying watershed-based approaches to urban runoff management, including incorporation of Low Impact Development (LID) or green infrastructure practices into development activities and implementing on-the-ground investigations and projects to address specific water quality concerns.

In 2015, the Urban Runoff Management Program for the SAR will reach its 25th anniversary. Since 1990, the program has evolved, from programmatic development and procedure documentation to active, in-the-field efforts to identify and fix specific water quality problems. This transition has occurred because of the knowledge gained from almost 25 years of learning about the variable nature of urban runoff and which management practices work best in the urban environment. The approach proposed by this ROWD is to use this hard-earned knowledge to continue to customize and deploy Best Management Practices (BMPs) to target identified water quality problems.

1.2 ROWD Development Process

This ROWD was developed through a collaborative effort between the Permittees, who met on a regular basis to develop the information presented here. This effort included reviewing multiple years of data to demonstrate that the Urban Runoff Management Program implementation efforts are yielding positive water quality benefits. This review also provided a clear basis for the implementation priorities and recommendations contained herein.

1.3 ROWD Roadmap

Section XXII.A of the 2010 Permit identifies five required elements for inclusion in the ROWD. **Table 1-1** lists these five elements and identifies where this information can be found in the ROWD. In addition, the ROWD also describes the evolved status of the Urban Runoff Management Program after four MS4 permit terms – essentially a "State of the Program" assessment. This evaluation is key to understanding the basis for the ROWD's program priorities and recommendations for the next MS4 permit cycle. To assist the Regional Board's review, following is a summary of the purpose and content of each ROWD section:

- *Section 2 – Urban Runoff Management Program Overview*. This section provides MS4 Permit background information and updates regarding the SAR and the MS4 facilities owned and operated by the Permittees.
- *Section 3 – Urban Runoff Management Program Evaluation*. This section highlights key compliance implementation activities during the term of the 2010 Permit, characterizes water quality in the SAR, and evaluates the Urban Runoff Management Program effectiveness.
- *Section 4 – Fifth Term Urban Runoff Management Program Priorities*. This section identifies the Urban Runoff Management Program implementation priorities during the next MS4 permit cycle.
- *Section 5 – Challenges to Effective Urban Runoff Management*. This section describes the challenges associated with implementation of the 2010 Permit and identifies where the

Regional Board can work in partnership with the Permittees to maintain and enhance the effectiveness of the Urban Runoff Management Program moving forward.

Table 1-1 Location of Required ROWD Elements per Section XXII.A of the MS4 Permit

Required ROWD Element	ROWD Location
Names and mailing address(es) of the primary administrative and technical contacts for the Permittees that operate the MS4	Section 2.1.2, Table 2-1
Any revisions to the DAMP including, but not limited to, all the activities the Permittees propose to undertake during the next permit term, goals and objectives of such activities, an evaluation of the need for additional source control and/or structural BMPs, any proposed pilot studies, etc.	Section 4
Changes in land use and/or population including map updates	Section 2.2.1, Table 2-3
Any significant changes to the MS4 including map updates of the MS4	Section 2.2.2
An assessment of the overall Urban Runoff Management Program and its effectiveness in meeting Water Quality Standards. If Water Quality Standards are not being met, the ROWD shall include new or revised program elements and compliance schedule(s) necessary to comply with Section VI of this Order	Section 3.3

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Section 2

Urban Runoff Management Program Overview

2.1 MS4 Permit Background

Four MS4 Permits have covered the Permittees within the SAR since 1990. Following is a brief summary of these permits and their primary focus.

2.1.1 MS4 Permit History

On July 13, 1990, the Regional Board adopted the first-term Riverside County MS4 Permit, Order No. 90-104 (NPDES No. CA8000192). This Permit included the District as the Principal Permittee and the County of Riverside and the Cities of Beaumont, Calimesa, Canyon Lake, Corona, Hemet, Lake Elsinore, Moreno Valley, Norco, Perris, Riverside and San Jacinto as Co-Permittees.

The Regional Board issued the second-term MS4 Permit on March 8, 1996 (Order No. 96-30; NPDES No. CAS618033). This Permit included the same Permittees as were covered by the first-term Permit. Both the first and second-term MS4 Permits focused on laying the foundation for the Urban Runoff Management Program to manage stormwater within the Permit Area. Required activities included establishing governance agreements to develop the first DAMP and establishing ordinances to give dischargers the authority to implement the Permit within their respective jurisdictions. The first and second-term MS4 Permits emphasized programmatic procedures and documentation.

The third-term MS4 Permit was adopted by the Regional Board on October 25, 2002 (Order No. R8-2002-0011; NPDES No. CAS618033). This Permit was adopted following a significant investment of time and resources by the Permittees and Regional Board staff to ensure that the Permit's compliance requirements and schedules were not only appropriate for the conditions in the SAR but also attainable. This outcome was noteworthy because unlike other third-term MS4 permits issued in southern California, this third-term Permit was not appealed to the State Water Resources Control Board (State Water Board). This MS4 Permit was adopted unanimously by the Regional Board with the full support of Regional Board staff and the Permittees. During the third-term Permit three additional cities, Menifee, Murrieta, and Wildomar, became Co-Permittees within the Permit Area.

The Regional Board adopted the fourth-term MS4 Permit on January 29, 2010 (Order No. R8-2010-0033; NPDES No. CAS618033). Like the 2002 Permit, substantial time and resources went into the development of permit language in the 2010 Permit that was acceptable to the Permittees and the Regional Board. The 2010 Permit was amended on June 7, 2013 (Order No. R8-2013-0024) to (a) add the newly incorporated Cities of Eastvale and Jurupa Valley to the list of Co-Permittees; (b) remove Murrieta and Wildomar (which are instead regulated by the San Diego Regional Water Quality Control Board's [San Diego Regional Board] MS4 Permit); and (c) ensure that all portions of the City of Menifee were regulated under the 2010 Permit, including those areas that were under the jurisdiction of the San Diego Regional Board.

The third and fourth-term MS4 Permits shifted the emphasis of the Urban Runoff Management Program from procedure-oriented activities to more active implementation of activities and projects designed to comply with the DAMP and address water quality impairments. This approach enables

finite program resources to be directed to where they can be most effective in managing urban runoff quality and protecting receiving waters.

2.1.2 Permittees

Table 2-1 identifies the Permittees that are covered by this ROWD and provides the primary administrative and technical contacts for the Permittees' Urban Runoff Management Program.

2.2 MS4 Characterization

The following sections provide updated information regarding the Permit Area, including population changes over time and characteristics of MS4 facilities in the SAR.

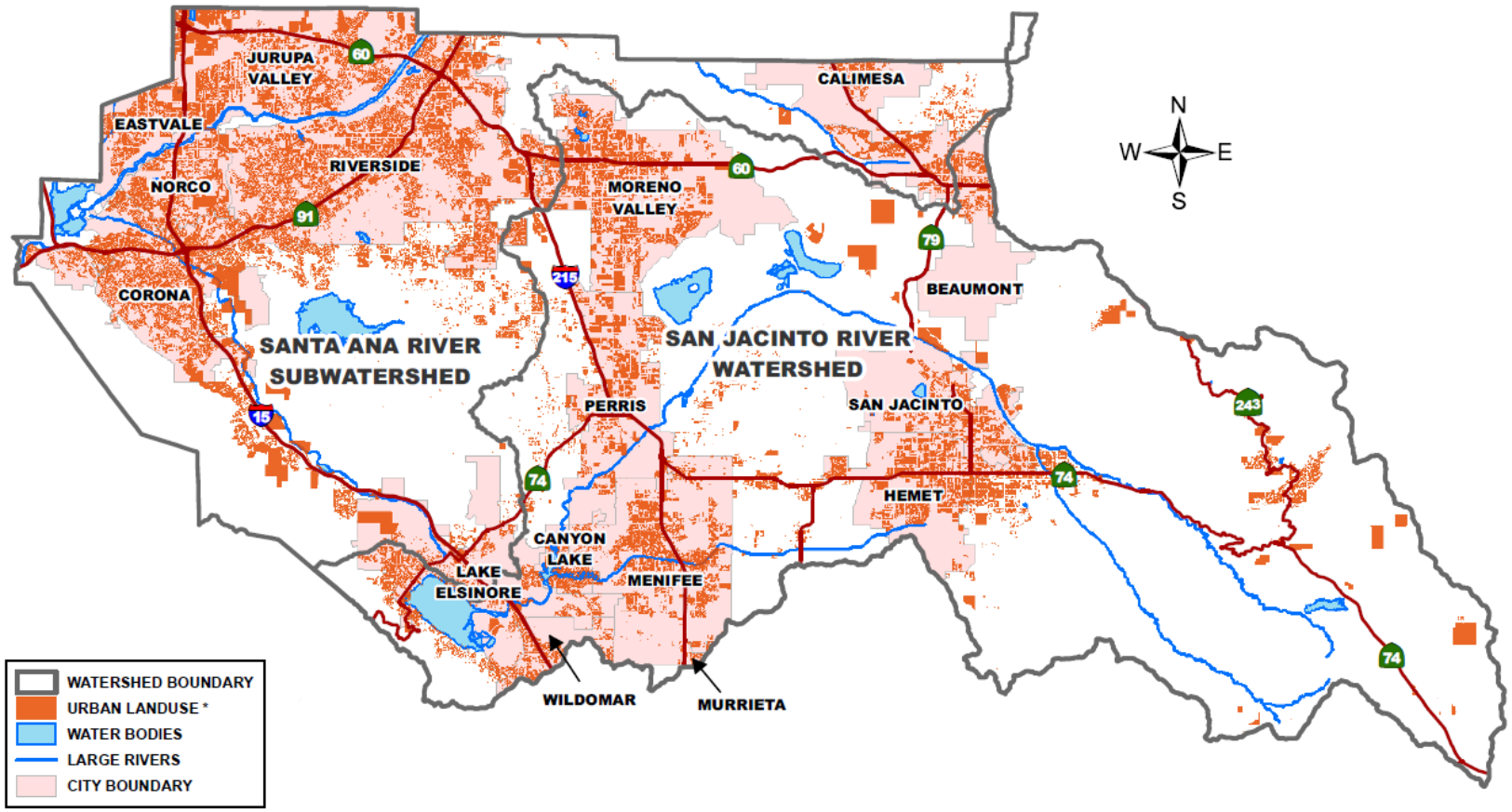
2.2.1 Permit Area

The Permit Area is the portion of the Santa Ana River Watershed lying within the County of Riverside and that is identified as (a) "Permittee Urban Area" (illustrated in Appendix 1 of the 2010 Permit), and (b) those areas under the Permittees' jurisdictions designated as "Agriculture" and "Open Space" that would become Permittee Urban Area if developed to industrial, commercial, or residential use during the term of the Order. These areas were excluded from the Permit Area under the 2010 Permit (Section III, MS4 Permit Fact Sheet):

- Federal lands and State properties, including, but not limited to, military bases, national forests, hospitals, colleges and universities, and highways;
- Native American tribal lands;
- Open space and rural (non-urbanized) areas;
- Agricultural lands; and
- Utilities, railroads, and special districts (including school districts, park districts, publicly owned treatment works (POTWs) and water utilities, etc.).

Figure 2-1 illustrates the Permit Area based on the most recent data. **Table 2-2** summarizes the current area and population of each of the Permittees located within this area. The natural characteristics of the Santa Ana River Watershed within the Permit Area, e.g., physiography, climate and water resources, recently have been characterized in the Watershed Action Plan (WAP) submitted to the Regional Board on May 29, 2014.[2] **Table 2-3** sets forth how the population of each Permittee has changed from 2002 to 2012-2013. During that period, the total population in the Permit Area has increased by approximately 45%.

[2] See *Watershed Action Plan, Santa Ana Region, Riverside County* - MS4 Permit deliverable (MS4 Permit Section XII.B.3 & B.8), May 29, 2014



* AREAS NOT IN URBAN: AGRICULTURE, STATE, FEDERAL, TRIBAL, PRESERVES & OPEN SPACE, RURAL RESIDENTIAL, STATE HIGHWAYS/FREEWAYS

Figure 2-1. Permit Area within the Santa Ana Region of Riverside County

Table 2-1. MS4 Permittee Contact Information

Permittee	Administrative Contact	Technical Contact
City of Beaumont	Kishen Prathivadi, Assist. Public Works Director 550 6th Street Beaumont, CA 92223 951-769-8520; kprathivadi@urbanlogicgroup.com	Hisam Baqai, Consulting Water Quality Engineer 550 6th Street Beaumont, CA 92223 760-887-7919; hisambaqai@gmail.com
City of Calimesa	Bob French, Public Works Director 908 Park Avenue Calimesa, CA 92320 909-795-9801, x235; bfrench@cityofcalimesa.net	Mike Thornton, City Engineer 908 Park Avenue Calimesa, CA 92320 909-795-9801, x225; mthornton@cityofcalimesa.net
City of Canyon Lake	Keith M. Breskin 31516 Railroad Canyon Road Canyon Lake, CA 92587 951-244-2955, x205; kbreskin@cityofcanyonlake.com	Courtney Black 31516 Railroad Canyon Road Canyon Lake, CA 92587 951-244-2955, x201; cblack@cityofcanyonlake.com
City of Corona	Nelson D. Nelson, Director of Public Works 400 S. Vicentia Avenue Corona, CA 92882 951-817-5765; Nelson.Nelson@ci.corona.ca.us	Michele Hindersinn, Associate Engineer 400 S. Vicentia Avenue Corona, CA 92882 951-736-2248; micheleh@ci.corona.ca.us
City of Eastvale	Carol Jacobs, City Manager 12363 Limonite Avenue, Suite. 910 Eastvale, CA 91752 951-703-4410; cjacobs@eastvaleca.gov	Joe Indrawan, Deputy City Engineer 12363 Limonite Avenue, Suite. 910 Eastvale, CA 91752 951-703-4473; jindrawan@eastvaleca.go
City of Hemet	Linda Nixon, Environmental Services Manager: Program Management , Reporting, Training, Industrial & Commercial Inspections 3777 Industrial Avenue Hemet, CA 92545 951-765-3880; LNixon@cityofhemet.org	Ron Proze, Water-Wastewater Superintendent: IC/ID, Municipal Facilities & Activities 3777 Industrial Avenue Hemet, CA 92545 951-765-3826; rproze@cityofhemet.org
City of Jurupa Valley	Jim Smith, P.E., City Engineer 8304 Limonite Avenue, Suite M Jurupa Valley, CA 92509 951-790-1331; jsmith@jurupavalley.org	Don Allison, P.E., Associate Engineer 8304 Limonite Avenue, Suite M Jurupa Valley, CA 92509 951-790-1331; dallison@jurupavalley.org
City of Lake Elsinore	Vince Damasse, Director of Public Works 130 S. Main Street Lake Elsinore, CA 92530 951-674-3124, x244; vdamasse@lake-elsinore.org	Rita Thompson, Senior Engineering Technician 130 S. Main Street Lake Elsinore, CA 92530 951-674-3124, x308; rthompson@lake-elsinore.org
City of Menifee	Jonathan G. Smith, Director of Public Works 29714 Haun Road Menifee, CA 92586 951-679-3843, x116; jsmith@cityofmenifee.us	Danis Bechter, Consultant Storm Water Manager 29714 Haun Road Menifee, CA 92586 951-672-6777; dbechter@cityofmenifee.us
City of Moreno Valley	Ahmad R. Ansari, P.E., Public Works Director/City Engineer City of Moreno Valley 14177 Frederick Street P.O. Box 88005 Moreno Valley, CA 92552-0805 951-413-3100; ahmada@moval.org	Kent Wegelin, Storm Water Program Manager City of Moreno Valley 14177 Frederick Street Moreno Valley, CA 92552-0805 951-413-3497; kentW@moval.org
City of Norco	Lori Askew 2870 Clark Avenue Norco, CA 92860 951-270-5678; laskew@ci.norco.ca.us	Kris Hanson 2870 Clark Avenue Norco, CA 92860 951-270-5667; khanson@ci.norco.ca.us
City of Perris	Ron Carr, Director of Public Works/Assistant City Manager 101 N. D Street Perris, CA 92570 951-943-6100; rcarr@cityofperris.org	Michael Morales, Capital Improvements Project Manager 101 N. D Street Perris, CA 92570 951-956-212, x226; mmorales@cityofperris.org
City of Riverside	Kevin Street, Regulatory Programs and Compliance Manager 3900 Main Street Riverside, CA 92501 951-351-6007; kstreet@riversideca.gov	Mike Roberts, Wastewater Resources Analyst 5950 Acorn Street Riverside, CA 92504 951-351-6310; mdroberts@riversideca.gov

Table 2-1. MS4 Permittee Contact Information

Permittee	Administrative Contact	Technical Contact
City of San Jacinto	Mike Emberton, Assistant City Manager/Public Works Director 270 Bissell Place San Jacinto, CA 92582 951-654-4041; MEmberton@sanjacintoca.us	Lynn Merrill, NPDES Consultant 270 Bissell Place San Jacinto, CA 92582 951-654-4041; lmerrill@sanjacintoca.us
County of Riverside	Steve Horn (Primary) Riverside County Executive Office 4080 Lemon Street 4th Floor, Riverside, CA 92501 951.955.1110; Shorn@rceo.org	Claudia Steiding (Secondary) Transportation and Land Management Agency 4080 Lemon Street, 4th Floor Riverside, CA 92501 951-955-1694; csteiding@rctlma.org
Riverside County Flood Control and Water Conservation District	Jason Uhley P.E., Watershed Protection Division Chief 1995 Market Street Riverside, CA 92501 951-955-1273; JUHLEY@rcflood.org	David Garcia P.E., NPDES Program Manager 1995 Market Street Riverside, CA 92501 951-955-1330; DHGarcia@rcflood.org Julianna Gonzalez, SAR MS4 Permit Manager 1995 Market Street Riverside, CA 92501 951-955-8064; juliannagonzalez@rcflood.org

Table 2-2. Size and Population of MS4 Permittee Jurisdictions

Permittee	Area (sq. mi)	Current Population
City of Beaumont	29.98	39,776
City of Calimesa	14.88	8,094
City of Canyon Lake	4.62	10,768
City of Corona	39.26	156,823
City of Eastvale	13.14	57,251
City of Hemet	27.70	80,877
City of Jurupa Valley	43.66	97,246
City of Lake Elsinore	43.15	55,430
City of Menifee	46.58	82,292
City of Moreno Valley	51.56	198,129
City of Norco	13.99	26,626
City of Perris	31.69	70,963
City of Riverside	81.51	311,955
City of San Jacinto	26.04	45,217
Unincorporated County of Riverside (Santa Ana Region)	769.24	358,827
Total	**1,237.00**	**1,600,274**

Table 2-3 Local and Regional Population Growth in MS4 Permittee Jurisdictions

MS4 Permittee	2002[1]	2006[1]	2007-08[2]	2008-09[2]	2009-10[2]	2010-11[2]	2011-12[2]	2012-13[2]
City of Beaumont	13,959	23,145	31,477	32,403	34,217	38,195	38,851	39,776
City of Calimesa	7,427	7,200	7,536	7,498	7,555	7,941	7,998	8,094
City of Canyon Lake	10,647	10,500	11,051	11,128	11,225	10,647	10,689	10,768
City of Corona	138,761	144,661	147,428	148,597	150,416	153,649	154,420	156,823
City of Eastvale	(a)	(a)	(a)	(a)	(a)	(a)	55,602	57,251
City of Hemet	63,001	69,544	74,185	74,361	75,820	79,607	80,089	80,877
City of Jurupa Valley	(a)	(a)	(a)	(a)	(a)	(a)	96,456	97,246
City of Lake Elsinore	33,460	40,985	49,807	50,267	50,983	52,503	53,024	55,430
City of Menifee	(b)	(b)	(b)	75,707	77,519	79,444	80,589	82,292
City of Moreno Valley	151,847	174,565	183,860	186,301	188,537	195,216	196,495	198,129
City of Norco	25,511	27,263	27,255	27,160	27,370	27,060	27,053	26,626
City of Perris	38,690	47,139	53,605	54,323	55,133	69,781	70,180	70,963
City of Riverside	277,459	292,883	296,842	300,430	304,051	306,779	308,511	311,955
City of San Jacinto	26,374	31,066	35,672	36,477	36,933	44,597	44,803	45,217
County of Riverside in SAR	317,226	368,437	413,813[3]	459,188	466,806	457,320	356,633	358,827
Total	**1,104,362**	**1,237,388**	**1,332,531**	**1,463,840**	**1,486,565**	**1,522,739**	**1,581,393**	**1,600,274**

[1] Population estimates obtained from 2007 Urban Runoff Management Program ROWD; per that document the original source is the California Department of Finance, E-4 Population Estimates

[2] Population estimates for Fiscal Years; Source: California Department of Finance

[3] Santa Ana Region of Riverside County population estimate is not available. This value is an estimate created by interpolating between the 2006 and 2008-09 values.

(a) Eastvale and Jurupa Valley incorporated as cities in 2011 (populations previously included in Riverside County population)

(b) Menifee incorporated as a city in 2008 (population previously included in Riverside County population)

2.2.2 MS4 Facilities

Prior to issuance of the 2010 Permit, the Permittees identified major outfalls and submitted maps of existing MS4 facilities. The Co-Permittees reported having approximately 269 miles of underground storm drains, and 95 miles of channels.[3] The District reported having 75 miles of underground storm drains and 59 miles of channels in the SAR.

[3] Source for these data is the 2008-2009 Urban Runoff Management Program Annual Report

Currently, the Co-Permittees report having approximately 600 miles of underground storm drains, and 170 miles of channels. The District reports having 120 miles of underground storm drains and 123 miles of channels in the SAR.[4] **Attachment A** to this ROWD includes updated MS4 facility maps.

2.3 MS4 Collaboration

Through four MS4 permit terms, the Urban Runoff Management Program has been active in technical and policy development and implementation activities that serve to identify improved strategies, and innovative techniques and practices for the management of urban runoff. Participation in these activities help to ensure that the program (1) is current on developments in urban runoff management; (2) can take advantage of opportunities to collaboratively implement programs that improve urban runoff quality; and (3) can work with policy-makers and regulators on developing and implementing urban runoff management strategies that achieve effective results. Key collaborative activities are described below.

California Stormwater Quality Association

The District is a charter member of CASQA, which assists California MS4 Permittees in implementing effective stormwater management programs through collaboration and sharing of knowledge gained over more than 25 years of experience in urban runoff management. The District is an active participant within CASQA: Jason Uhley, Chief of Watershed Protection for the District, has served on CASQA's Board of Directors and as Treasurer, currently chairs the Legislative Committee, and has previously chaired the Annual Conference. Other District staff actively participates on various CASQA Subcommittees, including Monitoring & Science, Legislative, Pesticides, and Construction. This active participation enhances the ability of the Urban Runoff Management Program to incorporate the collective experience of CASQA and its member agencies into its own program.

Santa Ana "One Water One Watershed" (OWOW) Initiative

The District is an active participant in the Santa Ana OWOW planning process, which focuses on establishing regional solutions for water problems within the SAR and is intended to develop linkages among all water interests. The OWOW's objective to encourage multi-benefit resource projects, including capture and use of stormwater, is consistent with water management goals in the Permit Area. Through this effort we have been able to enhance regional efforts and obtain grant funds to facilitate implementation.

Southern California Stormwater Monitoring Coalition (SMC) and Southern California Coastal Watershed Research Project (SCCWRP)

SMC develops technical information collaboratively with a number of city, county, and state agencies, including the Regional Board, through a cooperative agreement to provide a better understanding of urban runoff mechanisms and impacts, and to develop tools to improve urban runoff management. SCCRWP is a southern California research agency that conducts environmental research that supports the development of water quality management strategies, including urban runoff management. The District is a signatory to the SMC Cooperative Agreement and works collaboratively with SCCWRP. Collaborative urban runoff management projects with these organizations include:

- *Regional Watershed Monitoring Program*, which is an integrated regional monitoring program focused on three key questions: (a) What is the condition of streams in our region?; (b) What

[4] Source: Urban Runoff Management Program 2012-2013 Annual Report

are the stressors that affect stream condition?; and (c) Are conditions getting better or worse? The SMC is leading this effort and working collaboratively with its member agencies and SCCWRP. Fiscal Year 2012-2013 was the fifth year of this 5-year monitoring project and a final project report is expected in 2015.

- The *Regional Hydromodification Study*, which satisfies the 2010 Permit requirement to develop a Hydromodification Management Plan, was recently completed. The outcome of the study was the development of tools to support the implementation of hydromodification management measures to improve the overall condition of streams in southern California. Tools are being developed to support (a) an understanding of processes that control hydromodification; (b) screening, modeling or assessment activities; and (c) monitoring and management decisions. These tools support the Urban Runoff Management Program efforts to reduce channel degradation, excessive erosion and sedimentation in receiving waters and to reduce delivery of particle-bound pollutants to receiving waters. SMC has been working collaboratively with SCCWRP and Colorado State University on the execution of this project.

Regional Stormwater-related Task Forces

The District, on behalf of the Permittees, continues to be actively involved in three regional task forces focusing on efforts to improve urban runoff quality and protect receiving waters:

- *Stormwater Quality Standards Task Force (SWQSTF)* – Comprised of stakeholders in the Santa Ana River Watershed, the SWQSTF has been working collaboratively with the Regional Board to develop the scientific and technical basis for modifications of existing bacterial indicator Water Quality Objectives to protect recreational Beneficial Uses. The outcome was a Regional Board-approved amendment[5] to the Santa Ana Region Water Quality Control Plan (Basin Plan) that created new bacterial indicator Water Quality Objectives for the protection of REC-1 and REC-2 Beneficial Uses, established a high flow suspension of Bacterial Indicator Water Quality Objectives during Wet Weather events, and removed REC-1 as a Beneficial Use from Temescal Creek Reach 1a. These Basin Plan Amendments (BPA) have been approved by the State Water Board and are currently under United States Environmental Protection Agency (USEPA) Region 9 review. The outcome of the work of the SWQSTF will affect urban runoff management decisions related to the protection of recreational Beneficial Uses.

- *Middle Santa Ana River (MSAR) Bacterial Indicator Total Maximum Daily Load (TMDL) Task Force* – Comprised of stakeholders in the MSAR Watershed, including several Permittees, the MSAR Bacterial Indicator TMDL Task Force works collaboratively to implement watershed-wide compliance monitoring and bacterial indicator source evaluation activities to support efforts to comply with MSAR Bacterial Indicator TMDL requirements. The Regional Board resolutions adopting the Basin Plan and the subsequent Basin Plan Amendment, which resulted from the work completed by the SWQSTF, provides direction to MSAR Bacterial Indicator TMDL implementation activities.

- *Lake Elsinore & Canyon Lake (LE/CL) Nutrient TMDL Task Force* – Comprised of stakeholders within the San Jacinto Watershed, the LE/CL Nutrient TMDL Task Force works collaboratively to facilitate implementation of projects and activities designed to comply with the requirements

[5] Regional Board Resolution R8-2012-0001

of the Nutrient TMDLs applicable to each lake. The LE/CL Nutrient TMDL Task Force is administered by the Lake Elsinore and San Jacinto Watersheds Authority (LESJWA) (see below).

Other Regional Activities

The District and other Permittees also actively participate in a number of regional organizations and committees. Examples include:

- *Technical Advisory Committee (TAC)* – The SAR TAC coordinates the implementation of the DAMP and overall 2010 Permit compliance program within the Permit Area. Each Permittee shall designate at least one representative for the SAR TAC. The District chairs the meetings and provides staff support. During the 2010 Permit term, SAR TAC meetings have focused on TMDL and SWQSTF activities, Water Quality Management Plan (WQMP) implementation, and public education. TAC meeting agendas and minutes are provided in the Annual Reports.

- *San Jacinto River Watershed Council* - The San Jacinto River Watershed Council is a non-profit organization dedicated to addressing environmental issues of concern in the San Jacinto River Watershed. The focus of this organization is to provide educational, scientific, and technical assistance to help protect the natural resources of the San Jacinto River Watershed. The Council consists of a broad range of stakeholders including community groups, tribes, farming and dairy interests, businesses, water agencies, government agencies, and other interested stakeholders. The District participates in meetings of the Council as part of the implementation of the 2010 Permit.

- *Southern California Water Committee (SCWC)* – As described on its website,[6] the SCWC is a *"nonprofit, nonpartisan public education partnership dedicated to informing southern Californians about our water needs and our state's water resources. Through measured advocacy, SCWC works to ensure the health and reliability of Southern California's water supply."* The SCWC includes about 200 member organizations ranging from government and water agencies to agricultural groups, businesses, and environmental organizations. The County of Riverside is a sponsor of the SCWC and the District participates on the SCWC Stormwater Task Force.

- *Lake Elsinore and San Jacinto Watersheds Authority* – LESJWA is a joint powers authority focused on improving water quality and wildlife habitats, primarily in Lake Elsinore, Canyon Lake, and the surrounding watersheds. LESJWA's primary goals include supporting the planning, design and implementation of projects to improve water quality, working with stakeholders to secure reliable funding to operate and maintain water quality improvement projects, and serving as administrator of the LE/CL Nutrient TMDL Task Force and a water quality trading program for the San Jacinto River Watershed. Currently, several Permittees serve on the LESJWA Board of Directors.

- *Interagency Legislative Group* – This is a group of local water agencies that tracks and coordinates legislation related to water resource management. The District participates in this effort to facilitate funding for stormwater programs and effective legislation for urban runoff management.

[6] http://www.socalwater.org/

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Section 3

Urban Runoff Management Program Evaluation

This section provides an overall evaluation of the SAR Urban Runoff Management Program under the 2010 Permit. This evaluation encompasses three areas: (a) program implementation highlights; (b) water quality characterization from ongoing water quality monitoring programs; and (c) program effectiveness evaluation.

3.1 Program Implementation (2010-2014)

The 2010 Permit included a substantial number of compliance deliverables that required a significant expenditure of program resources by the Permittees. **Table 3-1** summarizes the *key* deliverables completed during the 2010 Permit term. Appendix 3, Section V (Monitoring and Reporting Program) of the 2010 Permit lists all required deliverables during the 2010 Permit term; the Permittees have completed these compliance requirements.

The 2010 Permit fine-tuned a number of program areas, such as updates to the DAMP and inspection programs, and also laid the foundation for the next generation of urban runoff management principles, such as incorporation of LID principles into New Development and Significant Redevelopment Projects (collectively, Priority Development Projects(PDPs)) and adoption of TMDL implementation plans targeting water quality impairments. The following subsections highlight examples of key deliverables and the benefits they have provided to the Urban Runoff Management Program implementation. The Annual Reports submitted during the course of the 2010 Permit provide a more complete record of program deliverables.

Implementation of Low Impact Development Principles

2010 Permit Outcome

The 2010 Permit required incorporation of LID principles into the management of urban runoff from PDPs. Implementation of LID principles places increased reliance on natural processes and natural landscapes to manage urban runoff as close to its source as possible. An important benefit from deployment of LID principles to PDPs is the opportunity to use urban runoff as a resource rather than as a waste. In particular, application of LID principles in the urban environment promotes numerous benefits including enhanced water quality and supply, stream and habitat protection, cleaner air, reduced urban temperatures, increased energy efficiency, and improved community aesthetics and recreational opportunities.

LID principles have been integrated into the Urban Runoff Management Program at multiple levels; at the watershed level through the coordinated planning approach described by the WAP (see below), and at the project level through their application in the planning and design of urban projects. The Urban Runoff Management Program revised the WQMP, which now includes guidance for application of LID principles to transportation projects (DAMP Appendix I). In addition, the District developed a LID BMP Design Manual and has undertaken its own research into the use and design of LID-related BMPs at District facilities as part of a program to facilitate use of these BMPs in the County (see discussion in Section 3.3.3).

Table 3-1. Summary of Key Permit Deliverables during 2010 Permit Term

Key Permit Deliverables	Completion Date
Enhanced Design Handbook for LID BMPs (focused on landscape-based BMPs and infiltration BMPs capable of addressing identified Water Quality Impairments across Riverside County	Completed in September 2011
Revised Industrial and Commercial Sources section (DAMP Section 8) to reflect 2010 Permit requirements	July 2011
WAP and associated components: Regional Geodatabase, Hydromodification Mapping Study, Evaluation Program and Management Plan, and Retrofit Study	Submitted to the Regional Board May 29, 2014
Comprehensive Bacteria Reduction Plan (CBRP) for MSAR Watershed	Approved by Regional Board February 10, 2012
Comprehensive Nutrient Reduction Plan (CNRP) for Lake Elsinore and Canyon Lake	Approved by Regional Board July 19, 2013
WQMP update to incorporate LID principles into New Development and Significant Redevelopment Projects	Approved by Regional Board October 22, 2012
Transportation Project Guidance to Incorporate LID Practices into Transportation Projects (DAMP Appendix I)	Approved by Regional Board October 22, 2012
Consolidated Monitoring Program Update (including Illicit Connection/Illegal Discharge [IC/ID] Procedures)	Completed in November 2013
Updated Sanitary Sewer Overflow Procedure (DAMP Appendix E)	Submitted to the Regional Board July 15, 2013
Developed Regional Treatment Control Approval Guidelines (DAMP Appendix M)	Completed January 29, 2012
LIP Template (DAMP Appendix N) developed to guide Permittee development of LIPs	LIP Template approved by the Regional Board May 24, 2012; Permittees completed their individual LIPs within one year of the approval date
Urban Runoff Management Program Effectiveness Assessment Strategy (DAMP Appendix O)	Completed November 30, 2010
TMDL Implementation; updated DAMP Section 13 to incorporate CNRP and CBRP requirements	Section was updated following approval of the CBRP and CNRP (see above)

Benefits to Program Implementation

Implementation of LID principles on all PDPs will provide long-term benefits to urban runoff management especially in watersheds subject to TMDLs. This approach will allow the design and implementation of PDPs that both reduce pollutant loads and manage urban runoff as a resource rather than as a waste. Examples of these types of projects are described below in Section 3.3.2.

TMDL Implementation

2010 Permit Outcome

A key outcome from implementation of the 2010 Permit has been the development and adoption of required TMDL implementation plans for the two TMDLs in the SAR:

- MSAR Bacterial Indicator TMDL – The CBRP adopted by the Regional Board on February 10, 2012[7]; establishes a Permittee implementation program to meet the Dry Season TMDL Wasteload Allocation (WLA).

[7] Regional board Resolution R8-2012-0015

- LE/CL Nutrient TMDLs – The CNRP adopted by the Regional Board on July 19, 2013[8]; establishes a Permittee implementation program to meet TMDL WLAs.

The status of implementation of each of these plans is described in Sections 3.2.2 and 3.2.3, respectively.

Benefits to Program Implementation

The adoption of the CBRP and CNRP shifted the Urban Runoff Management Program resources from planning activities to the implementation of projects and activities, including monitoring and assessment programs to evaluate the effectiveness of efforts to manage controllable sources of bacterial indicators in the MSAR Watershed, projects to reduce bacterial indicators in MSAR Receiving Waters and mitigation of Nutrients in Lake Elsinore and Canyon Lake. Implementation priorities for the 2015 Permit are described below in Section 4.1.

Watershed Action Plan and Hydromodification Management Plan

2010 Permit Outcome

The 2010 Permit required the development of a WAP to identify the approach that the Permittees would use to coordinate watershed management. The specific objective of the WAP is to address watershed scale water quality impacts of urbanization in the Permit Area associated with urban TMDL WLAs, stream system vulnerability to hydromodification from urban runoff, cumulative impacts of PDPs on vulnerable streams, preservation of Beneficial Uses of surface waters in the Permit Area, and protection of water resources, including groundwater recharge areas.

The final WAP submitted to the Regional Board[9] evaluated urban runoff management programs and other regional independent efforts to identify all collaboration opportunities through the Stormwater and Water Conservation Tracking Tool, which is referred to as the Geodatabase. The WAP and Geodatabase can be used by developers to identify appropriate measures for inclusions in a WQMP. The Geodatabase also provides an opportunity for the Permittees to evaluate each program and look for areas of collaboration and integration that could achieve multiple goals and address regional water quality issues.

Associated with WAP development, the 2010 Permit required the development of a Hydromodification Management Plan (HMP) that (a) describes how the HMP delineation will be used on a per project, subwatershed, and watershed basis to manage hydromodification caused by urban runoff; (b) identifies potential causes of identified stream degradation including consideration of sediment yield and balance on a watershed or subwatershed basis; (c) delineates existing unarmored or soft-armored stream channels in the SAR that are vulnerable to hydromodification from PDPs; and (d) evaluates hydromodification impacts for the channels deemed most susceptible to degradation. The HMP identifies sites to be monitored, includes an assessment methodology, and required follow-up actions based on monitoring results. Where applicable, monitoring sites may be used to evaluate the effectiveness of BMPs in preventing or reducing impacts from hydromodification. The elements that make up the complete HMP were developed as separate documents but are combined with the WAP: (a) Hydromodification Management Plan; (b) Hydromodification Management Plan Evaluation Program; (c) Causes of Degradation and Aggradation Technical Memorandum; and (d) Hydromodification Susceptibility Mapping and Report.

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[8] Regional Board Resolution R8-2013-0044

[9] Submitted to the Regional Board May 29, 2014

Benefits to Program Implementation

Critical outcomes of the WAP and HMP effort have been the establishment of the Geodatabase and identification of potential sites for regional BMP projects, which was conducted in the Santa Ana Watershed Retrofit Assessment. The Geodatabase is available to the development community and provides a common foundation for all watershed planning activities within the SAR. These tools coupled with other ongoing integrated planning efforts (as described in the WAP) set the stage for development and implementation of urban runoff management projects that provide multiple benefits to the SAR, especially projects that support TMDL compliance and address hydrologic conditions of concern.

Local Implementation Plans (LIP)

Permit Outcome

The 2010 Permit required the development of a LIP template to support development of LIPs by each of the Permittees. The LIPs describe the specific tools, processes, procedures, and resources used by the Permittees to implement the DAMP. All Permittees completed their respective LIPs in 2013.

Benefits to Program Implementation

The LIPs are manuals that provide information to assist Permittee staff with the urban runoff management programs within their jurisdictions. Because the LIP relies on the use of foundational program documents, e.g., the DAMP, any changes to these documents are automatically applied across the Permit Area. With LIPs established by each Permittee, jurisdictional resources have shifted to implementing urban runoff management activities to address specific water quality concerns.

Inspections

2010 Permit Outcome

The 2010 Permit required updates to a number of inspection-related programs. Of these programs the most significant required changes to programs targeting TMDL implementation, i.e., the IC/ID inspection program. Specifically, the 2010 Permit required the Permittees to review and revise their IC/ID inspection program to include an Illicit Discharge Detection and Elimination (IDDE) program using *IDDE - A Guidance Manual for Program Development and Technical Assessments* (IDDE Manual)[10] or any other equivalent program. During the 2010 Permit term, the IDDE Manual was reviewed and relevant IC/ID procedures were incorporated into the Consolidated Monitoring Program (CMP) for the Santa Ana Region (CMP Volume IV).

Benefits to Program Implementation

IC/ID inspections and application of IDDE procedures are a key element of the implementation of TMDLs, especially the MSAR Bacterial Indicator TMDL. These procedures are in active use and will continue to be so, especially as Permittees continue to identify, investigate, and mitigate controllable sources of bacterial indicators.

[10] Center for Watershed Protection and Dr. Robert Pitt, University of Alabama, 2005

Drainage Area Management Plan (DAMP) Updates

2010 Permit Outcome

The DAMP documents 2010 Permit compliance programs and provides guidance to the Permittees in the development and implementation of their LIPs. It is the principal document that translates 2010 Permit requirements into programs and implementation plans. The DAMP describes a wide range of continuing and enhanced BMPs and control techniques as well as the overall urban runoff management strategies implemented by the Permittees.

The 2010 Permit requires that the Permittees regularly review and revise the DAMP to incorporate new program elements and important changes in how they implement the compliance requirements. The most recent update was completed in January 2014. Important updates during the 2010 Permit term included:

- The District's *Design Handbook for Low Impact Development Best Management Practices* (September 2011) was revised to support implementation of the DAMP.
- The Industrial and Commercial Sources section (DAMP Section 8) was revised to reflect the requirements of the 2010 Permit.
- The Sanitary Sewer Overflow Procedure was updated and added to the DAMP as Appendix E.
- Regional Treatment Control Approval Guidelines were developed and added to the DAMP as Appendix M.
- The LIP Template (DAMP Appendix N) was developed to guide Permittee development of their LIPs.
- The Effectiveness Assessment Strategy was incorporated into the DAMP as Appendix O.
- DAMP Section 13, TMDL Implementation, was updated to incorporate CNRP and CBRP requirements.

Benefits to Program Implementation

By routinely revising the DAMP and supporting documents such as the Design Handbook for LID BMPs, the Permittees have developed up-to-date guidance and tools to manage urban runoff within their jurisdictions. This information has become institutionalized within each Permittee's jurisdiction through their respective LIP. With the supporting documentation and tools in place, the Permittees can and do focus on implementation rather than continued development of processes and procedures. This facilitates application of the latest BMP technology to projects to manage urban runoff.

Public Education and Outreach

2010 Permit Outcome

The 2010 Permit required continued implementation of a comprehensive Public Education and Outreach (PEO) program to educate residents and businesses regarding ways to reduce pollutants in urban runoff. The Urban Runoff Management Program meets this requirement through the use of multiple PEO tools ranging from direct education of students and local business-based education programs to web-based approaches.

Benefits to Program Implementation

Institutional BMPs such as PEO activities continue to provide basic information to the public regarding ways to improve urban runoff quality. While it is not possible to directly relate pollutant load reductions to specific numbers or types of PEO activities, the Permittees believe that benefits have been achieved through the PEO program. This is evident in the overall trends in water quality in the SAR, which demonstrate that although urbanization continues to increase, water quality has been maintained. This outcome has been achieved in part, the Permittees believe, because the benefits of 20 years of stormwater education have borne fruit. The Permittees will continue to modify the PEO program where needed to target specific locations or activities that are causing water quality impairments.

Monitoring Programs

2010 Permit Outcome

Monitoring activities related to 2010 Permit requirements are implemented under the Permittee's multi-volume CMP. For the SAR, overall monitoring activities are guided by Volume II: Quality Assurance Project Plan, QAPP and Volume IV: Santa Ana Region Consolidated Monitoring Program. The MSAR and LE/CL TMDL monitoring programs are incorporated by reference. The 2010 Permit required review and revision of the SAR CMP as needed during the Permit term, including by inference participation in TMDL monitoring program development. The SAR Permittees completed these requirements during the 2010 Permit term.

Benefits to Program Implementation

The establishment of the CMP and TMDL monitoring programs provides the monitoring and assessment tools needed to guide the Urban Runoff Management Program implementation activities, especially for the monitoring programs that are used to evaluate the effectiveness of TMDL implementation activities. With these monitoring programs established, the Urban Runoff Management Program has the tools it needs to continue to evaluate program effectiveness at improving urban runoff quality and protecting receiving water beneficial uses. This benefit will be discussed in more detail in the following sections.

3.2 Water Quality Characterization

The Permittees conduct water quality monitoring to meet requirements of the 2010 Permit, to implement water quality studies designed to improve understanding of water quality conditions, and to guide and prioritize urban runoff management decisions. These monitoring programs include:

- *MS4 and Receiving Water Monitoring Program* – This monitoring is conducted at MS4 outfall and receiving water stations distributed across multiple Permittee jurisdictions within Riverside County and involves sampling to assess current conditions for a number of constituents.
- *MSAR Bacterial Indicator TMDL Monitoring Program* – Monitoring required by the TMDL and specified in the CBRP involves a combination of watershed-wide compliance monitoring to assess receiving water quality and bacterial indicator source evaluation studies in tributary subwatersheds.
- *LE/CL Nutrient TMDL Monitoring Program* – Monitoring required by the TMDL and specified in the CNRP includes watershed monitoring, in-lake monitoring, and special monitoring needs associated with project implementation, e.g., Canyon Lake alum project.

The following sections briefly characterize water quality in the SAR based on the findings from these monitoring activities. References to more detailed analyses are provided as appropriate.

3.2.1 MS4 and Receiving Water Monitoring Program

The 2010 Permit requires the Permittees to conduct general water quality monitoring for multiple pollutants throughout the SAR.[11] Monitoring occurs at both MS4 outfalls and receiving water stations. In connection with this ROWD, the Permittees evaluated multiple years of data collected at its monitoring stations to characterize long-term trends in urban runoff (**Figure 3-1**). This trend analysis includes an evaluation of water quality observations during dry and wet weather conditions along with population data over a 20-year period to look for insights that could support incremental improvements to the Urban Runoff Management Program, where needed. Trend analysis was conducted for outfall stations only because there is currently insufficient data (e.g., fewer than three monitoring years) available to calculate a trend for the receiving water stations.

Figure 3-1. Data Collection Activity

Wet Weather

Outfall Station Analyses

Analysis of sample data routinely collected at outfall stations suggests that with regards to multiple constituents, water quality improvements have occurred during wet weather within the Permit Area. Some examples that highlight this trend include:

- *Lead* – Although exceedances of dissolved lead Water Quality Objectives have been observed across the SAR during the term of the 2010 Permit, trend analysis indicates that concentrations of total lead have been decreasing over time, resulting in improved water quality during wet weather events. This water quality improvement has been observed in the Magnolia Center Storm Drain Outlet Outfall Station (801MAG364) drainage area and the University Wash Channel Outfall Station (801UNV702), an area that recently underwent significant urban development and population growth.

- *Copper* – Although exceedances of dissolved copper Water Quality Objectives have been observed across the SAR during the term of the 2010 Permit, the trend analysis for total copper at the Magnolia Center Storm Drain Outlet (801MAG364) and the Corona Storm Drain (801CRN040) Outfall stations indicate decreasing concentrations of dissolved copper over time, an improvement in water quality.

- *pH* – Slightly elevated pH measurements (above the upper Water Quality Objective limit) were infrequently observed at the North Norco Channel Outfall Station (801NNR707). No pH exceedances were observed at the Corona Storm Drain Outlet Outfall Station (801CNR040) or at the Temescal Channel at Main Receiving Water Station (801TNS746).

- *Phosphorus* – The wet weather trend analysis for total phosphorus indicates no statistically significant change in water quality across the SAR at five of seven outfall stations. A statistically

[11] The MS4 Stormwater Monitoring Program for the SAR of Riverside County is described in the *Riverside County Consolidated Monitoring Program, Volume IV: Santa Ana Region Monitoring Plan*.

significant increasing trend in Wet Weather total phosphorus concentrations, indicating a decline in water quality, was observed at the Hemet Channel Outfall Station (802HMT318). A statistically significant decreasing trend in wet weather total phosphorus concentrations, indicating water quality improvement, was observed at the Corona Storm Drain Outfall Station (801CRN040).

- *Turbidity* – Turbidity is a potential indicator of urban development impacts. An assessment of wet weather turbidity data found statistically significant water quality trends indicating water quality improvement at two stations: Magnolia Center Storm Drain Outlet (801MAG364), an area where population has remained steady since the 1990s, and the Corona Storm Drain Outfall Station (801CRN040), an area that has undergone significant urban development and population growth since the 1990s.

Water quality data analyses of bacterial indicators and total nitrogen indicated either no trend or continued evidence of the water quality constituent as a Pollutant of Concern (POC):

- *Bacterial Indicators* – Monitoring results indicate continued exceedances of both the newly adopted *E. coli* Water Quality Objectives and the previous fecal coliform Water Quality Objectives.[12] These findings show that bacterial indicators continue to be a POC in the SAR. However, bacterial indicator source evaluation activities completed in 2012 and 2013 in the watershed tributary to MSAR Reach 3 showed that the incidence of human sources of bacterial indicators in water quality samples decreased. This finding suggests a positive trend in addressing controllable sources of bacterial indicators.

- *Total Nitrogen* – Total nitrogen exceedances were detected at stations across the SAR, but the trend analysis for total nitrogen generally indicates no statistically significant change in water quality in the region, except at the Hemet Channel Outfall Station (802HMT318), where trend analysis indicates increasing concentrations for total nitrogen (and total phosphorus), suggesting a decline in water quality.

Receiving Water Analyses

The water quality dataset for receiving water stations is limited to the two monitoring seasons within the 2010 Permit term; therefore trend analysis could not be conducted. SAR Receiving Waters are largely ephemeral, and flow is only observed (and sampled) during storm events that yield measurable flows. Historical LE/CL Nutrient TMDL monitoring data available for the Perris Valley Channel Receiving Water Station (802NVO325) was combined with Permit compliance monitoring data to yield a sufficient nutrient dataset to support trend analysis. The data assessment found trends that indicate water quality improvements for the bioavailable forms of nitrogen and phosphorus (i.e., concentrations of total inorganic nitrogen [TIN], ammonia, nitrate, and orthophosphorus were decreasing over time). These findings indicate that the Perris Valley Channel Receiving Water is not negatively contributing to nutrient loading to Canyon Lake or other downstream waterbodies.

Additional Wet Weather LE/CL Nutrient TMDL data from the San Jacinto River Watershed were evaluated to further understand potential impacts from nutrients to downstream Receiving Waters. Available Wet Weather LE/CL Nutrient TMDL Receiving Water Station data (2001-2013) for Salt Creek at Murrieta Road (802RCF745), San Jacinto River at Goetz Road (802RCF759), and Canyon Lake

[12] Regional Board adoption of Resolution R8-2012-0001 revised the Basin Plan and established new REC-1 bacteria water quality objectives based on *E. coli*. These objectives replace existing fecal coliform objectives. Although also approved by the State Water Board (2014-0005), these new objectives will not be effective until EPA approves the changes.

Spillway (802RCF841) were evaluated. Improving water quality trends were observed for bioavailable forms of nitrogen, including ammonia (all three TMDL Receiving Water Stations) and nitrate (Salt Creek at Murrieta Road). Statistically significant increasing trends (i.e., decreasing water quality) were observed for total phosphorus and orthophosphorus concentrations at Salt Creek at Murrieta Road and Canyon Lake Spillway Stations, while a decreasing trend (i.e., improvement in water quality) was observed for orthophosphorus at the San Jacinto River at Goetz Road Station.

Dry Weather

Outfall Station Analyses

Analysis of water quality data collected from MS4 outfall stations during Dry Weather conditions provided the following observations:

- *Lead* – No Dry Weather exceedances of dissolved lead Water Quality Objectives were observed at any outfall station monitored during the term of the 2010 Permit, including at the Magnolia Center Storm Drain Outlet Outfall Station (801MAG364), which drains into a reach of the Santa Ana River listed as impaired for lead on the 303(d) List.
- *Boron* – Boron was identified in the 2010 Permit as a historical Dry Weather POC at the Corona Storm Drain Outfall Station (801CRN040). No total boron exceedances have been measured at this Outfall since May 2007 indicating that this constituent is no longer a POC in the SAR.
- *Turbidity* – As noted previously, turbidity is a potential indicator of urban development impacts. An assessment of the Dry Weather turbidity data found one statistically significant Dry Weather trend, which was an improving water quality trend (decreasing turbidity levels) observed at the Hemet Channel Outfall Station (802HMT318). Monitoring data, coupled with flow and population analyses (see below), indicate that programs to manage dry weather urban runoff are providing the expected benefits.

Receiving Water Analyses

The 2010 Permit requires receiving water monitoring at a minimum of two locations for two dry weather monitoring events in a given monitoring year. With fewer than three years of monitoring data for one receiving water station, and no water quality data (VNS) for the second receiving water station, there is currently insufficient data available to calculate a trend from the dry weather monitoring data.

Relationship between Water Quality and Increased Population Density

The SAR has urbanized rapidly since the first MS4 Permit was issued in 1990. Plots of land, which once were used for agricultural purposes or were grasslands, have been transformed into master planned neighborhoods. Using increases in population as a surrogate for urban development, the Urban Runoff Management Program performed a correlation analysis as a tool to assist in evaluating the efficacy of the historical and current SAR Monitoring Program. For this analysis, annual changes in population were modeled for each monitoring station drainage area. **Figure 3-2** illustrates the progressive increase in population densities that have occurred in the watersheds above each outfall monitoring station for the period 1990 – 2013.

While a statistically significant correlation is not indicative of causation, correlations between changes in population (population growth) and water quality at long-term monitoring stations may suggest how effective the existing water quality programs are at protecting water quality. A correlation analysis of wet weather water quality concentrations versus population density tributary to outfall stations found

38 statistically significant correlations, including 17 that indicate water quality improvement and 13 that indicate water quality has held steady. This indicates that of the 38 correlations, 79% of these show either improvement or no change. The analysis indicates that the Urban Runoff Management Program has been largely effective in addressing pollutants in urban runoff in the face of increased population density. In only a few instances was there a statistically significant relationship observed between increased population density and lower water quality. These findings indicate that for the most part the potential impacts from long-term urbanization have been mitigated through implementation of urban runoff management programs targeting specific pollutant sources.

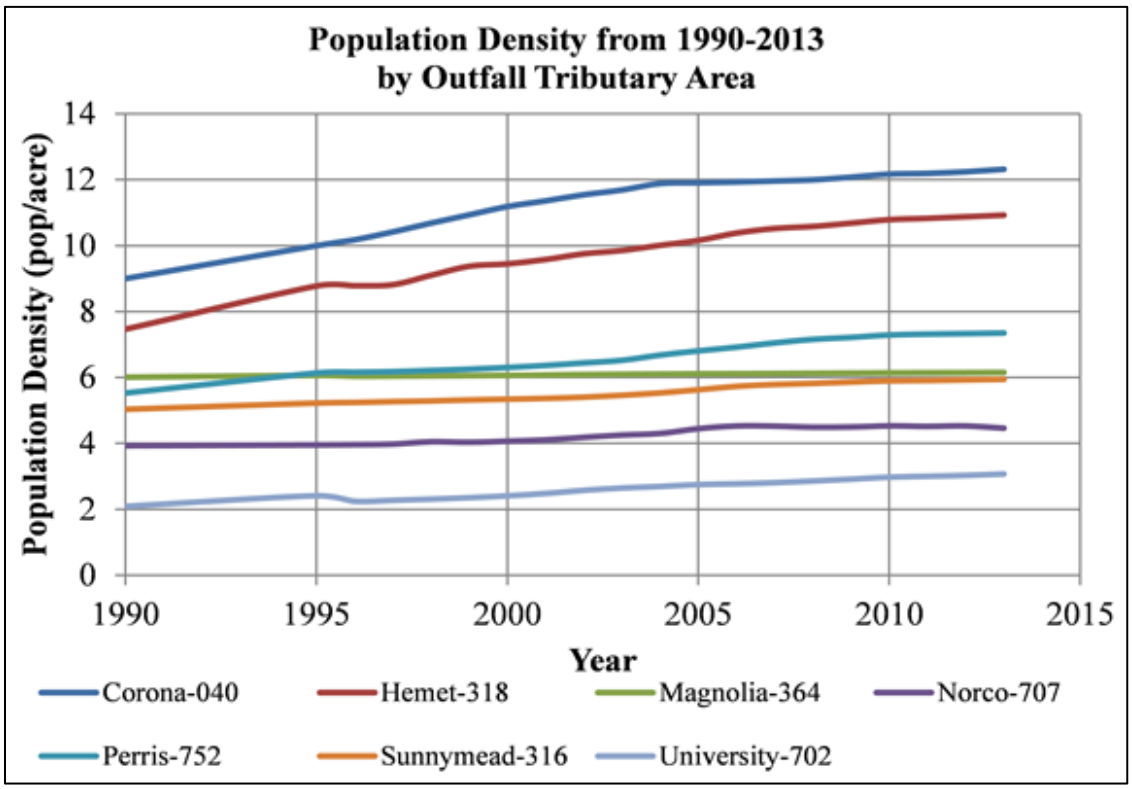
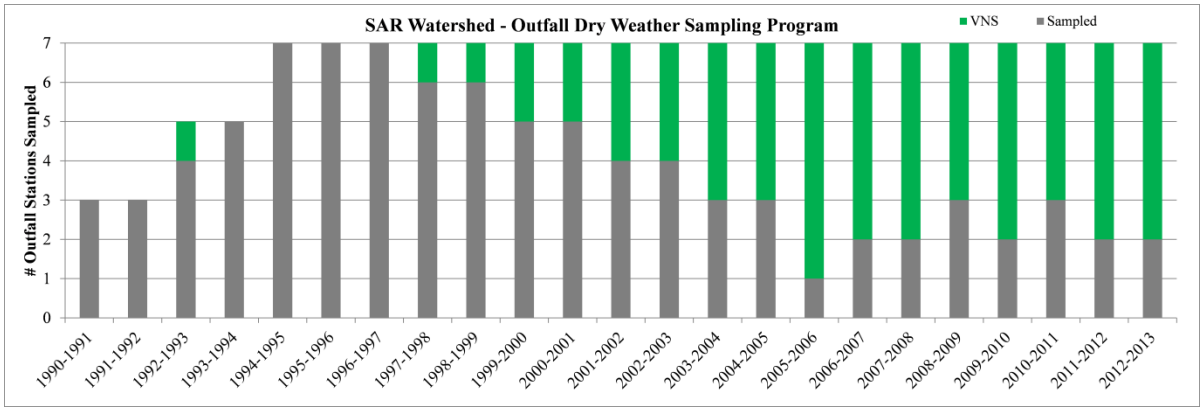


Figure 3-2. Changes in Population Density in Watersheds Draining to Outfall Monitoring Stations (1990 – 2013)

Santa Ana Region Dry Weather Flow Patterns

The Urban Runoff Management Program also conducted an analysis of the frequency with which dry weather water quality samples could be collected when a site was visited over the period of record (1990 – 2013). The results of this analysis show an increased frequency of finding insufficient flow available at the outfall to collect a sample (recorded as "visited not sampled" or VNS) (**Figure 3-3**). The most obvious changes in flow began about 10 years ago (note increasing size of green bar in Figure 3-3, Top). In addition, five outfall stations (802SNY316, 802HMT318, 801UNV702, 801NNR707, and 802PLJ752) were recorded as "VNS" during all dry weather monitoring events during the 2010 Permit term. The observed reduction in outfall flow occurred during both dry and wet rainfall periods (note red vs. blue bars in Figure 3-3, bottom). For example, while 2004–2005 was a record wet season in the region, a greater number of VNS observations were recorded in that year compared to prior years.



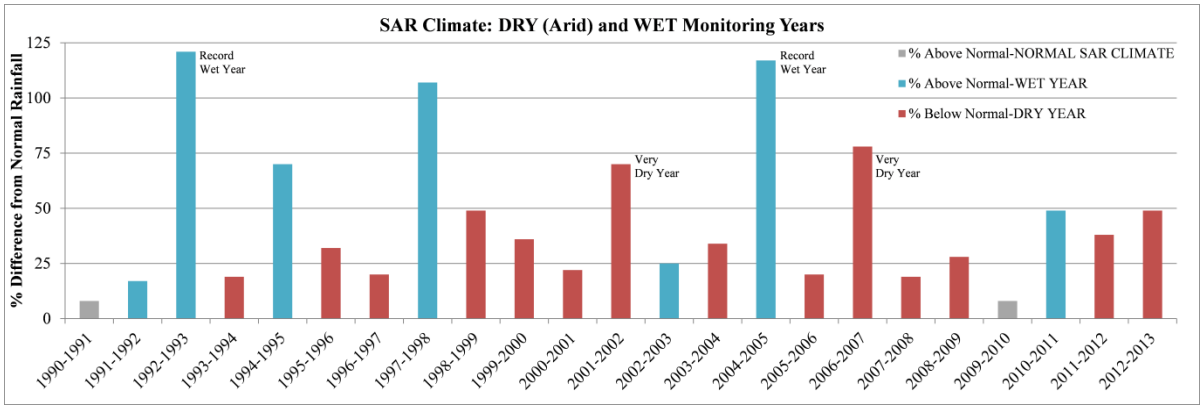


Figure 3-3. ***Top:*** **Changes in the Ratio of Outfalls "visited not sampled" (VNS) and Outfalls "sampled during a visit" (Sampled) over the history of the MS4 Outfall Dry Weather Sampling Monitoring Program.** ***Bottom*****: Rainfall and Climate Conditions in the Santa Ana Region.**

3.2.2 MSAR Bacterial Indicator TMDL Monitoring Program

The MSAR Bacterial Indicator TMDL requires watershed-wide compliance monitoring of receiving waters to assess compliance with Water Quality Objectives in impaired waterbodies, and implementation of upstream bacterial indicator source evaluations within the subwatersheds tributary to the impaired receiving waters (originally characterized as the "Urban Source Evaluation Plan" in the TMDL, which evolved into the "Source Evaluation Monitoring Activities" set forth in the CBRP).

Figure 3-4 summarizes bacterial indicator levels at watershed-wide compliance monitoring sites for dry weather conditions in both Dry and Wet Seasons. Comparative wet weather data results are shown as sample points. Data collected to date show significant differences in bacterial indicator levels among sites, three of which have at least some upstream drainage area within the SAR (Santa Ana River at MWD Crossing, Santa Ana River at Pedley, and Mill-Cucamonga Creek). The results consistently show clear differences in bacterial indicator levels based on flow condition and season. In particular, bacterial indicator levels are greatest during wet weather events. For dry weather flows, Wet Season (November – March) bacterial indicator levels are lower than Dry Season levels (April – October).

Several sites showed a consistent pattern of increasing bacterial indicator levels over the course of the summer dry season (e.g., see time series figures in the MSAR Bacterial Indicator TMDL 2013 Dry Season Report submitted to the Regional Board in December 2013[13]). The reason for this summer increase has not yet been determined.

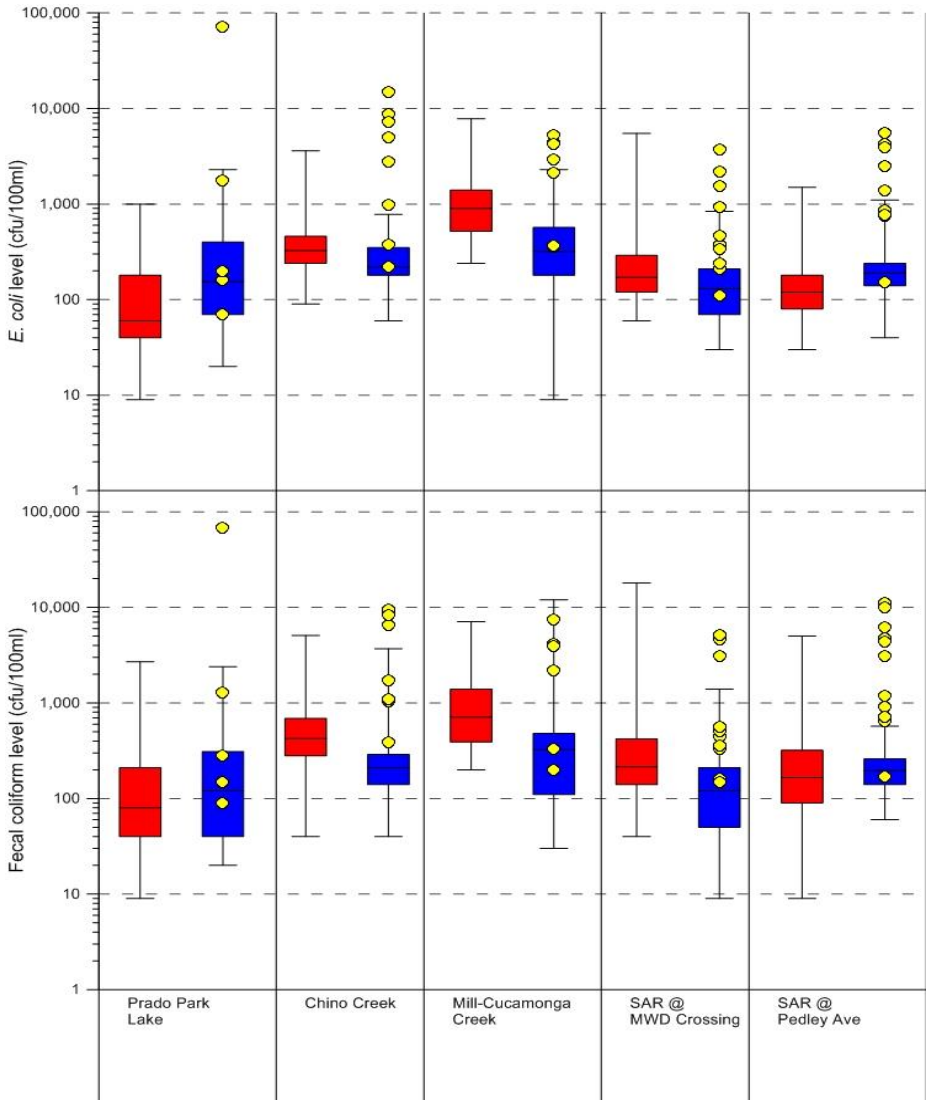


Figure 3-4. Box-Whisker Plots of Bacterial Indicator Levels from 2009 - 2012 during Dry Weather in the Dry Season (red) and Wet Season (blue), and during Wet Weather Events (yellow points).

[13] http://www.sawpa.org/wp-content/uploads/2013/01/Final-2013-Dry-Season-Report_121613.pdf

Watershed-wide Compliance Monitoring

As noted, the MSAR Bacterial Indicator TMDL requires implementation of watershed-wide compliance monitoring for bacterial indicators. Initiated in 2007, bacterial indicator data from five sites in the MSAR Watershed are collected. dry weather samples during Dry Season months are collected weekly over 20 consecutive weeks, generally from May to September and during the Wet Season months over 11 consecutive weeks, generally from late December through early March. In addition, one wet weather event is sampled each year, typically during late fall or early winter. The MSAR Bacterial Indicator TMDL Task Force, which oversees the monitoring effort, submits biannual seasonal data reports to the Regional Board to comply with CBRP reporting requirements.[14] The TMDL (and CBRP) require development of triennial reports that summarize data collected for the preceding 3-year period and evaluate progress towards achieving the WLAs and Load Allocations (LAs). To date, two triennial reports have been submitted to the Regional Board (2010 and 2013).[15] The next triennial report will be submitted in 2016.

Urban Source Evaluation – Tier 1

The CBRP required "Tier 1" source evaluation activities designed to identify controllable MS4 dry weather flow sources and their contributions to elevated bacterial indicator levels at downstream watershed-wide compliance sites. Source evaluation studies were conducted at Tier 1 locations in 2012 (all major MS4 drainage areas draining to a downstream watershed-wide compliance). The Tier 1 evaluation activities built on the foundation established by the Urban Source Evaluation Plan[16] were approved by the Regional Board in 2008, and superseded by the CBRP in 2012. Some of the Tier 1 monitoring sites were also sampled in 2007-2008 as part of early TMDL implementation activities. Tier 1 samples were analyzed for Total Suspended Solids (TSS) and *E. coli* concentrations, the presence or absence of the human associated *Bacteroides* marker, and field measured parameters.

Tier 1 source evaluation monitoring data showed that bacterial indicator levels in Dry Weather flow at MS4 outfalls is highly variable, but typically exceeded the WLA for *E. coli* of 113 Most Probable Number (MPN)/100 milliliters (mL) (**Figure 3-5**). Some Tier 1 sites had significantly greater *E. coli* levels or frequency of human-associated source *Bacteroides* detections than other sites, a fact that influenced the prioritization of Tier 1 sites and their associated drainage areas for subsequent source evaluation activities, as explained below.

The Tier 1 data results provided the basis for prioritization of sites (**Figure 3-6**) and associated subwatersheds for Tier 2 source evaluations activities, and where necessary, subsequent implementation activities to mitigate controllable sources. Prioritization involved developing a composite ranking for each Tier 1 site based on four criteria: (a) average dry weather flow rate (cubic feet per second [cfs]); (b) geometric mean of *E. coli* concentration (MPN/100 mL); (c) frequency of human-associated *Bacteroides* detection (%); and (d) risk of exposure rating (low or high) with regards to recreational activity.

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[14] Reports are available from http://www.sawpa.org/collaboration/projects/tmdl-taskforce/ under the Monitoring webpage.

[15] Reports are available from http://www.sawpa.org/collaboration/projects/tmdl-taskforce/ under the Resources webpage.

[16] http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/docs/msar/08_03_24_usep_final_032108.pdf

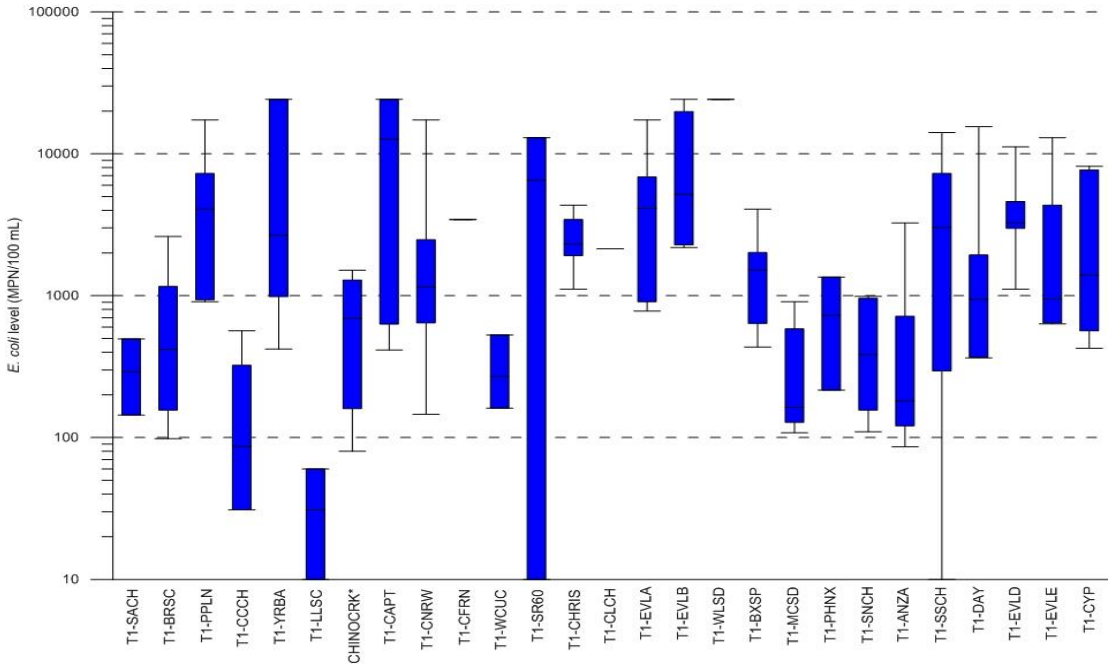

Figure 3-5. Box-Whisker Plots of *E. coli* Levels from Tier 1 Monitoring Sites (2012)

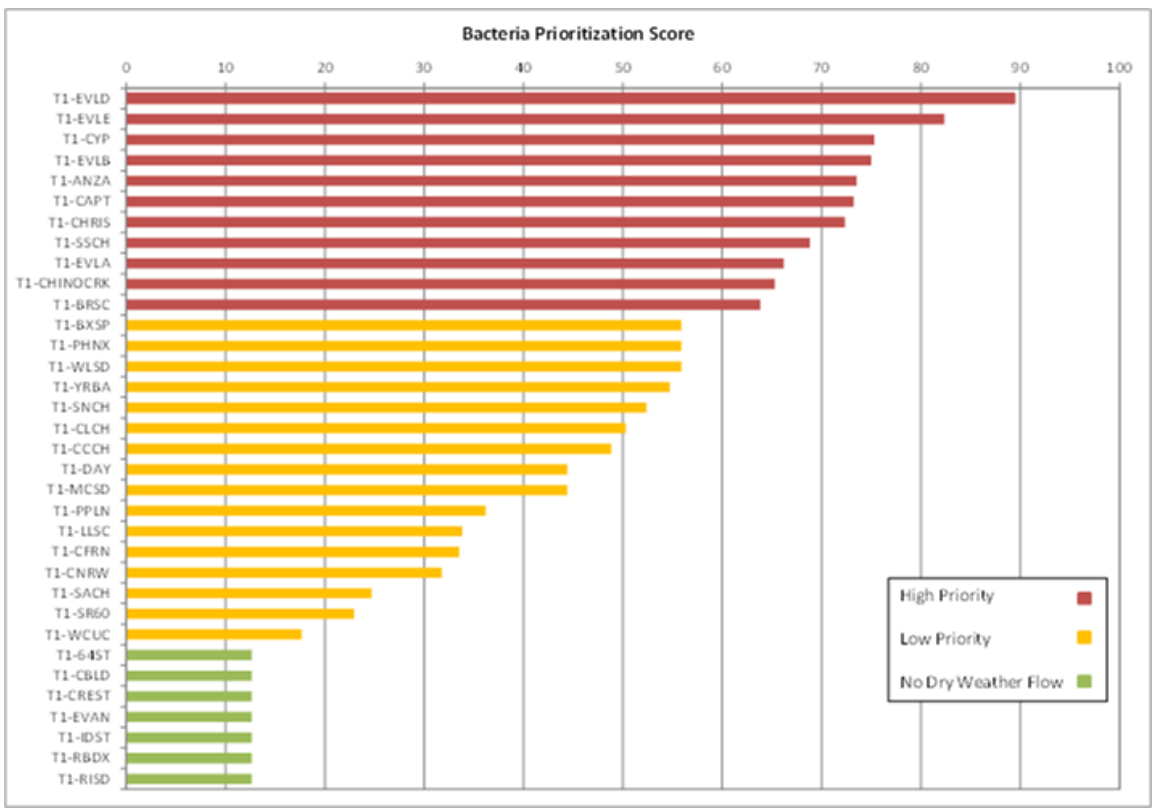

Figure 3-6. Prioritization Score for Tier 1 Source Evaluation Sites (2012); Scores Used to Prioritize Subsequent Tier 2 Source Evaluation Activities

Tier 1 source evaluation data were used to estimate the relative role of MS4 sourced urban runoff as a source of bacterial indicator levels in receiving waters. Blended bacterial indicator levels from MS4 outfall sources and clean POTW effluent were compared with observed downstream bacterial indicator levels to assess the potential for other non-MS4 sources to be contributors of bacterial indicators to impaired waterbodies.[17] The results from this analysis indicated the presence of significant non-MS4 sources of bacterial indicators, such as wildlife, air deposition, transient encampments, *in-situ* environmental growth, or re-suspension from sediments or biofilms. Key findings relevant to the Permit Area include:

- *Santa Ana River Subwatershed* – The source contribution analysis estimated that four drainage areas, served by the Anza, San Sevaine, Sunnyslope and Box Springs Channels, account for over 90% of the blended bacterial indicator levels in Santa Ana River Reach 3. However, the analysis also suggested the presence of a significant non-MS4 component. Efforts to distinguish between controllable and uncontrollable sources will continue into the next MS4 permit term (see Section 4.1.1).

- *Mill-Cucamonga Creek Subwatershed* – The analysis showed a close correlation between estimated blended bacterial indicator levels and data from the downstream watershed-wide compliance site. Thus, it may be inferred that instream sources of bacterial indicators may be small relative to MS4 inputs, or that decay by exposure to ultraviolet light offsets non-MS4 sources of bacterial indicators. Three high priority MS4 drainage areas, one draining a portion of the City of Eastvale, and the others within San Bernardino County, accounted for over 90% of the estimated blended bacterial indicator level in Mill-Cucamonga Creek. Tier 2 source evaluation activities are currently focusing on identifying potential controllable sources and will continue into the next MS4 permit term (see Section 4.1.1).

Urban Source Evaluation – Tier 2

The objective of Tier 2 source evaluations is to identify and mitigate or manage specific controllable urban sources most likely causing exceedances of bacterial indicator Water Quality Objectives. During the 2013 Dry Season, Tier 2 source evaluations were conducted by Permittees with jurisdictional area upstream of high priority Tier 1 sites. Specific actions included field reconnaissance, visual dry weather flow tracking, use of secondary screening tracers to guide tracking efforts, and collection of samples for *E. coli* bacterial indicator and human-associated *Bacteroides* analyses. The Tier 2 source assessment protocols were described in an update to the MSAR Water Quality Monitoring Plan and QAPP, which was submitted and approved by Regional Board staff. The Tier 2 protocols were based on techniques employed by the MS4 IC/ID Program to "locate and mitigate" sources of pollution throughout the watershed. In order to customize the Tier 2 efforts to target bacterial indicator sources, bacteria-specific techniques were added to the framework of the IC/ID Program.

Part of the Tier 2 assessment was intended to develop a better understanding of dry weather flow from residential irrigated areas. Prior to the Tier 2 assessment, understanding of the residential irrigation component of dry weather flow was limited to general observation about residents watering habits. For example, it was initially assumed that residential overwatering constituted a small portion of the dry weather flow and that the amount of homeowners who overwater were limited. Based on Tier 2 assessment observations it became apparent that residential overwatering was a significant source of

[17] See 2013 Triennial Report submitted to the Regional Board for a detailed description of the methodology and results of these analyses; http://www.sawpa.org/wp-content/uploads/2013/01/CBRP-TMDL-Implementation_Final.pdf

dry weather flow and that tracking down specific sources would require a larger effort than initially anticipated. For example, it was observed that the rate of dry weather flow from a neighborhood scale drainage area is highly dynamic and a function of individual property owner irrigation schedules. These facts made it impossible to conclude that any specific subarea were persistently without dry weather flow or to quantify a daily volume of dry weather flow without continuous flow measurements. Quantitative water balances thus could not be developed. Instead, dry weather flow rates were evaluated qualitatively to identify areas with elevated dry weather flow required further investigation.

Monitoring reflects substantial variability in bacterial indicator levels, with *E. coli* levels ranging from non-detect (<9 MPN/100 mL) to greater than 10,000 MPN/100 mL. Spatial and temporal variability was very high, with significant variability observed both between sites and at the same site sampled over different weeks. Based on the Urban Runoff Management Program's understanding of dry weather flow generation, this variability could be explained by differences at the individual property level, i.e., water quality is dependent upon which property was generating dry weather flow at the time that samples were collected. Despite this finding, there were some neighborhoods with consistently high bacterial indicator levels over the four weeks of monitoring, which could point to a larger source area than an individual property. This type of finding is particularly valuable, as it identifies where critical resources should be targeted.

Samples were also analyzed to assess the presence/absence of human-associated *Bacteroides* in dry weather flows. Three detections of human-associated *Bacteroides* were recorded in 2013, all from City of Eastvale manholes. Samples collected from MS4 facilities upstream of the San Sevaine, Anza, and Phoenix Channels did not reflect any detections of human *Bacteroides*. The number of detections in 2013 was much lower than observed in previous years (**Figure 3-7**). When human-associated *Bacteroides* was detected, the Permittees initiated follow-up investigations to identify potential sources using enhanced IC/ID inspection techniques. During the 2010 Permit term there have been an increasing number of successful investigations that have identified and mitigated controllable bacterial indicator sources (see Section 3.4.1 for examples). The Permittees will continue to implement this locate and mitigate strategy that is at the heart of Tier 2 source evaluations.

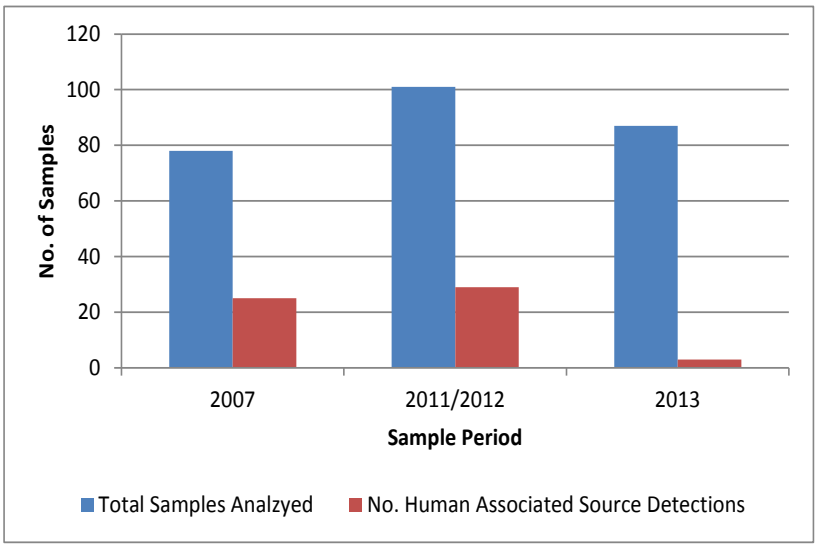

Figure 3-7. Number of Human- Associated Bacteria Detections Observed in MSAR Watershed

3.2.3 Lake Elsinore/Canyon Lake Nutrient TMDL Monitoring Program

The LE/CL Nutrient TMDL requires stakeholders, including the Permittees, to implement a nutrient monitoring program for the watershed (Watershed Monitoring Program), in-lake monitoring for each lake (In-Lake Monitoring Program) and Alum Treatment Effectiveness Monitoring. Monitoring data is

required to assess compliance with the TMDL and to provide the basis for review and potential updates to the TMDL. In-lake and watershed monitoring activities were initiated by the LE/CL Nutrient TMDL Task Force in 2007.

In December 2010, the Task Force, in consultation with the Regional Board, revised the In-Lake Monitoring Program for Lake Elsinore and Canyon Lake. The revised program decreased the number of sample locations in these waterbodies, which allowed the Permittees to re-direct funds to in-lake project implementation. No changes were made to the Watershed Monitoring Program. In 2013, the Regional Board adopted the CNRP, which was prepared by the Urban Runoff Management Program to identify the program of implementation that the Permittees would follow to comply with applicable urban runoff WLAs. The CNRP requires continued implementation of watershed and lake monitoring to demonstrate compliance with the TMDL and document the effectiveness of implemented BMPs. The following sections provide an overview of findings to date from TMDL monitoring activities.

Watershed Monitoring Program

Watershed monitoring is conducted to determine nutrient loads into Canyon Lake from Salt Creek and the San Jacinto River, as well as the loads reaching Lake Elsinore from Canyon Lake overflows and the local watershed tributary to the Lake (**Figure 3-8**). Watershed monitoring was also historically conducted at Cranston Guard Station to characterize natural background water quality and in the San Jacinto River at Ramona Expressway just downstream of Mystic Lake, which retains runoff from most storm events in the upper watershed (overflows occur at an approximate10-15 year return period; this return period is steadily increasing as Mystic Lake continues to subside, thus increasing its capacity to capture Wet Weather runoff). U.S. Geological Survey flow gages at watershed monitoring stations provide the additional data necessary to develop models for the estimation of nutrient loading to the lakes (see Figure 3-7).

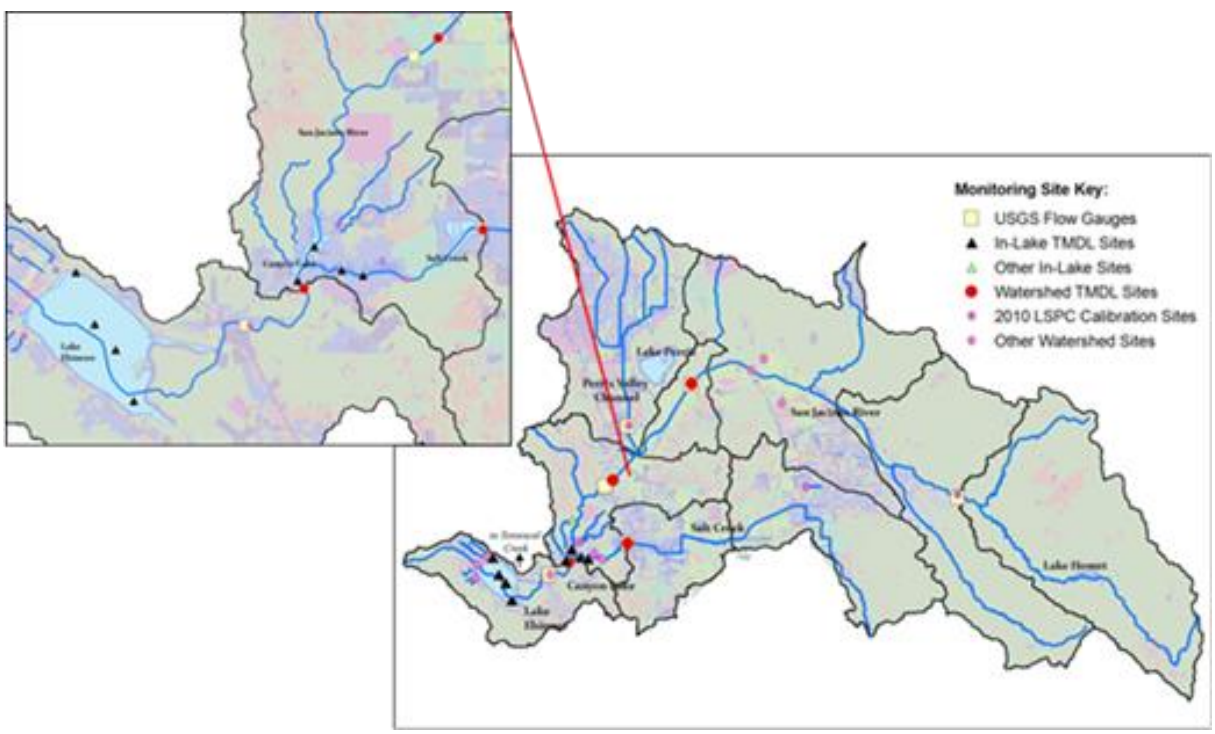

Figure 3-8. Watershed and In-Lake Monitoring Sites for the LE/CL Nutrient TMDLs

Samples have been collected from 16 storm events from FY 2007–2008 through FY 2012–2013 Wet Seasons. **Figures 3-9 and 3-10** show average total phosphorus and total nitrogen concentrations, respectively, in samples collected over each of these storm events. Nutrient concentrations during the peak of each storm event were higher. Generally, nutrient concentrations ranged from 0.3 to 1.5 milligrams per liter (mg/L) for total phosphorus and 1.5 to 4.0 mg/L for total nitrogen, exceeding numeric targets for the lakes during most storms. The greatest exceedance ratios were for total phosphorus. Two storm events generated significant nutrient loads and resulted in substantial sediment mobilization events (average event mean TSS concentrations were 12,965 mg/L and 2,539 mg/L). One event occurred on U.S. Forest Service land upstream of Lake Hemet in January 2010; the other event occurred in the San Jacinto River at the inflow to Canyon Lake in February 2011.

Comprehensive in-lake water quality monitoring was conducted in Lake Elsinore and Canyon Lake from 2006 through June 2012. In June 2012, the Task Force and Regional Board agreed to temporarily cease in-lake monitoring so that funds could be allocated to project implementation, which supported rapid implementation of an in-lake project and its necessary supporting studies. With this project well under way, the Task Force is currently in the process of preparing a new monitoring plan to support monitoring activities that will re-commence in 2015.

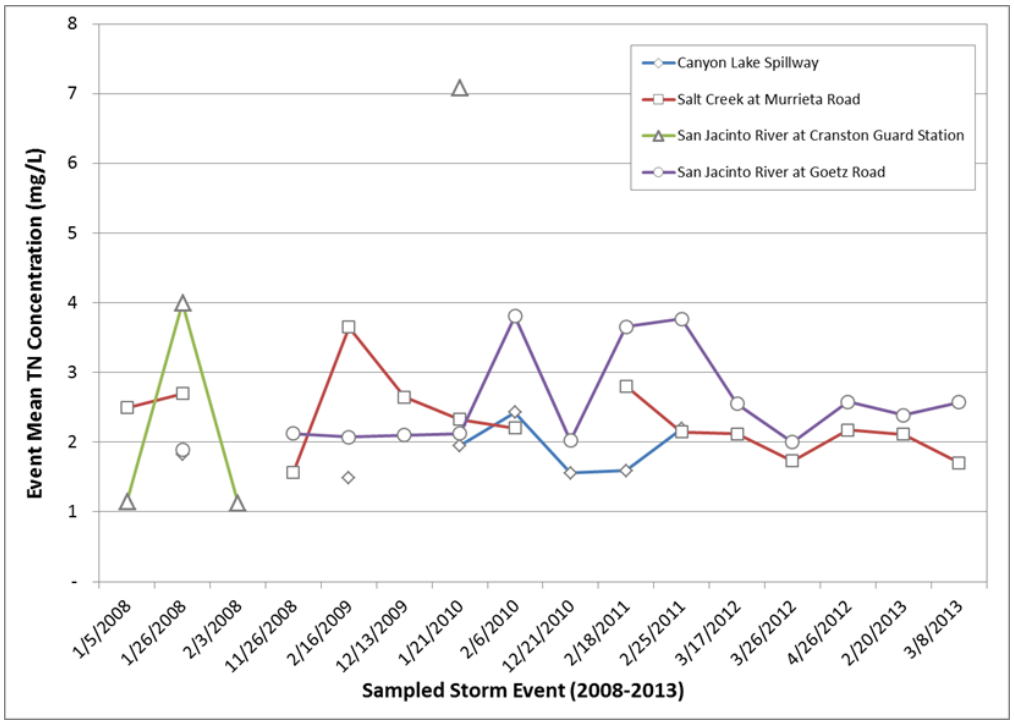

Figure 3-9. Average Total Nitrogen Concentration for Each Sampled Storm Event at the LE/CL Nutrient TMDL Watershed Monitoring Sites

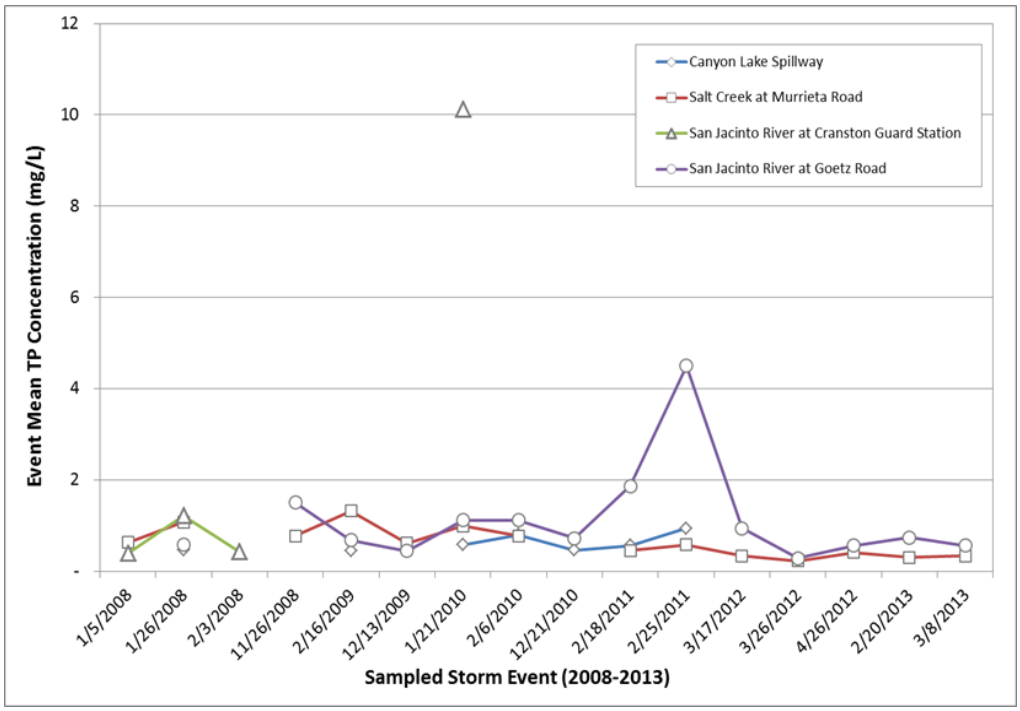

Figure 3-10. Average Total Phosphorus Concentration for Each Sampled Storm Event at the LE/CL Nutrient TMDL Watershed Monitoring Sites

In-Lake Monitoring Program

From 2006 to 2012, lake water quality samples were collected monthly from October through May, and biweekly from June through September. Samples were analyzed for nutrients and nutrient-related constituents, e.g., chlorophyll-*a*. Detailed findings are available in the LE/CL Nutrient TMDL Annual Water Quality Reports.[18] Following is a brief summary of key observations.

Figure 3-11 shows the locations of in-lake monitoring stations used to characterize water quality from 2006-2012. These locations included:

- *Lake Elsinore* – Initially, three stations were monitored in this lake. In 2007, this level of effort was reduced to one station (LEE2) in the middle of the lake.
- *Canyon Lake* – Samples were collected from four sampling locations: Stations CL07 and CL08 in the Main Lake Basin; Stations CL09 and CL10 in the East Bay.

[18] http://www.sawpa.org/collaboration/projects/lake-elsinore-canyon-lake-tmdl-task-force/; see the Monitoring webpage

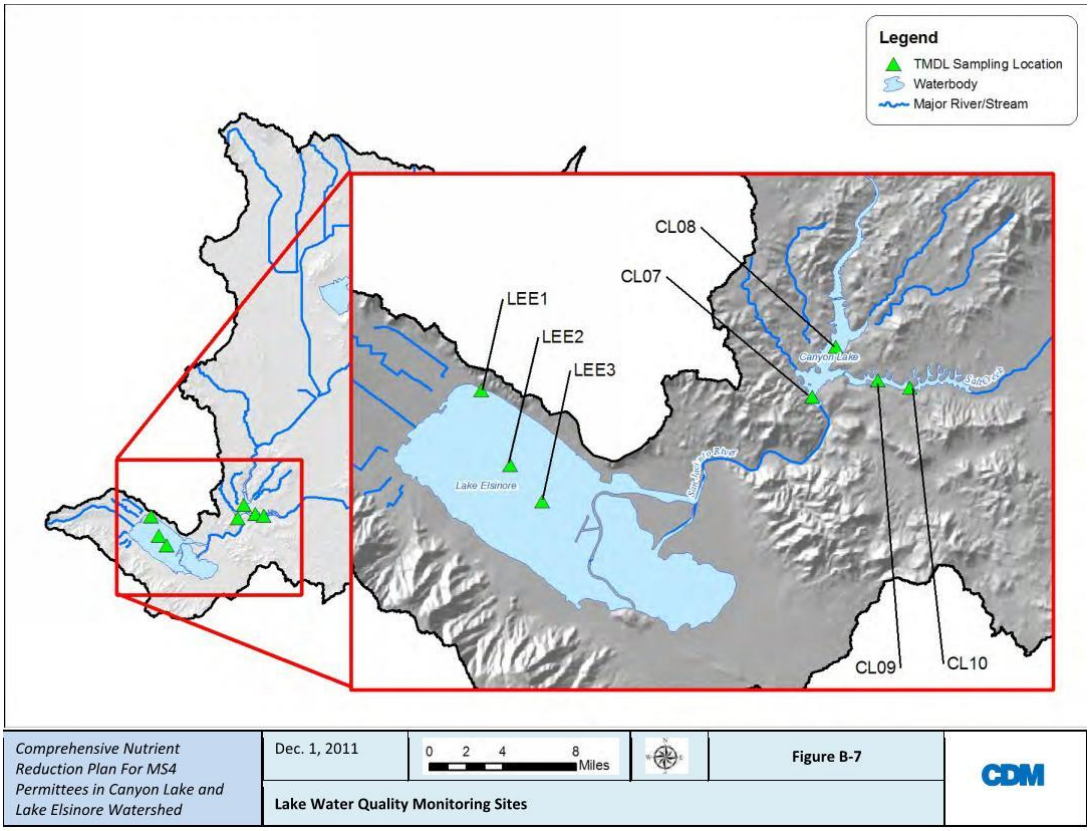

Figure 3-11. Lake Elsinore and Canyon Lake Monitoring Locations (Figure from CNRP).

Over the period of record, exceedances of both TMDL causal targets (nitrogen, phosphorus) and response targets (chlorophyll-*a*, dissolved oxygen, ammonia toxicity) were observed in both lakes. Time series plots of water quality constituents for both lakes show different patterns.[19] These differences are largely due to differences in hydrology (i.e., Canyon Lake receives runoff from upper watershed every year, but only spills to Lake Elsinore in moderately wet years) and lake depth (i.e., Canyon Lake is deeper and therefore experiences thermal stratification). Also, an aeration and mixing system is operated in Lake Elsinore, which inhibits thermal stratification and mixes dissolved oxygen across the water column. Thus, dissolved oxygen conditions in Lake Elsinore are in compliance with TMDL response targets.

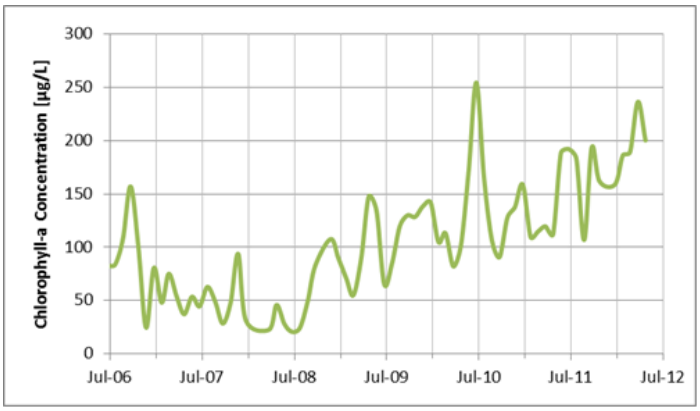

Figure 3-12. Average Monthly Chlorophyll-a Concentration in Lake Elsinore.

In Lake Elsinore, chlorophyll-*a* concentrations have gradually increased since 2006 (**Figure 3-12**). The lower concentrations in 2006–2008 have been attributed to the approximate 20-foot lake

[19] See CNRP Attachment B, Section B.4.5 for detailed summary of these water quality data; available at: http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/elsinore_tmdl.shtml,

level rise resulting from the FY 2004-2005 Wet Season.[20] The massive influx of stormwater in this Wet Season significantly reduced total dissolved solids (TDS) in the lake. This influx of lower salinity water served to improve TDS-sensitive zooplankton populations, the primary algae predators in Lake Elsinore. Beginning in 2008, dryer conditions coupled with evaporation resulted in a steady increase in TDS concentrations to a level known to reduce zooplankton reproduction rates (~1200 mg/L TDS).[21] The consequence was rising chlorophyll-*a* levels. With the prolonged drought continuing in Southern California, TDS and chlorophyll-*a* concentrations have continued to rise in Lake Elsinore.

Thermal stratification and seasonal Wet Weather nutrient loads combine to make algal blooms more seasonal in Canyon Lake (**Figure 3-13**). Algae blooms, typically with chlorophyll-*a* concentrations ranging from 50 – 150 micrograms per liter (µg/L), occur at two different times of the year:

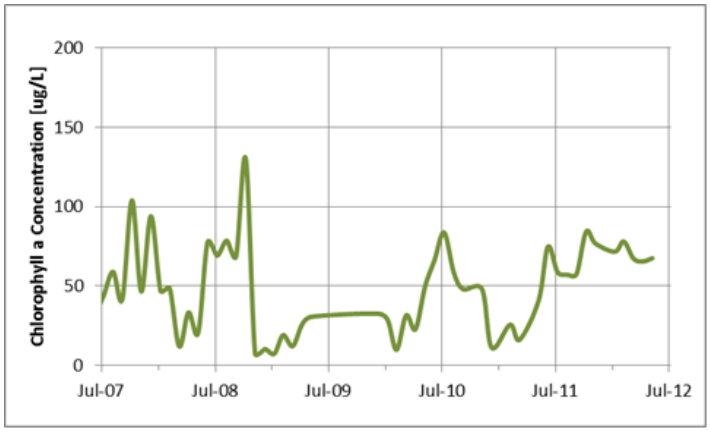

Figure 3-13. Average Monthly Chlorophyll-*a* Concentration in Canyon Lake.

- Late winter or early spring (most often in February) when temperatures begin to rise following Wet Weather events that have provided new bioavailable nutrients; and
- Late summer or early fall following lake turnover (most often in October) when internal sediment nutrient fluxes are mixed into the photic zone of the lake.

In Canyon Lake's Main Lake Basin, thermal stratification results in low dissolved oxygen conditions within the hypolimnion. Historically, fish kills have occurred as a result of the mixing of these lower dissolved oxygen waters with higher ammonia concentration throughout the water column.

The ratio of nitrogen to phosphorus (N:P) has been used to determine the limiting nutrient for algae growth in each lake. A ratio of N:P in excess of 7:1 indicates that phosphorus is likely limiting the growth of phytoplankton (algae), and nitrogen is limiting for ratios less than this threshold.[22] Very different N:P ratios for Lake Elsinore and Canyon Lake indicate that Lake Elsinore is mostly phosphorus limited, while Canyon Lake is mostly nitrogen limited.[23]

The CNRP relied on the above water quality findings as a baseline for developing a plan for the Urban Runoff Management Program to comply with TMDL WLAs in both lakes. The CNRP relies on a three-layered strategy that is composed of watershed BMP deployment, in-lake nutrient management, and

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[20] Horne, A.J., 2009. *Three Special Studies on Nitrogen Offsets in Semi-Desert Lake Elsinore in 2006-08 as Part of the Nutrient TMDL for Reclaimed Water Added to Stabilize Lake Levels*, submitted for the LESJWA, June 20, 2009

[21] Veiga-Nascimento, R.A. 2004. *Water Quality and Zooplankton Community in a Southern California Lake Receiving Recycled Water Discharge*. Master's Thesis. University of California, Riverside, September 2004

[22] Schindler, D.W., Hecky, R.E., Findlay, D.L., Stainton, M.P., Parker, B.R., Paterson, M.J., Beaty, K.G., Lyng, M., and Kasian, S.E.M. 2008. *Eutrophication of lakes cannot be controlled by reducing nitrogen input: Results of a 37-year whole-ecosystem experiment*. Proceedings of the National Academy of Sciences: 105: 11254-11258

[23] See CNRP Figures B-11 and B-12; available at: http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/elsinore_tmdl.shtml,

actions by non-MS4 entities with allocated loads to achieve compliance with TMDL WLAs and LAs. For the Permittees, implementation of the CNRP through ongoing execution of the alum project (see Section 3.3.2) and watershed BMPs and implementation of LE/CL TMDL priorities for the term of the next MS4 permit (see Section 4.1.2) are expected to result in TMDL compliance.

Alum Treatment Effectiveness Monitoring

As part of CNRP implementation, the Permittees named in the LE/CL Nutrient TMDL are co-sponsoring and managing the Alum Treatment Project in Canyon Lake. Five applications are scheduled to take place within the lake. This project includes a monitoring program to evaluate the effectiveness of the alum applications at removing phosphorous and reducing algal concentrations. Water quality monitoring takes place at four in-lake stations before and after each alum application. The objective of the monitoring program is to collect water quality data throughout the duration of the Alum Treatment Project and evaluate the cumulative effectiveness of the alum treatments after the last application is completed in September 2015. Preliminary data indicates that the alum treatments are performing as expected. However, since only two of the five planned applications have been completed, it is too early to judge the full effectiveness of this project on water quality. Nevertheless, early results suggest that Canyon Lake will likely meet the targets for Total Phosphorus and Chlorophyll-a by end of 2015 as specified in the TMDL. A detailed report documenting the effectiveness of alum treatments will be submitted to the Regional Board after the project is completed.

3.3 Urban Runoff Management Program Effectiveness

Program effectiveness assessment can be challenging, given that the outcomes of many programs implemented under the 2010 Permit result in process-oriented data, e.g., numbers of construction inspections, number of PEO impressions, or number of IC/ID investigations. In 2013, the Urban Runoff Management Program finalized its Program Effectiveness Assessment Guidelines (see DAMP Appendix O). These guidelines include an Overall Urban Runoff Management Program Effectiveness Assessment Strategy, which is based on guidance developed by CASQA in 2007. This guidance relies on a two-part assessment that, when combined, include six evaluation levels (**Figure 3-14**).

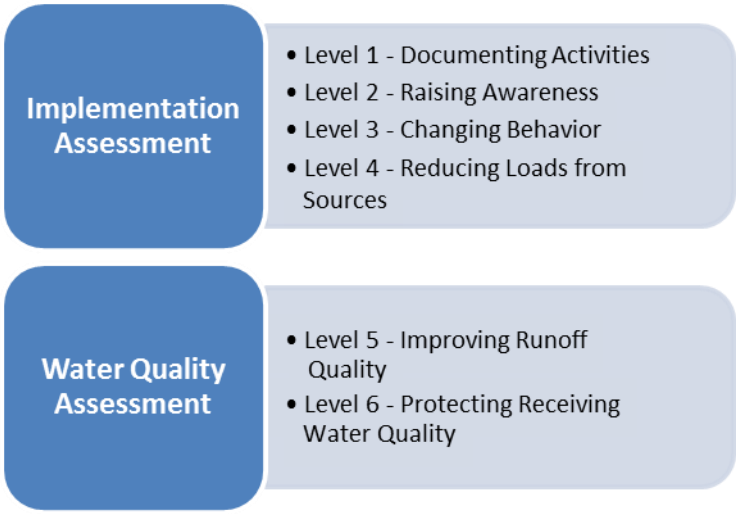


Figure 3-14. CASQA Effectiveness Levels

- *Levels 1-4* are part of the Urban Runoff Management Program Implementation Assessment, which focuses on reducing pollutant loads through changing behavior, increased awareness, reducing pollutant sources, and documenting activities. All are indirect measurements in that the underlying presumption is that these actions will be manifested in improved quality of urban runoff and protection of receiving waters.

- *Levels 5-6* are part of the Water Quality Assessment, which provides a direct evaluation of the effectiveness of the Urban Runoff Management Program activities by looking directly at water quality benefits, e.g., actual improvements in the quality of urban runoff or reductions in pollutant loads, or demonstrating protection of a beneficial use previously shown to be impacted from urban runoff.

Using the DAMP guidelines, the following sections demonstrate the effectiveness of the Urban Runoff Management Program. Program implementation activities (Levels 1 through 4) are substantive and annual reports document how these activities have raised awareness, changed behavior, or reduced pollutant loads from potential sources. The best evidence of an effective program are the Level 5 and 6 assessments, which demonstrate how the Urban Runoff Management Program is directly improving water quality and protecting Receiving Water Beneficial Uses. As discussed above, program resources are increasingly shifting from process-oriented outcomes to implementation-oriented outcomes, where the most important water quality benefits will be achieved. Following is a discussion of the status of the Urban Runoff Management Program effectiveness and expectations for increased effectiveness in the future as the program continues its emphasis on a find-it-and-fix-it strategy to manage water quality.

3.3.1 Implementation Assessment

The Urban Runoff Management Program conducts an annual program evaluation as part of the preparation of its Annual Report.[24] This evaluation relies on the program effectiveness guidelines as described in Appendix O of the DAMP. The purpose of this assessment is to identify needed changes to the DAMP to ensure that the program evolves towards increasing effectiveness, e.g., in reducing pollutant loads from potential sources. The most recent assessment is provided in Section 12 of the 2012 – 2013 Annual Report, the highlights of which are summarized below. Additional metrics that document program activity are available in the Annual Reports submitted by the Urban Runoff Management Program. Highlights from 2012 – 2013 include:

- *IC/ID Program (2012 – 2013)* – **Figure 3-15** summarizes the effectiveness of the IDDE Program in the Permit Area (implementing Section IX of the 2010 Permit and originally reported in Annual Report Table 12-2). The number of illegal discharges, dumping and spill events is steadily declining. For the 2012-2013 reporting period, 1,971 IC/ID reports were received and evaluated (i.e., investigated). It is notable that only a small number of these incidents required enforcement action; most often the responsible party was unaware that what they are doing was prohibited and they were receptive to correcting identified issues. Moreover, where follow-up sampling was conducted to further evaluate potential water quality concerns, none of the reports showed that criteria were exceeded or follow-up enforcement was required. Experience with this program over the years has shown that it is very effective at reducing pollutants reaching the MS4. The effectiveness of the program is highlighted by the fact that the "locate and mitigate" techniques utilized by field personnel implementing the IC/ID Program served as the model for the Tier 2 bacterial indicator source assessments, being implemented as part of CBRP implementation (see Section 3.2.1).

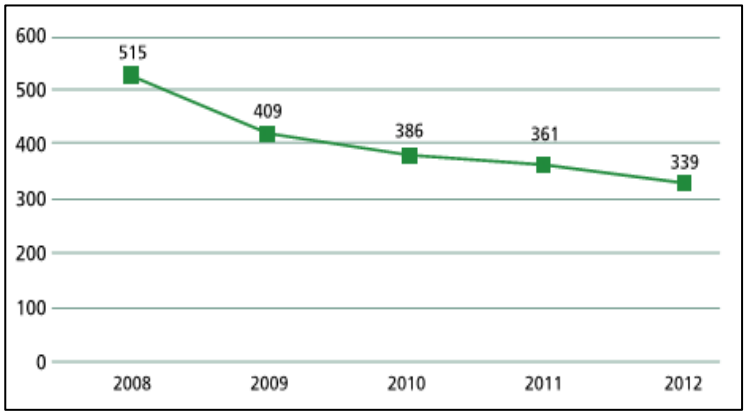


Figure 3-15. Stormwater Quality Illegal Discharge, Dumping, and Spill Events, Riverside County, 2008 – 2012 (Source: Riverside County 2013 Indicators Report)

- *Construction Inspections (2012 – 2013)* – Table 6-1 in the Annual Report summarizes the number of construction inspections conducted in the Permit Area in 2012-2013 that required some enforcement action. The most common types of enforcement were verbal or written warnings. The number of issued notices of violation was very low and no cease and desist orders were necessary. This pattern also was true of previous years under the 2010 Permit. These results indicate that urban runoff management program inspectors are actively engaged in conducting inspections and that the actual number of documented violations which could lead to a water quality concern is low.

[24] The most recently available Annual Report for 2012-2013 is available at: http://www.floodcontrol.co.riverside.ca.us/NPDES/SantaAnaWS.aspx

- *Source Reduction Activities (2012 – 2013)* – A review of the programs where the removal of waste was quantified (e.g., through street sweeping, waste removal from Permittee facilities, or residential programs) shows that as in previous years, Permittees are actively reducing the potential for waste and pollutants to be discharged to Receiving Waters (**Table 3-2**; **Figure 3-16**). These statistics show the benefits of full implementation of MS4 inspection activities and community programs that offer alternative ways to dispose of waste. Given the volume of waste removed each year and thus potential sources of pollutants to receiving waters, these programs will continue at their current high level of implementation.

Figure 3-16. Catch Basin Cleaning in Riverside County MS4

Table 3-2. Effectiveness of Source Reduction Activities in the Santa Ana Region (2012-2013)

Metric	Outcome
Estimated tons of Waste removed by street sweeping	10,806 tons
Estimated tons of Waste removed from open channels	1,856 tons
Estimated tons of Waste removed from storm drain inlets	2,292 tons
Estimated tons of anthropogenic trash removed from MS4 facilities	2,879 tons
Tons of Waste collected at Household Hazardous Waste Information Exchange or Anti-freeze, Batteries, Oil and Paint program events	659 tons
Gallons of used oil collected	363,087 gallons

The above highlights represent only a snapshot of program activities that are effectively removing or reducing potential sources of pollutants in urban runoff. Information regarding other programs designed to document urban runoff management activities, raise awareness or change behavior is contained in the Annual Reports. These programs, which are described in the DAMP and programmed for implementation through each Permittee LIP, will continue to be implemented in the next MS4 permit term.

3.3.2 Water Quality Assessment

As discussed above, the best means to demonstrate program effectiveness is to directly evaluate the quality of urban runoff (Level 5 evaluation) and the degree to which the program is implementing projects or program activities that are or will demonstrably protect receiving water quality (Level 6). Each of these elements are discussed below with examples provided to demonstrate how the Urban Runoff Management Program has shifted its emphasis towards tangible actions that directly improve water quality.

Improving Urban Runoff Quality

Section 3.2.1 provided a summary of long-term trends observed for water quality in the SAR over more than 20 years. While there are some constituents that remain POC (e.g., bacterial indicators and nutrients) at certain locations, water quality has generally either remained stable or improved over the period. These water quality trends occurred over a period of time when the population of the SAR has steadily increased. Figure 3-2 shows increased population density within each of the drainage areas represented by an MS4 outfall monitoring location over a 20-year period.

As a whole, population in the SAR has increased significantly, by about 45% just since 2002 (**Table 3-3**). At the same time population countywide has increased by about 48%.[25]

Table 3-3. Long-term Population Growth in the Santa Ana Region (2002-2013)

Year	Estimated Permit Area Population[1]	Estimated Countywide Population[2]
2002	1,104,362	1,655,291
2006	1,237,388	1,975,913
2007-08	1,332,531	2,049,902
2008-09	1,463,840	2,102,742
2009-10	1,486,585	2,140,626
2010-11	1,522,739	2,179,692
2011-12	1,581,393	NA
2012-13	1,600,274	2,264,879

[1] 2002 and 2006 estimates from 2007 ROWD; remaining estimates from Annual Reports

[2] Estimates for 2002 through 2010-2011 from California Department of Finance E-4 population estimates for January 1 of each year; 2012 estimate from U.S. Census Bureau estimate.

NA = No data available

While it can be reasonably assumed that the rate of population growth is coincidental to the rate of urbanization, further corroboration can be seen in the record of construction permits issued over the period from 1993 to 2013 (**Figure 3-17**). This period of elevated construction permit issuance coincides with the period of rapid population growth (see Figure 3-2; Table 3-3). This growth lasted until approximately 2009 when the economic downturn began. Permit issuance is now experiencing a rebound as can be seen by the positive slope of the graph from 2012 into 2014. Even with this period of rapid urbanization, long-term water quality trends are generally positive, which the Permittees believe reflects the effectiveness of the Urban Runoff Management Program. This information shows a remarkable outcome and strong trend that may be evidence of the effectiveness of the Urban Runoff Management Program.

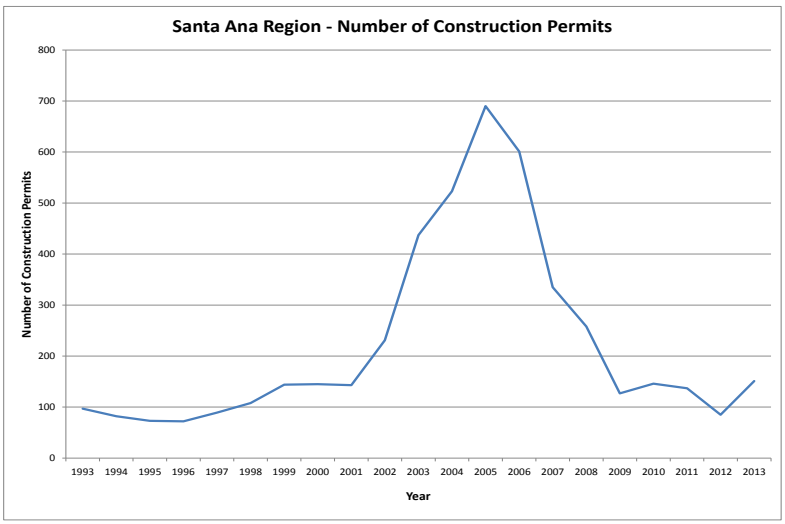


Figure 3-17. Number of Construction Permits Issued (1993 - 2013) (Source: Regional Board)

While it may be reasonably assumed that the rate of population growth is coincidental to additional evidence that urban runoff management is effective in improving water quality in the SAR is the fact that the contribution of urban runoff from MS4 outfalls to dry weather flows have declined markedly over the period of record (see Figure 3-2 and discussion in Section 3.2.1). This change has occurred regardless of wet and dry rainfall cycles and rapid urbanization. In fact, the time period over which MS4 outfalls were increasingly found to be dry coincides with the period of most rapid development. This is a

[25] Based on U.S. Census Bureau information

significant finding, given that increased urbanization, with attendant increased irrigation activity and runoff from residential development, should have increased dry weather MS4 flows.

The reasons for the decline in dry weather discharges are likely varied, but increased emphasis on water conservation and use of on-site BMPs to treat and retain water onsite are factors, which reflects implementation of an effective Urban Runoff Management Program. These benefits are expected to accrue at a more rapid pace in the future with the implementation of LID principles on all future PDPs.

The expectation for increased urban runoff capture in the future is significant. The Urban Runoff Management Program's revised WQMP was approved in October 2012. This revision incorporated LID green infrastructure requirements that fundamentally change how urban runoff is managed both during dry and wet weather conditions. This program change coupled with increased emphasis on regional water management (see Section 3.3.3 below) is expected to further reduce the potential for the MS4 to contribute urban runoff to receiving waters. For example, in just the first year of LID implementation, the Urban Runoff Management Program documented 195 acres of projects where LID-based BMPs consistent with the new WQMP requirements were completed.

Protecting Receiving Water Quality

Overview

Given that receiving water quality has been shown to be improving or stable for a number of constituents, the potential for urban runoff to be a source of receiving water impairment is likely limited to only limited pollutants, e.g., bacterial indicators and nitrogen. TMDLs have already been established to address water quality impairments caused by these pollutants, the MSAR Bacterial Indicator TMDL and LE/CL Nutrient TMDLs. It is therefore critical that the Urban Runoff Management Program focus its efforts on TMDL implementation activities set forth in the Regional Board-adopted CNRP and CBRP for the LE/CL and MSAR Watersheds, respectively. The implementation of these plans, which describe ongoing or planned implementation activities designed to achieve compliance with TMDL WLAs, are key to having an urban runoff management program that effectively protects Receiving Water quality. In the limited amount of time that has passed since the adoption of these plans, great strides have been made at protecting Receiving Water quality. The following sections provide examples of implementation activities directed towards protecting receiving water quality.

MSAR Bacterial Indicator TMDL

Since at least 2008 and continuing with the adoption of the CBRP in 2012, the Urban Runoff Management Program has been conducting a series of source evaluation assessments incorporating techniques borrowed from the IDDE Program to identify controllable sources of bacterial indicators. Where human sources of bacterial indicators have been observed, investigations have been conducted to find and mitigate such sources. **Case Study 1: Bacteria Source Evaluation Projects** in Section 3.4.1 provides a summary of CBRP implementation in action, which involves not just data collection but also corrective action when an exceedance of a Water Quality Objective has been identified. This locate and mitigate strategy has been effective in improving protection of receiving waters. As will be described in Section 4.1.1, the Urban Runoff Management Program will continue to target program resources on correcting controllable sources of bacterial indicators during the next MS4 Permit term. In addition, the Permittees are devoting increased resources to develop and implement regional retrofit projects that provide multiple benefits, including improved water quality, dry weather flow mitigation, and urban runoff capture. These opportunities have the potential to provide multiple water quality benefits.

LE/CL Nutrient TMDLs

Under the CNRP, the Permittees are directing resources to the implementation of projects to mitigate nutrients in Canyon Lake. **Case Study 2: Canyon Lake Alum Treatment Project** in Section 3.4.2 describes this important TMDL implementation project, which is a keystone project in the CNRP. The alum project was initiated in early 2013 even before the CNRP was adopted by the Regional Board. To date, water quality monitoring data and field observations indicate that this project has been effective in improving water quality in Canyon Lake. Through the LE/CL Nutrient TMDL Task Force, the Permittees within the LE/CL Watershed will continue to implement this project through the next MS4 Permit term, assess the benefits achieved, and determine what additional steps (if any) may be required in order to protect the health of the lake. Section 4.1.2 describes further how the Urban Runoff Management Program will continue to implement the CNRP during the next MS4 Permit term.

Other Potential Pollutants of Concern

Other potential POC in the SAR can be identified through the findings of the water quality monitoring program (e.g., as summarized through Section 3.2.1) or through review of the 303(d) iList applicable to the SAR. **Table 3-4** lists the waters identified as impaired on the State's 303(d) List.[26] The right column in Table 3-4 describes anticipated Urban Runoff Management Program activity during the next permit cycle. A number of these listings will be addressed through continued implementation of the CNRP and CBRP and ongoing bacterial indicator monitoring activities with the Regional Board. Pollutants, such as PCBs, in Lake Elsinore are legacy pollutants with no currently known source in urban runoff. The metals, copper and lead, have the potential to be delisted in the next impairment listing cycle (2016) once a complete evaluation of the total recoverable versus dissolved fraction of these metals is completed. If any impairment is still present and associated with urban runoff, BMPs are already being implemented statewide to reduce sources of these metals in urban runoff. For example, vehicular traffic is the primary source of these metals in the urban environment: copper, present in vehicular brake pads, and lead, used in vehicle wheel weights. The State of California is addressing these metals through new statutes. In 2010, the State adopted Senate Bill 346, which, when fully implemented by the California Department of Toxic Substances Control, will nearly eliminate copper use in brake pads, which will in turn greatly reduce this urban source of copper in wet weather urban runoff. Similarly, the State adopted a law that prohibits the manufacture, sale, or installation in California of a wheel weight that contains more than 0.1% lead. Over time, the amount of lead attributable to this source during wet weather is expected to decline.

Recreational Use Basin Planning Activities

Since 2003, the Urban Runoff Management Program has invested substantial program resources working collaboratively with the Regional Board, non-governmental organizations (NGOs), and sister stormwater agencies on basin planning activities. This investment has directly supported the Regional Board's efforts to implement effective water quality programs and will have a direct impact on the overall effectiveness of the Urban Runoff Management Program for protecting receiving water quality well into the future.

[26] The mostly recent State Water Board and EPA-approved 303(d) list for California is based on the State's 2010 Integrated Report.

Table 3-4. Waterbodies Listed as Impaired in the Santa Ana Region of Riverside County[1].

Waterbody	Pollutant	Potential Source	TMDL Date	Anticipated Urban Runoff Management Program Activity
Canyon Lake (Railroad Canyon Reservoir)	Nutrients	Nonpoint Source	2005	Continued CNRP implementation
	Pathogens	Nonpoint Source	2006	Continued coordination with Regional Board data collection efforts to delist[2]
Lake Elsinore	Nutrients	Unknown Nonpoint Source	2005	Continued CNRP implementation
	Organic Enrichment/ Low Dissolved Oxygen	Unknown Nonpoint Source	2005	Continued CNRP implementation
	Polychlorinated Biphenyls (PCBs)	Source Unknown	2019	Legacy pollutant; no known source of PCBs in discharge of urban runoff.
	Sediment Toxicity	Source Unknown	2021	Anticipated to be addressed through implementation of Lake Elsinore Nutrient TMDL, including CNRP activities
	Unknown Toxicity	Source Unknown	2007	Anticipated to be addressed through implementation of Lake Elsinore Nutrient TMDL, including CNRP activities
Lake Fulmor	Pathogens	Unknown Nonpoint Source	2019	Continue coordination with Regional Board data collection efforts to delist
Goldenstar Creek	Indicator Bacteria	Source Unknown	2021	Continue coordination with Regional Board data collection efforts to delist
Mill Creek (Prado Area)	Nutrients	Agriculture, Dairies	2019	Listing addressed by the 2004 Basin Plan Amendment that included WLA for TIN; likely already addressed through existing general dairy waste discharge permit that prohibit discharge for 25-year, 24-hour storm events; likely to be delisted in 2016
	Pathogens	Dairies	2007	CBRP Implementation
	TSS	Dairies	2019	Likely already addressed through existing general dairy waste discharge permit that prohibit discharge for 25-year, 24-hour storm events; listing will be re-evaluated in 2016
Santa Ana Reach 3	Copper (wet season)	Source Unknown	2021	Expected to be delisted in 2016 using multi-stakeholder dataset that will be used to develop site-specific total recoverable/ dissolved metals translator
	Lead[3]	Source Unknown	2021	Expected to be delisted in 2016 using multi-stakeholder dataset that will be used to develop site-specific total recoverable/ dissolved metals translator
	Bacterial Indicators	Dairies	2007	Continued CBRP Implementation
Santa Ana Reach 4	Bacterial Indicators	Nonpoint Source	2019	Continue coordination with Regional Board data collection efforts to delist
Temescal Creek, Reach 1	pH	Source Unknown	2021	Elevated pH in this waterbody is believed to be natural; not caused by urban runoff
Temescal Creek, Reach 6 (Elsinore Groundwater subbasin boundary to Lake Elsinore Outlet)	Bacterial Indicators	Source Unknown	2021	Continue coordination with Regional Board data collection efforts to delist

Table 3-4. Waterbodies Listed as Impaired in the Santa Ana Region of Riverside County[1].

Waterbody	Pollutant	Potential Source	TMDL Date	Anticipated Urban Runoff Management Program Activity

[1] Excerpted from http://www.swrcb.ca.gov/santaana/water_issues/programs/tmdl/docs/303d/2010_303d.pdf

[2] Regional Board has indicated it is collecting data to determine which waterbodies with Bacterial Indicator listings can be considered for delisting in next 303(d) listing cycle.

[3] This listing resulted from USEPA action; the State Water Board did not include this constituent on the 303(d) list.

On June 15, 2012, the Regional Board adopted the BPA (Resolution R8-2012-0001) that establishes revised requirements for the protection of recreational uses in the SAR and replaces the REC-1 Bacterial Indicator Water Quality Objectives with *E. coli* Water Quality Objectives. Regional Board staff developed this BPA in collaboration with the SWQSTF. The BPA was approved by the State Water Board on January 21, 2014 and by the California Office of Administrative Law (OAL) on July 2, 2014. The BPA has now been submitted to the USEPA for approval. The USEPA is expected to act on the adopted BPA by the end of 2014. The outcome will be a revised approach for ensuring protection of recreational uses in the SAR that supports the CBRP and affects how compliance with wet weather TMDL WLAs will be evaluated (e.g., taking into account application of a high flow suspension).

In anticipation of full implementation of the BPA, the SWQSTF has begun work on a Regional Monitoring Plan (RMP) that will be coordinated with existing bacterial indicator-related monitoring activities within the SAR including those conducted under the CBRP. The Urban Runoff Management Program will continue to invest resources in SWQSTF activities given the direct application to MS4 permit implementation and future evaluations regarding the effectiveness of the Urban Runoff Management Program.

3.3.3 Urban Runoff Management Program Innovation

While the Permittees continue to work collectively to implement compliance programs under the 2010 Permit, many of the individual Permittees are actively involved in projects that not only benefit urban runoff quality in the SAR, but also address the need for integrated water resource management. While some of these activities are not counted as MS4 permit successes because they are being implemented independently of the 2010 Permit, they are discussed to illustrate that the Permittees are working with each other and non-MS4 agencies to ensure the proper management of urban runoff, including its use as a resource.

Integrated Water Resource Projects

In parallel with implementation of the Urban Runoff Management Program and TMDL requirements, the Permittees are actively engaged in local or regional projects that address both water quality benefits and other environmental benefits including water supply augmentation and habitat restoration. **Table 3-5** provides a summary of projects being implemented or expected to be implemented in the near future (funding has been committed to the projects). An additional important integrated water resource project in the SAR is the Lake Mathews Drainage Water Quality Master Plan, which is discussed separately in **Case Study: Lake Mathews Drainage Water Quality Master Plan** in Section 3.4.3.

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
Day Creek Channel, Stage 6	District	The Day Creek Channel, Stage 6, in addition to including 2,700 linear feet of concrete rectangular channel (Reach 1) and 1,100 linear feet of rock lined channel (Reach 2), includes a 29'Wx184'L bioretention facility. The bioretention facility captures a portion of the urban runoff prior to discharge to the Santa Ana River and removes pollutants by filtering the stormwater through plants adapted to the local climate and soil moisture.	Water Quality Dry Weather and low flow diversion Stormwater capture and infiltration TMDL compliance support Habitat Habitat maintenance	Project Complete
San Sevaine Channel, Stage 7	District	San Sevaine Channel, Stage 7 includes improvements to an existing flood control channel and new construction for a realigned portion of the channel. This project, which consists of 5,150 feet of engineered channels also includes a 6.61-acre habitat/water quality basin. The basin was created adjacent to the channel so that the low flow from the main channel could be directed to meander through the basin. The basin was graded and seeded to allow natural riparian and wetland habitat to develop using urban runoff as a water source.	Water Quality Dry Weather and low flow diversion Stormwater capture and infiltration Habitat Creates habitat for wildlife Habitat maintenance	Project Complete
Southwest Riverside Line C	District	This project which is located generally south of Dufferin Avenue, east of Lyon Avenue and west of Old Heritage Road, includes a0.75-acre mitigation area. Water enters the basin via an energy dissipater at the upstream end, which slows the velocity of the water and allows the water to run in sheet flow across the basin bottom. The basin floor has a slope of less than 1%, which allows for the slow movement of water, providing sufficient hydrology for hydrophytic vegetation. The mitigation area has now been covered with fresh water marsh, riparian and upland vegetation.	Water Quality Stormwater capture and infiltration Habitat Creates habitat Habitat maintenance	Project Complete
Gavilan Hills Smith Road	District	The District is responsible for the construction, maintenance, and operations of the Gavilan Hill-Smith Road Channel and Debris Basin Habitat Mitigation Project. The Gavilan Hills-Smith Road Channel and Debris Basin is a major flood control facility in the Lake Mathews area. The project consists of creating and enhancing approximately 8.3 acres of Riversidian sage scrub and riparian habitat (APN 287-170-009) located at the end of Smith Road approximately 3,000 feet south of Cajalco Road in the unincorporated community of Lake Mathews.	Water Quality Stormwater capture and infiltration Habitat Creates habitat Habitat maintenance	Project Complete

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
Kayne Street Storm Drain	District	As mitigation for the Kayne Street Storm Drain project, the District is allowing approximately 0.05-acre of the basin area to re-vegetate with native riparian vegetation 12 inches or greater in height. Riparian species included willow or mulefat, with percent cover of at least 30%.	Water Quality Stormwater capture and infiltration Habitat Creates habitat Habitat maintenance	Project Complete
Nason Basin	District	As mitigation for the Nason Basin Project, the District established a Reduced Maintenance Area (RMA) of 0.65 acres. Maintenance within the RMA must be avoided unless there is at least one foot of accumulated sediment within the RMA. Additionally, the avoidance of maintenance has resulted in an abundance of wildlife within the RMA including various species of birds, tadpoles and dragonflies.	Water Quality Stormwater capture and infiltration Habitat Creates habitat for wildlife Habitat maintenance	Project Complete
Gunnerson Pond	District	The project consists of constructing an emergent freshwater marsh in the portion of the project area immediately north of Highway 74 (Riverside Drive) and a Cottonwood Riparian community in the portion of the project area immediately south of Highway 74. Construction of the emergent freshwater community has involved excavation of soil to create an open water pond with a 1.7 acre island, planting wetland vegetation on the perimeter of the pond, and planting trees to create additional riparian community along Highway 74.	Water Quality Stormwater capture and infiltration Habitat Creates habitat for wildlife Habitat maintenance	Project Complete
Lake Elsinore Outlet Channel Mitigation Area	District	As part of the Lake Elsinore Outlet Channel project, which is an improved unlined trapezoidal open channel approximately 2.5 miles in length running from Lake Elsinore (the lake) to Riverside Drive, approximately 20 acres of willow woodland riparian habitat have been acquired for reservation. This vegetation provides nesting and foraging habitat for the least Bell's vireo (*Vireo bellii pusillus*), a federal and State-listed endangered species Operation and maintenance responsibilities will require local residents to maintain an unobstructed flow path by periodically grading and clearing the channel and repairing perimeter fences.	Water Quality Stormwater capture and infiltration Habitat Creates habitat for wildlife Habitat maintenance	Project Complete

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
Soboba Settlement Recharge Program	EMWD City of Hemet City of San Jacinto Lake Hemet MWD	As part of the adjudicated settlement of the Soboba Tribe Settlement Agreement. (*Soboba Band of Luiseno Indians v. Metropolitan Water Districts of Southern California*, a Watermaster for the basin was established and a 7,500AFY recharge program was commenced in the Hemet / San Jacinto Ground Water Management Zone. A recharge system was established in the San Jacinto River south of the Lake Park Drive Bridge. This project uses both stormwater and imported State Water Project to meet the recharge requirements.	Water Conservation Provide additional groundwater recharge by promoting infiltration.	Operational since 2013
Mill Creek Wetlands	City of Eastvale – (Lines A and B in (western part of Eastvale drain to Cucamonga Creek) San Bernardino County MS4 Permittees in Mill-Cucamonga Creek Watershed	Dry Weather Flow: Captures and diverts a portion of Dry Weather flow from the downstream end of the concrete-lined channel that drains the entire watershed upstream of the Mill-Cucamonga Creek at Chino-Corona Road (WW-M5) MSAR Bacterial Indicator TMDL compliance monitoring site to a debris basin northwest of the Chino-Corona Bridge over Mill-Cucamonga Creek and then under Chino Corona Road into a series of basins. The basins are to be operated as free surface wetlands during Dry Weather to provide a hydraulic residence time of 7 days, which provides potential for reduction of Bacterial Indicators. Treated Dry Weather flows are discharged back to Mill-Cucamonga Creek, about 0.5 miles downstream of Chino-Corona Road. Wet Weather: During wet weather, as water levels rise within the basins, they will function as extended detention basin or wet ponds. Even though the project is within San Bernardino County, it benefits Riverside County. Eastvale Line A and Eastvale Line B (western portion of Eastvale) both drain to Cucamonga Creek.	Water Quality Treatment of portion of dry weather flows Functions as extended detention basin BMP or wet ponds BMP during Wet Weather Pollutant removal effectiveness ranges from 50% to 85% (based on the literature values) Habitat Creates wetland habitat for wildlife	Construction expected to be soon
Lakeland Village Master Drainage Plan	District	The Lakeland Village Master Drainage Plan (MDP) study area encompasses 13 square miles that includes 16 watersheds. Runoff originating from these watersheds generally flows northeasterly, across Grand Avenue (the community's principal thoroughfare) and into Lake Elsinore. Existing land-use within the study area is predominantly residential or vacant open space. The watersheds in the Lakeland Village area are considered to have high debris production potential and the area has historically experienced excess debris deposition. When fires occur within the steep canyons, vegetation is destroyed that leaves the soil more susceptible to erosion. During high intensity rainfall events, the debris originating from fires along with eroded sediment is swiftly carried downstream towards Lake Elsinore. Lake Elsinore is currently listed as a 303(d) impaired waterbody. The Regional Board has identified nutrients, specifically nitrogen and phosphorous, as the principal cause of this impairment. Very few, if any, of the existing developments within the Lakeland Village area were required to implement water quality BMPs as a condition of their development. Thus,	Water Quality Dry Weather and low flow diversion Habitat Minimize impacts to potentially sensitive areas	Comment period for the Draft EIR has ended. The District is currently working on the response to comments. Once completed, the MDP and EIR will go to the Board of Supervisors for approval.

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
		"first flush" events typically collect and carry trash, dirt, and other pollutants directly to the lake. Addressing the area's urban runoff will help to improve the existing water quality of Lake Elsinore.		
Brine Line Protection	District Santa Ana Watershed Project Authority (SAWPA) U.S. Army Corps of Engineers (USACE) Other Agencies	SAWPA Inland Empire Brine Line (Brine Line) is a 48" diameter pipe that conveys primarily high saline, non-domestic wastewater from industrial dischargers and municipal desalter facilities in Riverside and San Bernardino Counties to the Orange County Sanitation District wastewater treatment facilities. The Brine Line is a key component in improving water quality and expanding reclaimed water use within the two counties. The USACE Santa Ana River Mainstem Project raised the crest of Prado Dam 28 feet and constructed new outlet works that have increased discharges to the Santa Ana River up to 30,000 cfs. These flows may result in lateral erosion and scour, which could damage the Brine Line and ultimately the environment. To protect the Brine Line and the environment, a project consisting of the installation of approximately 2,220 LF of AZ26-700 sheet piles with a width approximately two feet and tiebacks spaced approximately every 10 feet on center will be built to reduce the likelihood of erosion and scour.	Water Quality Operation of the Brine Line improves water quality in watershed. Prevention of potential releases of wastes to the environment. Water Conservation Expand reclaimed water use Habitat Habitat maintenance Minimize erosion and scour	District is paying for the design, construction and land acquisition
Bautista Creek Channel – Recharge Basins	District Lake Hemet MWD	This is a water conservation project located east of the City of Hemet. The project will be a joint effort between the District and Lake Hemet MWD to design, construct, and operate additional groundwater recharge basins adjacent to Bautista Creek Channel. The basin design will allow percolation of stormwater and be similar to that of the existing basins built upstream by the U.S. Army Corp of Engineers. To increase recharge potential, the project will include the construction of a pipeline connection into the recharge area from an existing water supply pipe located nearby the project area. The source of this water supply is surplus water imported from the Sacramento-Delta or the Colorado River.	Water Conservation Provide additional groundwater recharge by promoting groundwater infiltration of both storm water and imported water supply.	District is working on a cooperative agreement with Lake Hemet MWD that will include details on agency responsibilities and funding for the Project.
Lincoln/Cota Street Recharge Project	District City of Corona	The District continues to partner with the City of Corona to divert base flow and stormwater flows from Temescal Creek to the existing Lincoln and Cota recharge ponds owned and operated by the city. The Lincoln and Cota Ponds have approximately 24,835 AFY of unused recharge potential that could facilitate capture and conservation of tertiary treated wastewater discharged to Temescal Creek from the city's wastewater treatment plant during dry conditions and/or storm flows in Temescal Creek during storm conditions.	Water Quality Stormwater capture and infiltration Water Conservation Groundwater recharge and increased water supply	The City of Corona is securing Water Rights

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
Nuview Union School District's Infiltration Project	County of Riverside	The County and District provided Nuview Union School District's a letter of support (letter provided separately) for an infiltration project – The proposed project maximizes infiltration from parking lot reconstruction through application of LID principles. In addition, the project will involve integrated "greening" of the school site and environmental education which includes a renewable energy and LID curriculum. The proposed project utilizes Hydrologic Source Controls, infiltration and bioretention BMP to achieve 100% infiltration of stormwater from the parking lot reconstruction project.	Water Quality Stormwater capture and infiltration Water Conservation Groundwater recharge and increased water supply	Pending
Little Lake Basin Recharge Modification	District Lake Hemet MWD	Lake Hemet MWD is working with the District on a joint water conservation project involving increasing the dead storage within the District's existing Little Lake Basin for additional recharge opportunities. Lake Hemet MWD has prepared plans for lowering the basin bottom by five feet.	Promotes water conservation by creating groundwater recharge. Project may also include a pipeline to transport water from District's basin to Lake Hemet MWD's Little Lake Reservoir for additional recharge benefits.	Preliminary Plans prepared and submitted for District review.
Temescal Creek Flood Plain Acquisition	District	The District is working on acquiring the Temescal Creek floodplain area to remove existing properties from high risk flood zones and protect the floodplain from future development encroachment. On October 31, 2013 the District purchased APN 391-110-005 (10.10 acres) and on November 27, 2013 APN 391-060-008 and a portion of APN 391-060-010(43.19 acres).	Water Quality Prevention of surface water contact with sources of pollutants Habitat Protect existing bank and natural state of Temescal Creek Provide habitat mitigation banking, where feasible Water Supply Provide water conservation and habitat mitigation banking where feasible.	District funds included in Annual Budget for FY 2013-2014
Mockingbird Canyon Restoration	District	Over the last 40 years, Mockingbird Canyon Wash (Wash) has experienced significant erosion, deposition, and flooding problems. Through a geomorphology study the District plans to develop a better understanding of the causes of these problems and to identify specific measures (e.g., habitat restoration and bank stabilization) that, if implemented, would stabilize the Wash and alleviate hydromodification and flood-related damages to riparian habitat. These measures would be incorporated into a conceptual level management/remediation plan that could be implemented in a phased approach through the District's Capital Improvement Program.	Habitat Habitat restoration through reduced erosion Bank stabilization Reduced sedimentation	Phased Project: Geomorphology Study included in Annual Budget for FY 2013-2014

Table 3-5. Examples of Ongoing or Planned Multi-Benefit Projects in the Santa Ana Region

Project Name	Participating Jurisdiction(s)	Project Description	Benefits	Status
Arlington Basin Grant Project	District Western Municipal Water District (WMWD)	The District and WMWD are working collaboratively to facilitate the construction of three stormwater recharge facilities in the Arlington area and expansion of the Arlington Desalter Project. Two of the stormwater recharge facilities will be integrated into Southwest Riverside MDP Line G. The third facility will be adjacent to Arlington Channel near Van Buren and Indiana Avenue. The project is estimated to develop 1,848 acre-feet per year (AFY) of new water supply. The project will also result in the removal of 1,789 tons/year of salt and 89,539 kg/year of nitrate. Additional water quality benefits are expected to accrue due to dry and wet weather diversions.	Water Quality Stormwater capture and infiltration Reduced salt and nutrient loads Water Conservation Groundwater recharge and increased water supply	District funds included in Annual Budget for FY 2013-2014
Coldwater Sub-basin Recharge Program	District City of Corona	The District and City of Corona are working collaboratively to prepare plans and environmental documents necessary to rehabilitate stormwater recharge ponds along Glen Ivy Road and to facilitate drainage improvements to reduce flood inundation of Temescal Canyon Road. These ponds had historically recharged approximately 1,800 acre feet per year on average.	Water Conservation Groundwater recharge and increased water supply	District funds included in Annual Budget for FY2013-2014
Sportfish Hatchery/ Nursery Project	City of Lake Elsinore	The nursery would supplement the low natural recruitment of sport fish offspring under the lake's high TDS conditions and the periodic mortality of sport fish from low dissolved oxygen levels. The nursery would promote a desirable stable state for the nutrient enriched lake of true aquatic plants and sport fish. The anticipated result would be clear water, abundant zooplankton and a high number of sport fish. The City of Lake Elsinore is proposing to annually purchase approximately 37,500 sport fish fry (1.0 gram size) and grow them to a large sized fingerling of 50 grams in the nursery over a period of four to five months. The Sport Fish Nursery would primarily be composed of three above ground concrete raceways, with the dimensions of 12'W x 40'L. The nursery would also feature three round tanks (12' diameter) for displaying adult fish of various species found in Lake Elsinore. Public tours of the facility are planned to raise awareness and garner support for restoring Lake Elsinore. A flow-through system design utilizing water from the Lake that is continuously circulated through the tanks and discharged back to the Lake is the most economically feasible approach to sustaining the biological parameters in the nursery system.	Water Quality TMDL compliance support Improved biological community Improved water clarity	Approved in the FY 2014-2015 Capital Improvement Project budget

BMP Water Quality Research

When designing BMPs for incorporation into development projects, BMP performance is a critical element in the design. BMP performance data most commonly come from the International BMP Database (IBD), which is the most extensive ongoing effort to collect and distribute BMP performance data in the United States. The IBD is sponsored by USEPA, the Water Environment Research Foundation, the American Society of Civil Engineers/Environmental and Water Resources Institute, the American Public Works Association, and the Federal Highway Administration. The stated purpose of IBD development is "to provide scientifically sound information to improve the design, selection, and performance of BMPs."

While the IBD provides a substantial data source regarding BMP performance, the availability of data from arid regions is limited simply because there has been little data development in this environment. During the 2010 Permit term, the District successfully obtained a grant to not only retrofit its facility grounds using LID BMPs from the LID BMP Design Handbook, but also to establish a local laboratory for the development of BMP performance data for many common LID-based BMPs (see **Case Study 4: LID BMP Monitoring Facility** in Section 3.4.4). The District is routinely monitoring wet weather runoff from its site to determine the effectiveness of a variety of BMP types. The outcome will be local BMP performance data that can be used in the design of BMPs in the region.

3.4 Program Implementation: Case Study Examples

This section highlights four key examples of Urban Runoff Management Program implementation activities directed at solving specific water quality concerns or developing technical data to support identification and selection of BMPs to manage urban runoff in the Permit Area.

3.4.1 Case Study 1: Bacterial Indicator Source Evaluation Project

Project Description

As discussed in Section 3.2.2 above, the Permittees actively implement Tier 1 and 2 source evaluations required by the CBRP to locate and mitigate controllable sources of bacterial indicators. Findings from the Tier 1 source evaluation effort provided the basis for prioritizing Tier 2 source evaluation activities. Beginning in summer 2013 and continuing in 2014, the Permittees have been implementing local source evaluation studies to identify elevated sources of bacterial indicators and, where possible, eliminate sources that are controllable.

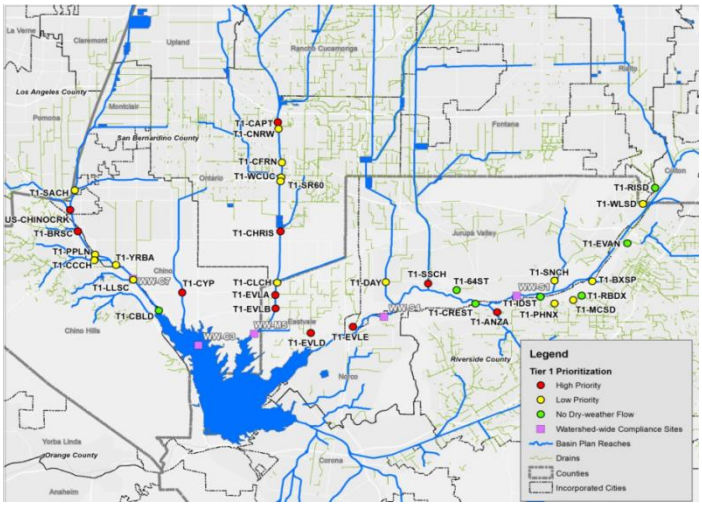


Figure 3-18. Priority Sites for Tier 2 Source Evaluation Assessment in MSAR Watershed

Relevance to 2010 Permit Compliance

The 2010 Permit required the Permittees to develop a CBRP that sets forth implementation activities to achieve compliance with the TMDL WLAs applicable to urban runoff in the MSAR Watershed. The CBRP establishes a prioritization approach for targeting program resources (**Figure 3-18**). Where the program identifies a potential controllable source of bacterial indicators, Permittees deploy Urban Runoff Management Program tools, e.g., IC/ID inspection protocols and specialized monitoring methods to attempt to find and mitigate the source.

Implementation Benefits Achieved

Examples of positive water quality benefits achieved to date include:

- Early Tier 1 source evaluation work identified a persistent human source of bacterial indicators in Box Springs Channel. Using IC/ID investigation tools, the District worked collaboratively with the City of Riverside and discovered that a single restroom toilet on the Riverside Community College campus was inadvertently connected to a storm drain rather than to a sanitary sewer. The cross-connection was corrected; subsequent sampling has determined that this project eliminated this human source of bacterial indicators.

- Human source bacterial indicators found in Eastvale Line E indicated the need for a follow-up investigation. Eastvale Code Enforcement staff identified a potential source, day laborers congregating near a home improvement store. City staff enforced non-loitering ordinances and water quality has since improved.

- Several transient encampments within or immediately adjacent to District channels, (Temescal Channel, University Wash, etc.) were identified and remediated. Where transient encampments reoccur under bridges in these channels, efforts have been made to modify bridge abutments to prevent or deter future encampments. Modifications range from wrought iron barriers to full scale retrofits with walls that block access to the underside of the bridges.

Figure 3-19. Source Evaluation Activities on San Sevaine Channel, Looking Upstream

Tier 2 source evaluations will continue as part of CBRP implementation (**Figure 3-19**). Where these evaluations identify potentially controllable sources of bacterial indicators, investigations will be initiated to identify specific sources for mitigation.

3.4.2 Case Study 2: Canyon Lake Alum Treatment Project

Project Description

The Permittees work collaboratively with the LE/CL Nutrient TMDL Task Force to improve water quality to meet TMDL nutrient requirements applicable to Canyon Lake (**Figure 3-20**). A key part of this effort is the implementation of an alum treatment project to reduce the impacts of existing nutrients on the lake as well as to protect the lake from the introduction of additional nutrient loads during rain events. The alum project consists of a series of five seasonal (February/September) alum applications over a two-year period that started September 2013. By binding phosphorus to make it a limiting nutrient that reduces algae growth, continued alum use reduces the cycling of nutrients and associated sediment oxygen demand in the lake bottom. The expected result is compliance with interim/final chlorophyll-*a* response targets by the end of the test period. Changes in biogeochemical processes should also indirectly increase dissolved oxygen in the hypolimnion and reduce the frequency of ammonia toxicity, which should be sufficient to achieve the interim dissolved oxygen response targets and may be sufficient to achieve the final dissolved oxygen response targets. The first two alum applications were completed in September 2013 and February 2014 (**Figure 3-21**).

Figure 3-20. Aerial Photograph of Canyon Lake (Source: www.sawpa.org)

Figure 3-21. Photographs of Alum Application Activities on Canyon Lake

Relevance to 2010 Permit Compliance

The 2010 Permit required the Permittees to develop a CNRP that established activities to be implemented to achieve compliance with the TMDL WLAs applicable to urban runoff in the Canyon Lake Watershed. Analyses demonstrated that compliance with urban WLAs require implementation of nutrient mitigation activities in both the watershed and lake. Accordingly, the CNRP was built around a framework that includes both watershed-based BMPs and in-lake remediation activities. The CNRP identified the alum project as a key in-lake remediation strategy to comply with TMDL requirements.

Implementation Benefits Achieved

Initial post-September 2013 alum application results indicate 31% (Main body) and 36% (East Bay) reductions in Total Nitrogen; 47% (Main body) and 92% (East Bay) reductions in Soluble Reactive Phosphorus; and 43% (main body) and 67% (East Bay) reductions in Total Phosphorus. Chlorophyll-*a* levels increased post-alum application. Water quality trend analyses will expand with each monitoring event. Following the February 2014 application, unusually clear water was observed in the main body of the lake (**Figure 3-22**). This outcome resulted in a number of comments being posted to the Friday Flyer's (Canyon Lake Newspaper) Facebook page (**Figure 3-23**).

Figure 3-22. Clear Water in Canyon Lake following February 2014 Alum Application

"This is AMAZING! It appears those alum treatments are starting to pay off. Dennis Bickers sent this picture of the Main Lake saying, "Something has happened to Canyon Lake in the past week. The water in the Main Lake has become amazingly clear. You can easily see the bottom at a depth of 10 to 15 feet. In the clear water picture, that is not the tree's reflection but the sandy bottom from about 4-6 foot depth."

Figure 3-23. Canyon Lake Resident Comment on Outcome of February 2014 Alum Treatment (Source: Friday Flyer Facebook Page, March 31, 2014)

3.4.3 Case Study 3: Lake Mathews Drainage Water Quality Master Plan

Project Description

In 1992, the District, as Principal Permittee, cooperated with the Metropolitan Water District of Southern California and the County of Riverside to develop the Lake Mathews Drainage Water Quality Master Plan (DWQMP). The DWQMP was utilized to develop the Lake Mathews Area Drainage Plan (ADP) adopted by the Riverside County Board of Supervisors in 2003. Since 2003, the ADP has been utilized to plan and construct regional and watershed BMPs (**Figure 3-24**). To compare third-term Permit (2002) requirements to the fourth-term (2010) Permit requirement, and to aid in long-term planning for the Lake Mathews Watershed, the project proponents developed the Lake Mathews Watershed Water Quality Improvement Study (WQIS) in 2012.

Figure 3-24. Lake Mathews Aerial View

Relevance to 2010 Permit Compliance

The DWQMP was developed to protect the quality of water in Lake Mathews by taking a regional approach to constructing stormwater BMPs to manage runoff in the watershed. In the 2010 Permit, Lake Mathews is listed in Table 3b Beneficial Uses and 303(d) impaired waters. The Permit also contained language that recognized the need for regional treatment facilities (II.A.11). Although many of the BMPs have been constructed since the DWQMP's publication, several remain at conceptual stage. The goal of the WQIS is to aid in prioritizing these concept stages projects for construction taking into consideration the advancements in understanding in watershed modeling as well as 2010 Permit requirements that PDPs include LID BMPs.

Implementation Benefits Achieved

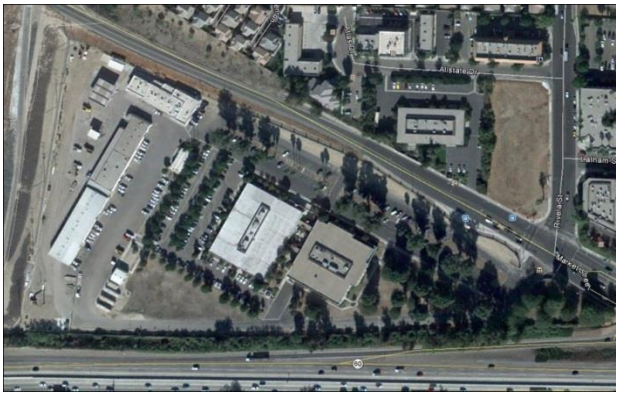
The WQIS helped the Permittees measure the impact a well-executed plan can have on meeting Water Quality Objectives. The original DWQMP contained 14 regional BMPs. Of those 14, a total of 8 have been built. The WQIS concluded that with the improvement seen in the watershed tributary to Lake Mathews to date, only one out of the six remaining BMPs still in the conceptual stage needs to be built to meet the goals of the DWQMP. It also allowed the Permittees to update the original watershed model to reflect a better understanding of modeling watersheds in the SAR, which was due to the modeling performed, by the LE/CL Nutrient TMDL Task Force, for the adjacent San Jacinto Watershed.

3.4.4 Case Study 4: LID BMP Monitoring Facility

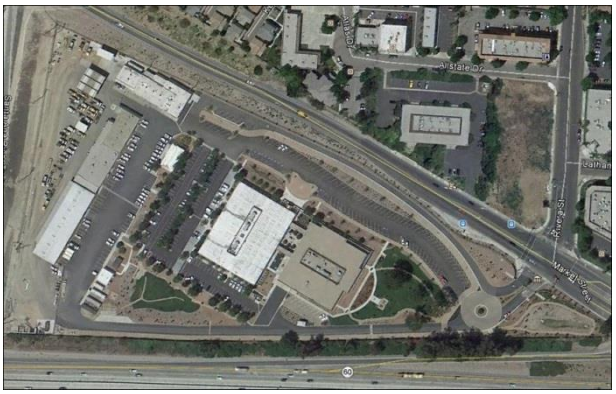
Project Description

The District implemented an award-winning $2.5M project that not only updated its parking lot and grounds, but also utilized state-of-the-art water conservation and LID techniques and practices (**Figure 3-25**). The project includes the following major features (e.g., see **Figure 3-26**):

- Replacement of approximately 8,400 square feet of existing asphalt pavement and base with porous asphalt pavement and porous concrete pavement and sub drain systems;
- Construction of two raised flow-through planters and one landscape filter basin ("rain gardens");
- Revision of the parking circulation layout to reduce the area of impervious asphalt and eliminate over 600 linear feet of concrete curb, gutter, and storm drain and replacement with a vegetated infiltration swale;
- Replacement of two-thirds of the site's turfed area with drought tolerant landscaping and efficient irrigation systems designed to meet the County's Water Efficient Landscape Ordinance;



Project Site – Prior to Construction



Project Site – Post Construction

Figure 3-25. Aerial View of District Facilities – Pre- and Post-Construction of LID BMP Monitoring Facility

- Deepening of an existing infiltration basin to facilitate positive drainage for the LID features; and
- Construction of 10 monitoring vaults with flow and water quality monitoring equipment.

Since completion, the project has received numerous recognitions and awards, including the American Society of Civil Engineers Outstanding Stormwater Management Project Award, Keep Riverside Clean and Beautiful 2013 Beautification Award, National Association of Flood & Stormwater Management Agencies 2012 Excellence in Communications Award, and the Clair A. Hill Water Agency Award for Excellence from the Association of California Water Agencies.

Figure 3-26. Photographs of Various Stages of Construction of a Bioretention Basin at LID BMP Monitoring Facility

Stormwater Program Benefits

In addition to conserving water and reducing runoff, the project serves as a laboratory for testing the water quality and water conservation benefits of the constructed LID features. The long-term effectiveness and durability of these features will be tracked and the data will be used to improve the design and deployment of these features in public and private PDPs in the County. Specific questions of interest include:

- What lessons did the construction process teach us about how to better design these types of features?
- How much volume reduction results from stormwater captured within the engineered soil/media layers of these features?
- What is the pollutant removal effectiveness of these features?
- Do the features perform as expected over time?
- Do the operations and maintenance regimes specified in the District's LID manuals need to be adjusted based on real-world performance of these features?
- How can the District improve the design of these features based on lessons learned from long-term operation and maintenance?

Section 4

Fifth-Term Urban Runoff Management Program Priorities

In Section 1, it was noted that the Urban Runoff Management Program for the SAR will soon achieve its 25th anniversary. Over this past quarter century, much has been learned regarding what works and more importantly what does not work in managing pollutants in urban runoff in the Permit Area. Given this experience, the Permittees are now able to use their collective knowledge to customize and deploy BMPs in an effective manner, one that allocates resources to the most important water quality issues of concern. The Permittees are concerned, however, that inclusion of non-iterative RWLs requirements or additional new programs or modified organizational frameworks in the fifth-term MS4 Permit will divert limited, static resources from ongoing and planned implementation projects to addressing deliverables that will not directly address water quality concerns. At this juncture in the history of the Urban Runoff Management Program, Permittees do not believe that development of new planning documents or administrative checklists is the best use of these resources. Accordingly, in this section, which addresses urban runoff management program priorities for the fifth-term MS4 Permit, the Permittees have identified three key areas of focus:

- Continue emphasis on implementation of projects and activities that address high priority water quality concerns (e.g., TMDLs and other 303(d) listed waterbodies);
- Provide for iterative RWLs permit language and modify or refine, specific existing 2010 Permit requirements to make them more effective based on experience gained under that permit; and
- Maintain and, where appropriate, enhance regional collaboration and support for innovative approaches to addressing water quality.

Given these priorities, each of which is discussed in more detail below, the Permittees request that the fifth-term MS4 Permit recognize the significant progress being made towards the management of urban runoff in the Permit Area (as documented in Section 3) and update the 2010 Permit based on these priorities. This will ensure that the Urban Runoff Management Program can continue to allocate resources to improving water quality and protecting receiving water beneficial uses.

4.1 Project Implementation

The following sections describe the Urban Runoff Management Program's priority implementation projects and activities planned for the fifth MS4 Permit term.

4.1.1 Continue MSAR Bacterial Indicator TMDL Implementation

The MSAR, Santa Ana River Reach 3, and several major tributaries to that reach are impaired by elevated bacterial indicator levels that indicate a potential health risk for persons engaged in water contact recreation. In 2005, the Regional Board adopted the MSAR Bacterial Indicators TMDL to

address bacterial indicator levels in the MSAR Watershed.[27] The 2010 Permit required the Permittees to submit a CBRP for implementing the TMDL during the Dry Season.[28] The CBRP was approved by the Regional Board in 2012 and is now being actively implemented by those Permittees with MS4 discharges in the area subject to the TMDL.[29]

In 2012, the Regional Board also amended the Basin Plan (BPA) to update and revise the Water Quality Standards related to water contact recreation (including associated bacteria objectives).[30] This BPA was subsequently approved by the State Water Board[31] and the California OAL[32] and is now under review by USEPA.

Aggressively implementing the CBRP, in accordance with the recently revised Water Quality Standards, is one of highest priorities for the Permittees. This implementation continues and reinforces the commitment made when the Permittees initiated long-term watershed-wide compliance monitoring and an urban source investigation program in 2007.[33] Since then, thousands of samples have been tested and the resulting data have been used to focus subsequent remediation efforts. **Attachment B** of this ROWD describes in detail the Urban Runoff Management Program's path to compliance with the Dry Season Bacterial Indicator WLAs.

CBRP implementation relies on an innovative risk-based scoring system to target stream segments and stormwater outfalls with the highest potential to exceed Water Quality Standards. The scoring system includes use of state-of-the-art Deoxyribonucleic acid (DNA) analyses to identify bacteria arising from human sources (*Bacteroides*) that pose the greatest health threat to people recreating in impaired waters (e.g., see Figure 3-6 as an example of this prioritization). The Permittees' foremost goal is to eliminate all such sources immediately after each is identified. To date, this program (consisting of Tier 1 and Tier 2 source assessments) has been highly successful at discovering and reducing bacterial loads from controllable human sources (e.g., identification of cross-connected sewers and transient encampments along the river; see also Case Study 1 in Section 3.4.1). Over time, the number of water quality samples with detectable human DNA markers has continued to decline (see discussion in Section 3.2.2, Figure 3-7). In light of these successes, source evaluation assessments will continue to form the backbone of Riverside County's MSAR Bacterial Indicator TMDL compliance strategy.

The Permittees will also continue to use their current inspection programs as a tool to address and minimize pollutant loads from restaurants, food processors, kennels, stables, veterinary clinics, pet stores, dog parks, and similar sources with a higher potential to contribute bacteria to urban runoff. For example, results from Tier 2 source assessments in 2013 identified a few homeowners living adjacent to storm channels who were improperly disposing of large volumes of pet waste by throwing it "over the fence." Permittees have notified these property owners that they must cease such practices. If required to ensure consistent compliance, more serious enforcement actions will be initiated, using the authority granted by ordinances enacted by all Permittees.

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[27] Resolution No. R8-2005-0001; August 26, 2005

[28] Resolution No. R8-2010-0033; January 29, 2010, Adoption of Order No. R8-2010-0033 NPDES No. CAS 618033 (see §VI-D-1)

[29] Resolution No. R8-2012-0015; February 10, 2012

[30] Resolution No. R8-2012-0001; June 15, 2012

[31] State Water Board Resolution No. 2014-0005; January 21, 2014

[32] OAL approved the State Water Board's regulatory action on July 2, 2014

[33] Resolution No. R8-2007-0046; June 29, 2007

The Permittees will also continue their ongoing efforts to reduce non-storm urban runoff during dry weather conditions. Part of this nuisance flow is generated by improperly maintained/operated landscape irrigation systems. The Permittees are working closely with local water supply agencies to encourage water use efficiency by residents. The recent extreme droughts, as well as higher water rates, have caused many homeowners to significantly reduce landscape irrigation. Monitoring data shows a significant downward trend in dry weather urban runoff at numerous MS4 outfalls throughout Riverside County (see Figure 3-3). This trend demonstrates the positive outcome of efforts to more effectively manage local water use.

As part of CBRP implementation, the District and other Permittees have begun development of a source control program designed to minimize the amount of dry weather urban runoff reaching the Middle Santa Ana River and Cucamonga Creek. Implementation of this program could include retrofiting existing facilities to intercept and divert dry weather urban runoff before they reach rivers and streams. These diversions would be utilized for outfalls where TMDL compliance sampling and Tier 2 sampling data indicate that an outfall is contributing a controllable source of impairment, and where source assessment efforts could not locate and address these sources. In some cases, these flows could potentially be diverted to off-channel percolation ponds to support groundwater recharge. In addition, in some instances, it may be appropriate to transfer some dry weather urban runoff to the local wastewater authority for further treatment. The Urban Runoff Management Program is planning to implement pilot demonstration projects in conjunction with the fifth-term Permit.

As will be discussed in more detail below, during the next permit term, the Permittees will join with MS4 agencies in adjacent counties to implement the RMP for bacteria. This new initiative, modeled on the successful watershed-wide compliance monitoring conducted for the MSAR Bacterial Indicator TMDL, will provide frequent (five samples/month), high quality data regarding rivers, lakes, and streams where water contact recreation most commonly occurs.[34] The significant time and money earmarked for this project demonstrates the Permittees' commitment to protect human health by improving water quality, not just in the MSAR Watershed, but throughout the Permit Area.

A key element in the new RMP will be development of an objective procedure for determining whether elevated bacteria levels are caused by controllable anthropogenic sources or uncontrollable natural sources. The BPA defines "uncontrollable sources" to include, but not be limited to, wildlife activity and waste, bacterial regrowth within sediment or biofilm, re-suspension from disturbed sediment, flocks of semi-wild waterfowl and human shedding during swimming. The Permittees are committed to working with Regional Board staff and colleagues in adjacent counties to develop credible scientific tools to make this determination, which is essential to ensure that available resources are targeted appropriately.

Finally, upon final approval of the BPA, the Permittees within the MSAR Watershed believe that re-visiting the MSAR Bacterial Indicator TMDL should be a high priority during the next permit term. Necessary changes include removing references to obsolete Basin Plan provisions (e.g., fecal coliform objectives) and considering other revisions related to wet weather compliance to reflect the newly adopted "high flow suspension" requirements.

Protecting human health and safety is the core mission of every stormwater agency. Thus, in the next permit term, Permittees within the MSAR Watershed will be focused on implementing the CBRP and

[34] Such places are designated REC-1-Tier A; see "Table 5-REC-1-Tiers" in the amended Basin Plan.

meeting the TMDL urban WLA for *E. coli* bacteria. If the WLA is not attained, Permittees will demonstrate that bacterial indicators from controllable urban sources are not the cause of non-attainment. Extensive monitoring data demonstrate real improvements in water quality as a result of existing programs and the Urban Runoff Management Program's priority in the next permit will be to reinforce these successful strategies with new initiatives designed to better protect water contact recreation beneficial uses in the MSAR Watershed.

4.1.2 Continue LE/CL Nutrient TMDL Implementation

Elevated nutrient levels have been determined to impair water quality and imperil beneficial uses in Canyon Lake and Lake Elsinore. Elevated concentrations of nitrogen and phosphorus promote excessive algae growth and reduced dissolved oxygen that, in turn, increase the risk of fish kills and interference with recreational activities in the lakes.

In 2004, the Regional Board adopted the LE/CL Nutrient TMDL to address elevated nutrient levels in urban and agricultural runoff flowing to Canyon Lake and Lake Elsinore.[35] Following approval of the TMDL in the fall of 2005, the Permittees within the LE/CL Watershed joined with other stakeholders (including agricultural operators, municipal POTWs, Caltrans, the U.S. Forest Service, the U.S. Department of Defense and others) to form a Task Force dedicated to cooperative implementation of the LE/CL TMDL.

In 2006, the Regional Board approved the long-term monitoring plan prepared by the LE/CL Nutrient TMDL Task Force for both lakes and the surrounding watershed.[36] Water quality monitoring commenced immediately thereafter. The following year, the LE/CL Nutrient TMDLTask Force developed an *In-Lake Sediment Nutrient Reduction Plan*[37] describing the overall strategy for achieving compliance with the TMDL requirements. That strategy called for a combination of aeration/mixing, fishery management and lake level stabilization with recycled water to improve water quality. The Regional Board approved the Plan in 2007[38] and since then, all three elements have been fully implemented.

The 2010 Permit required the Permittees subject to the TMDL's requirements to implement the Lake Elsinore *In-Lake Sediment Nutrient Reduction Plan* and to submit a more detailed plan for achieving similar compliance in Canyon Lake.[39] That follow-up plan, the CNRP, was approved by the Regional Board in 2013[40] and implemented later that same year (which included the initiation of the Alum Treatment Project (see Case Study 2 in Section 3.4.2)). With two of five alum applications completed, early monitoring data clearly show that the resulting improvement in Canyon Lake water quality is exceeding all expectations.

Similar dramatic improvements in water quality were observed in Lake Elsinore in the years immediately following the first round of fishery management (e.g., carp removal and game fish stocking) and start-up operation of the aeration/mixing system. Relying on water quality monitoring

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[35] Resolution No. R8-2004-0037; December 20, 2004

[36] Resolution No. R8-2006-0031; March 3, 2006

[37] Plan is available at: http://www.sawpa.org/collaboration/projects/lake-elsinore-canyon-lake-tmdl-task-force (under the Resources link) or from the Regional Board

[38] Resolution No. R8-2007-0083; November 30, 2007

[39] Resolution No. R8-2010-0033; January 29, 2010 Order No. R8-2010-0033; NPDES No. CAS 618033 (see §VI-D-2)

[40] Resolution No. R8-2013-0044; July 19, 2013

data collected from in-lake buoys, Dr. Alex Horne (University of California, Berkeley) has determined that dissolved oxygen concentrations are improving and nitrogen levels are declining in response to the aeration/mixing project.[41] Regional Board staff reviewed and concurred with Dr. Horne's analysis as part of the recent renewal of Elsinore Valley Municipal Water District's (EVMWD) NPDES Permit, which allows the discharge of recycled water to Lake Elsinore.[42] The aeration/mixing project is also expected to reduce phosphorus releases from lake-bottom sediments by at least 35%. The Regional Board incorporated this conservative assumption directly into the LE/CL Nutrient TMDL. Nevertheless, the Permittees (acting through the LE/CL Task Force) are committed to performing additional sediment monitoring studies to confirm the actual effectiveness of this phosphorus control strategy. The aeration/mixing project is jointly funded by EVMWD, the City of Lake Elsinore, and the County of Riverside; the latter two entities are Permittees. Negotiations are underway to allow other Permittees to assist this remediation effort by sharing in annual operating costs. The City of Lake Elsinore and County of Riverside currently hold enough operational credits to assure compliance with the entire 10-year WLA for urban runoff.

In addition to the water quality remediation projects described above, Permittees in the San Jacinto River Watershed are implementing other BMPs designed to reduce nutrient loads to both lakes. All Permittees are implementing new LID requirements for site retention of stormwater for all new PDPs within their jurisdictions, which will greatly reduce urban runoff over time. A more detailed and comprehensive description of similar BMPs installed elsewhere in the watershed was provided to the Regional Board in the Annual Report.At present, all of the major water quality remediation and improvement projects that were proposed in the CNRP are being fully implemented. The Permittees subject to the LE/CL Nutrient TMDL will continue to rely on the current permitting/inspection process to assure consistent compliance with 2010 Permit requirements and will continue to develop and implement additional BMPs to further reduce nutrient loads to Canyon Lake and Lake Elsinore.

Based on water quality monitoring data gathered from 2011-2013, it appears that Canyon Lake will likely achieve compliance with the interim response targets for chlorophyll-*a* and dissolved oxygen by the TMDL deadline in December 2015. To date, Permittees are in compliance with the urban WLA for nitrogen and phosphorus in both lakes largely due to the prolonged drought. This status may change in response to a single wet winter, like that which occurred during the winter of 2005, because compliance with the WLAs is calculated based on rolling 10-year averages.[43] The Permittees are particularly concerned with this issue, as the range of extreme wet seasons is much greater than assumed in the TMDL.

After completing the alum applications planned for 2014 and 2015, and establishing a long-term cost-sharing agreement to support the aeration/mixing project, the highest priority for the Permittees during the next permit term is to work with the Regional Board to update the TMDL. The information generated after 10 years of intensive water quality monitoring, sophisticated watershed and lake modeling, and project effectiveness assessments indicates that the TMDL must be revised in light of

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[41] Dr. Alex Horne: *Three Special Studies on Nitrogen Offsets in Semi-Desert Lake Elsinore in 2006-08* as part of the *Nutrient TMDL for Reclaimed Water Added to Stabilize Lake Levels,* September 10, 2010; Dr. Alex Horne: *Nitrogen Offsets Produced by Artificial Water Column Mixing by Aeration Bubble Plumes in Lake Elsinore, California*, December 3, 2013; and Dr. Alex Horne: *Lake Monitoring Program and Nitrogen and Phosphorus Offset Demonstration Program for Discharge of Nitrogen and Phosphorus to Lake Elsinore*, November 25, 2013.

[42] Resolution No. R8-2013-0017; September 13, 2013

[43] Compliance is evaluated as a 10-year rolling average commencing on January 1, 2011.

our better understanding of the mechanisms that deliver nutrients to the lakes as well as in-lake processes.

In 2010, the LE/CL Nutrient TMDL Task Force commissioned Tetra-Tech, Inc. to revalidate and update the watershed runoff models.[44] Through this process, the Task Force learned that there were numerous errors in the land use data used to develop the original TMDL models. In addition, Tetra-Tech corrected the watershed runoff models to better account for substantial subsidence in the Mystic Lake area of the watershed. These corrections dramatically altered the calculated flows and nutrient loads to Canyon Lake.

Additional analyses prepared by Dr. Michael Anderson (University of California, Riverside) showed that zooplankton played a large role in controlling algae. The analysis also revealed that naturally elevated salinity levels in Lake Elsinore were limiting the zooplankton population (see also Section 3.2.3).[45] Dr. Anderson also determined that legacy phosphorus in existing lake-bottom sediments was biologically active for much longer than originally thought. He estimates that the half-life for phosphorus to mineralize into an inert form, incapable of serving as a nutrient for further algae growth, is approximately 15 years.[46] Therefore, half the phosphorus deposited in Canyon Lake during the El Niño winter of 2005 will still be promoting algae growth in 2020 (**Figure 4-1**). Moreover, 25% of the phosphorus that arrived nearly 10 years ago will still be biologically active in 2035.

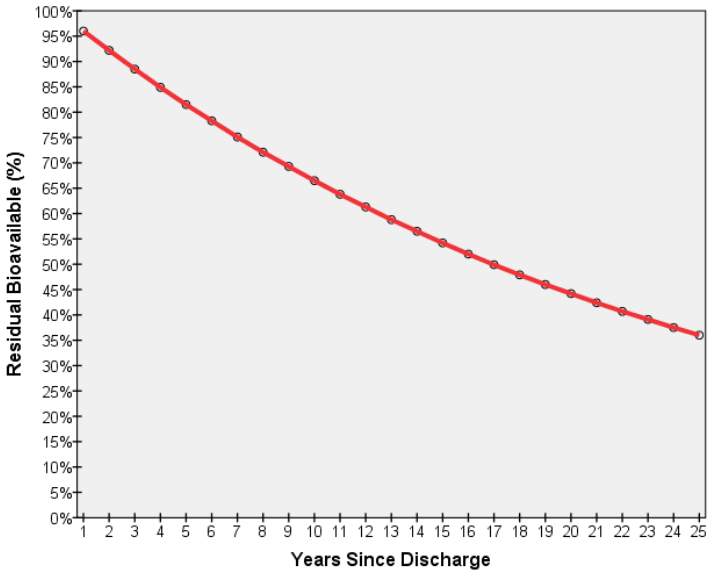

Figure 4-1. Decay Curve for Phosphorus Discharged to Canyon Lake

4.1.3 Develop Regional Monitoring Program and Evaluate Existing Use Impairment Listings for Bacterial Indicators

As noted in Section 4.1.1, with the adoption of the Recreation Use Standards BPA (also see Section 3.3.2), the SWQSTF, which includes Riverside County's sister stormwater agencies (Orange County and San Bernardino County), is obligated to develop a RMP that prioritizes bacterial indicator sampling where REC-1 activity is most likely to occur. The BPA identifies four high priority sites within the Permit Area where year-round monitoring is to occur: Lake Elsinore, Canyon Lake, Lake Perris, and Santa Ana River Reach 3. Other sites may be included for monitoring (in addition to what is already required by the MSAR Bacterial Indicator TMDL) based on their priority to be defined in the RMP. While additional resources will be needed to implement the monitoring anticipated by the BPA,

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[44] Tetra Tech, Inc. *San Jacinto Watershed Model Update (2010) - Final*. October 7, 2010.

[45] Dr. Michael Anderson. *Zooplankton Monitoring at Lake Elsinore (Draft Report)*; August 26, 2004.

[46] Dr. Michael Anderson. *Technical Memorandum for Task 1: Estimate Rate at Which Phosphorus is Rendered no Longer Bioavailable in Sediments.* December 31, 2011.

the Urban Runoff Management Program is committed to participating in this activity wherever urban runoff has the potential to impact water quality.

Development of an objective procedure for determining whether elevated bacteria levels are caused by controllable anthropogenic sources or uncontrollable natural sources is an important element of the RMP. These procedures are especially important given the need to properly evaluate bacterial indicator data and potential risks to human health. In addition, new data now shows that several waterbodies previously cited for excessive bacteria levels may no longer be impaired.[47] Other waterbodies are moving closer to meeting applicable water quality objectives. The Permittees will work closely with Regional Board staff to support preparation of the documentation needed to remove these waterbodies from the State's 303(d) list during the review cycle scheduled to occur in 2016. Permittees will also intensify water quality monitoring efforts where needed to support this effort.

4.1.4 Support Integrated Water Resource Management Projects

Table 3-5 in Section 3.3.3 described a number of ongoing or planned water resource projects within the Permit Area that will provide multiple benefits to the SAR. These benefits include protection of downstream waters (through stormwater capture), increased local water supply (through infiltration of captured stormwater), habitat or channel restoration, and increased habitat for wildlife. The trend towards developing water resources projects that provide multiple benefits is on the rise nationwide. This change is driven by a number of factors, including the recognition that effective water resource management is best accomplished in a holistic manner and the need for agencies to pool resources to achieve their goals. In California the drought emergency has further elevated the importance of an integrated approach to water management.

In the next permit term, the Permittees will continue to aggressively seek opportunities to collaborate on water resource projects that provide multiple benefits to the Permit Area, including mitigating urban runoff quality concerns. Potential partners include water districts, environmental and regulatory agencies (e.g., U.S. Forest Services, U.S. Fish & Wildlife Service, Bureau of Reclamation, and California Department of Fish and Wildlife), and neighboring MS4 Permittees and flood control districts. This commitment to integrated water resource management is consistent with the SAWPA-led OWOW initiative for the watershed, the response required to the recently declared State of California Drought Emergency, and the District's mission to reclaim and save waters for beneficial uses, including mitigation of drought concerns.

Integrated water resource management projects are developed and implemented over long timeframes (often well beyond a single permit term) to allow for all planning and public outreach requirements to be met (e.g., California Environmental Quality Act compliance) and for jurisdictions to secure required funding. As a consequence, in order to participate in these projects, Permittees need to be able to commit funding to multi-benefit projects well in advance of their completion. The new MS4 Permit must facilitate Permittee participation in projects providing multiple urban runoff benefits. Additionally, the permit should not mandate such efforts as forward planning requirements, which can overwhelm the program. The Permittees need flexibility to identify areas of concern, develop options, and implement actions based on priorities and expected opportunities.

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[47] Per Bill Rice of the Regional Board, as note discussed at the joint Stormwater Quality Standards and MSAR Task Force meeting on April 15, 2014

4.1.5 Apply USEPA's Integrated Planning Framework to Prioritize Project Development and Implementation Based on Relative Risk Reduction

The USEPA finalized its Integrated Municipal Stormwater and Wastewater Planning Approach Framework ("Integrated Planning Framework") in its June 5, 2012 memorandum to USEPA Regional Administrators and Regional Permit and Enforcement Division Directors. While the framework is intended to combine stormwater and wastewater planning activities, the planning framework is sound even if only applied to urban runoff programs. As stated by USEPA:

> "Integrated planning will assist municipalities on their critical paths to achieving the human health and water quality objectives of the CWA [Clean Water Act] by identifying efficiencies in implementing requirements that arise from distinct wastewater and stormwater programs, including how best to make capital investments. Integrated planning can also facilitate the use of sustainable and comprehensive solutions, including green infrastructure, that protect human health, improve water quality, manage stormwater as a resource, and support other economic benefits and quality of life attributes that enhance the vitality of communities."[48]

According to USEPA, some of the key overarching principles associated with the development of an integrated plan include:

- Maintaining existing regulatory standards that protect public health and water quality.
- Allowing a municipality to balance CWA requirements in a manner that addresses the most pressing public health and environmental protection issues first.
- Employment of innovative technologies, including green infrastructure. The purpose and principles described above recognize the benefits of prioritizing available limited resources to address the highest priority environmental concerns. This approach should be applied to the Urban Runoff Management Program; it is not an abdication of water quality concerns but a recognition that progress is made only with concrete approaches to real, identified water quality issues.

As discussed above, the increased emphasis on integrated water resource management in the region means that the opportunity exists for urban runoff programs to contribute resources to larger, multi-benefit projects. The Permittees seek an MS4 permit that encourages application of these integrated planning framework principles to urban runoff management.

4.2 Proposed Modifications/Refinements to 2010 Permit Requirements

As discussed in Section 4.1, the Urban Runoff Management Program's priority for the fifth-term Permit is continued implementation of activities and projects that focus on the high priority water quality concerns in the Permit Area. For the most part, this can be done through continued application of 2010 Permit requirements and procedures. However, the program has identified some areas where modifications or refinements of 2010 Permit requirements would make the overall program more

[48] http://www.epa.gov/npdes/pubs/integrated_planning_framework.pdf

effective at addressing its priorities. These requests, which are summarized below, are based on the significant experience gained through permit implementation.

4.2.1 Receiving Waters Limitations Permit Language

The 2010 Permit establishes the legal obligation to protect water quality and contains rigorous implementation procedures by which dischargers can demonstrate compliance with RWLs. This approach has worked well because it sets high standards for performance but recognizes that meeting these standards will require considerable time and resources, in an iterative process. Thus, the process is deliberately designed to reward good faith efforts to implement BMPs designed to achieve progress toward attainment. Historically, the compliance obligation and the process were always seen as two sides of the same coin; permit compliance was determined through an evaluation of the efforts of Permittees under the maximum extent practicable standard. The failure to reach compliance with Water Quality Standards was not itself a violation of the permit; failing to work to reach compliance could be.

A recent court case has challenged this long-standing iterative approach to improving water quality in urban runoff. In interpreting the terms of the former Los Angeles County MS4 Permit, the Ninth Circuit Court of Appeals held that Permittees under that permit were required to strictly comply with RWLs, without regard to other provisions of that permit setting forth an iterative implementation process.

While the Ninth Circuit's decision interpreted only the wording of the former Los Angeles County Permit and is therefore not strictly applicable to other MS4 permits, similar language in those other MS4 permits could be similarly interpreted. It is therefore essential that the next permit make clear that compliance with RWLs continue to be assessed on an iterative process basis, not the strict and immediate liability suggested by the Ninth Circuit opinion. Permittees require a path to compliance, not the threat of potential immediate legal challenge for the failure to meet RWLs.

Numerous examples are available to guide the Regional Board as it drafts the new Permit. For example, USEPA has issued permits elsewhere in the country (e.g., District of Columbia) that do not require strict compliance with water quality standards. CASQA has prepared template language that could be considered. We have also attached copies of comment letters submitted by communities in Riverside County to the State Water Board (see **Attachment C**), which discuss the crucial need to reform RWL language to clearly set forth an iterative process and a path for Permittees to comply with their MS4 permits.

The Permittees believe that language clarifying the iterative process would not modify the State Board's existing requirement for attainment of water quality standards, as set forth in Order Nos. 2001-15 and 99-05. It is merely stating in clearer terms that which has always been intended – that compliance is a process, not a matter of strict, immediate liability. This approach recognizes that addressing pollutants in urban runoff is not fully within the control of Permittees. The 2010 Permit itself recognizes that the Permittees do not have jurisdiction or control over all land uses and activities that may affect water quality (see 2010 Permit, Part I.B). To that end, the RWLs permit language must provide that Permittees are in interim compliance provided they (1) have an approved long-term plan designed to assure that controllable urban runoff achieves compliance with Water Quality Standards and discharge prohibitions; (2) are making a good faith effort to fully implement that plan; and (3) are evaluating the effectiveness of those efforts and, as appropriate, are modifying the implementation plan based on these assessments

The need for a path to compliance is not only to reduce the potential for meritless lawsuits over exceedance of Water Quality Standards whose cause may have nothing to do with MS4 discharges. This is a risk, and the growing body of knowledge regarding, for example, natural sources of bacteria in the urban watershed demonstrates that RWL exceedances can be caused by multiple factors unrelated to urban runoff. But as importantly, the Permittees need to have reformed RWL language so that they can continue to prioritize their compliance efforts on major pollutant issues, which is the chief goal of Permittees for the next term permit. This prioritization becomes impossible if Permittees must use their limited resources to "chase" every Water Quality Standard exceedance, no matter how transitory.

The nearly quarter century experience of the Urban Runoff Management Program in the SAR confirms that only with iterative, process-based programs can real progress be made in addressing and improving urban runoff quality. It is exactly the approach that has been used in the CBRP and CNRP to produce significant, real-world improvements in water quality.

4.2.2 Extension of CBRP and CNRP

The Regional Board approved the CBRP in February 2012 and the CNRP in July 2013. The fifth-term Permit should explicitly acknowledge these approvals and require the Permittees to continue to implement the plans, in lieu of imposing numeric effluent limitations to achieve compliance with each TMDL's WLAs.

In addition, the CBRP was prepared with the expectation that the BPAs would be enacted. The amendments include new provisions to de-designate some 303(d) listed waterbodies and to address certain high flow conditions and uncontrollable sources. With USEPA approval expected by the end of 2014, and until the Regional Board can reopen and update the MSAR Bacterial Indicator TMDL, the fifth-term Permit should clearly provide how MS4 compliance is to be determined in light of these recent changes to the recreational Water Quality Standards.

4.2.3 Simplification of Annual Report Submittal Requirements

Section IV.4.B.2 of Appendix 3 of the 2010 Permit lists the minimum requirements for preparation of the Urban Runoff Management Program's Annual Report. In addition to this specific list, throughout the Permit there are references to items to be included in the Annual Report. The number of reporting items has become so numerous that preparation of the Annual Report has become an overly cumbersome process. At least two states have established alternative annual reporting approaches for Phase 1 MS4 individual permits that rely on electronic reporting forms that use a checklist-type format to document annual activities.[49] Attachments are provided to the regulatory agency where necessary to share additional information. The regulatory agency also retains the right to request additional information. These alternative approaches both simplify and focus the annual reporting process.

During the next permit term, the Urban Runoff Management Program requests the opportunity to develop an alternative annual reporting format that uses a similar checklist or report card format to document annual activities. The Permittees would work collaboratively with Regional Board staff to ensure that the proposed format provides sufficient information. Until an alternative annual report

[49] New York: http://www.dec.ny.gov/docs/water_pdf/ms4anrpt.pdf; or Minnesota: http://www.pca.state.mn.us/index.php/view-document.html?gid=7325

format is approved, the Permittees propose to prepare Annual Reports using the existing reporting requirements.

4.2.4 MS4 Permittee Exemption from CWA Liability for Exceedances Caused by "*De Minimus*" Discharges Authorized by the Regional Board

Many discharges to the MS4 system occur from so called *de minimus* discharges, such as well blow-offs, groundwater dewatering activities, fire hydrant testing, water transfers, and other similar activities. Nearly all of these activities are governed by the Regional Board's General Order authorizing certain *de minimus* discharges.[50] Although some of these discharges may exhibit acceptable water quality at the point of discharge, they may create conditions that cause downstream pollution. This is especially true for stimulating bacteria growth and/or mobilizing nutrients in the sediment.

Since the Regional Board has determined that such discharges pose no significant threat to water quality, MS4 agencies should not be held legally responsible where such flows may cause or contribute to downstream exceedances. Without such liability protection, the Permittees may have no choice but to prohibit all such discharges to the MS4 system. Alternatively, the Regional Board can require all *de minimus* dischargers to demonstrate that the discharge will have no adverse effect on water quality at the point of discharge and at all locations downstream of that point as a condition of enrollment under the General Order.

4.2.5 Self-Certification for Inspections of BMP Operation and Maintenance

The Permittees request inclusion in the fifth-term Permit the option of developing a self-certification or third-party certification program for certain BMPs and developments. For example, a development that has only one required BMP (e.g., a bioswale) and does not pose a significant threat to a receiving water should be able to self-certify that the BMP is functional per the frequency provided in the most current DAMP. Further, sites with history of effective BMP deployment should be allowed to self-certify. The Permittees, however, would still be responsible for ensuring that the BMP is in compliance with their stormwater ordinances and the MS4 Permit.

4.2.6 Regional Opportunities

Section 4.1.4 of this ROWD describes the importance in the SAR of integrated water resources management. In addition to supporting efforts to comply with TMDL WLAs and other water quality issues, integrated water resources management has the critical additional benefit of addressing water supply requirements.

With continued development in the region, the opportunity for development of regional or sub-regional BMP projects to manage urban runoff will increase. Moreover, where such projects can be linked with other regional efforts to more effectively manage water resources, opportunities for partnerships among water agencies should be encouraged.

The 2010 Permit established the following LID BMP hierarchy: infiltration, harvest and reuse, bioretention, and biotreatment. Developers must evaluate the feasibility of implementing these LID BMPs on-site before an alternative compliance approach may be considered, such as reliance on a regional BMP. This hierarchy raises significant barriers to the implementation of regional or sub-regional BMP projects. Given the regional need to manage water use more effectively and the desire

[50] Resolution R8-2009-0003

among many regional water purveyors, POTWs, planning agencies, and others to focus resources on the development of multi-benefit projects, it is critical that where opportunities become available to use urban runoff as a resource to support an integrated water resource project, the MS4 Permit not pose a barrier to such participation.

The recently adopted Los Angeles County MS4 Permit establishes performance criteria that may be applied to a project where there is an opportunity for regional groundwater replenishment off-site from the development.[51] This permit language supports opportunities to manage local water resources more effectively. The draft Orange County MS4 Permit allows for the use of off-site LID BMPs where appropriate demonstrations are satisfied. The Permittees request similar flexibility in the next MS4 permit. The permit should facilitate regional projects where opportunities exist to support urban runoff management.

4.3 Continued Regional Collaboration

One of the keys to progress in urban runoff management over several permit terms, and particularly in the last decade, has been the collaboration between and among the Urban Runoff Management Program, other agencies, the Regional Board, and regional watershed groups (see discussion in Section 2.3). This collaboration has developed and grown as the benefits of shared water management goals have become more apparent. During the fifth permit term, the program will continue to look for opportunities to implement collaborative integrated water resource management projects that improve urban runoff quality. The following is a brief overview where such opportunities may exist.

4.3.1 Santa Ana Region County Urban Runoff Management Programs

The Urban Runoff Management Program has been coordinating with the Orange County and San Bernardino County Urban Runoff Management Programs for many years to share knowledge gained in urban runoff management and to work collaboratively on regional water quality and regulatory issues through the Task Forces administered by SAWPA. These Task Forces are funded in part by the Permittees (e.g., MSAR Bacteria TMDL Task Force and SWQSTF). In addition, Permittees in all three counties are active participants in the OWOW initiative, which is guiding the types of integrated water resource management projects described above in Section 4.1.4. During the fifth permit term the Urban Runoff Management Program will continue to coordinate with its neighboring programs on an as-needed basis and will continue to contribute funding to Task Force activities.

4.3.2 Regional Board

The Urban Runoff Management Program currently collaborates effectively with the Regional Board through participation in several regional task forces: (a) MSAR Bacteria TMDL; (b) LE/CL TMDL; (c) Stormwater Quality Standards; and (d) the Technical Advisory Committee (TAC). Participation in these task forces provides the opportunity for the Permittees and Regional Board staff to share views openly and to identify approvable approaches to address high priority water quality concerns. During the next permit term, the program will continue its participation in, and funding support of, these activities. In addition, the program plans to work collaboratively with the Regional Board on the implementation of the RMP being developed to support the adopted recreational use standards BPA.

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[51] Los Angeles Regional Water Quality Control Board Resolution R4-2012-0175; http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/stormwater/municipal/index.shtml

4.3.3 Other Agency Collaboration

The Permittees already regularly collaborate with other agencies, including but not limited to water purveyors, wastewater dischargers, and agricultural interests, to coordinate urban runoff management activities and/or TMDL implementation requirements in the Permit Area. Some of this collaboration occurs between individual Permittees and local agencies, while other efforts, such as with the agricultural community, occur through the work of the TMDL Task Forces. In the next permit term the Permittees will look for opportunities to address urban runoff water quality concerns through enhanced collaboration with agencies interested in water resource management projects. This is not an activity which should be facilitated (though not mandated) by the fifth-term Permit, so that the Permittees may focus resources on opportunities that are most likely to bear fruit and not be locked in to Permit-required efforts. Sufficiently flexible language in the Permit should achieve this goal.

Additionally the Permittees, as represented by the District, also participate in the SMC Regional Watershed Monitoring Program. The program aims at assessing the regional health of southern California's rivers and streams. This regional monitoring consortium includes southern California Coast Water Research Project, the USEPA Office of Research and Development, Caltrans, the SWRCB, the Los Angeles, Santa Ana, and San Diego Regional Water Quality Control Boards, each of the Principal Permittees in Southern California, and the Cities of Los Angeles, San Diego, and Long Beach.

The overall goal for this consortium is to establish a southern California stormwater research and monitoring program that focuses on improvement of stormwater monitoring science, coordination among data collection programs and evaluation of the effects of stormwater discharges to receiving waters. The SMC's Final Report for monitoring completed during the period of 2009-2013 is anticipated to be published in 2015.

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Section 5

Challenges to Effective Urban Runoff Management

5.1 Finite Economic Resources

The fiscal resources that Permittees can allocate to urban runoff management, while significant, are finite. Given this reality, the Permittees must direct urban runoff management program spending towards the highest priority water quality concerns. For the Permit Area, the highest priorities are implementation of the CBRP and CNRP to comply with Bacterial Indicator and Nutrient TMDLs. To date, the Regional Board and State Water Board have shown their agreement with these priorities by approving multiple grant awards to provide seed money to ensure that CBRP/CNRP urban runoff management projects move from concept to reality.

The Permittees request that the fifth-term Permit explicitly recognize the value of setting program priorities to address the most important water quality concerns. The top priority of the Urban Runoff Management Program will continue to be those water quality issues where the risk to public health and safety is greatest. Water quality issues with lesser impacts on health and safety will be addressed as resources become available.

This risk-based approach to urban runoff management is consistent with USEPA's Integrated Planning Framework (discussed in Section 4.1.5), which recognizes that individual agencies must prioritize their financial resources on the most significant water quality challenges. The Urban Runoff Management Program is already implementing USEPA's approach to water management. The Permittees request that the fifth-term Permit facilitate, and not impede, the continued implementation of this urban runoff management philosophy. In particular, the Permit's RWLs language should reflect the iterative/compliance path approach discussed in Section 4.2.1, which will allow Permittees to focus their efforts – and taxpayer dollars – on addressing the major and chronic urban runoff issues in the Permit Area, not chasing random exceedances with no major impacts on beneficial uses.

5.2 Conflicting Mandates and Uses

While most MS4 facilities were originally designed to manage stormwater during high flow events to protect life and property, these facilities also manage non-flood related waters, such as facilitating water transfers, managing rising groundwater, and conveying water from fire hydrant testing and water well blow-offs. As discussed in Section 4.2.4, many of these discharges are permitted under waste discharge requirements, including the provisions of the General *De Minimus* Permit issued and administered by the Regional Board. In addition, stormwater discharges from Phase II and other Phase I dischargers (e.g., Caltrans) to MS4 facilities operated by the Permittees are also allowed by the State Water Board and the Regional Board.

The use of Permittee-operated MS4 facilities for such discharge is creating conflicts with the strict MS4 permit requirements imposed on the Permittees. For example, although wastewater discharges from POTWs may meet Water Quality Objectives at the point of discharge, the flows may promote growth and resuspension of bacterial indicators in downstream channels, including receiving waters. Stormwater discharges from Phase II and other Phase I dischargers may contribute pollutants and contribute to hydromodification of downstream channels. However, not only are the Permittees

expected to manage the quality and volume of these other discharges, but these other dischargers are not required to participate in funding the monitoring of the receiving water quality or to address hydromodification impacts.

Another area where conflicting mandates has become an issue is the increasing challenge faced by the Permittees in attempting to modify or retrofit existing MS4 facilities. For example, a project to modify a retention basin to deepen, enlarge, or change the flow pattern may, because of impacts on habitat, require multiple permitting/approval steps, where multiple agency reviews can delay or even prevent a project necessary to manage urban runoff quality. Typical permitting/approvals for such projects may include:

- CEQA review
  - Biological surveys and reports
  - Cultural surveys and reports
  - Air and Noise studies and reports
  - Mitigation proposal (on-site, off-site, in-lieu fee) and potentially a mitigation management plan
  - Nesting bird/burrowing owl plan, if required
  - Jurisdictional delineation
- 1602 Streambed Alteration Agreement (California Department of Fish and Wildlife)
- 401 Certification (Regional Board)
- 404 Permit (USACE)
  - Maintenance Baseline Study

The potential for the permitting and approval process to impact the viability of a water quality improvement project is high. A recent example is the evaluation of BMP alternative scenarios developed to protect Lake Mathews from potential impacts from urban runoff. The *best* BMP alternative to improve urban runoff water quality (which would have included other benefits, such as improved wildlife habitat) involved development of in-stream treatment wetlands in Cajalco Creek and a tributary to the Creek. However, due to the difficulty in permitting an in-stream BMP under the CWA,[52] it was determined that other, less environmentally, effective alternatives ranked higher.

These multiple levels of reviews, approvals and permitting have two potentially significant adverse impacts on urban runoff management projects. The first is the potential for diminishing the effectiveness of the original project through multiple project adjustments required by the reviewing agencies. The second is the potential for delay in ultimate completion of the project, which in turn, can affect the Permit compliance status of the Permittees.

The Permittees certainly understand that government agencies must comply with their mandates to review and evaluate proposed projects. However, the Regional Board should at the same recognize that the decisions of these other agencies can severely impact the viability and timeliness of an urban runoff management project. Where the Permittees have made a good faith effort to manage urban runoff, but compliance with Permit requirements is delayed or hindered by the project approval

[52] *Lake Matthews Watershed Water Quality Improvement Study*. Final Report, Metropolitan Water District of Southern California, December 2012.

process, the Regional Board should recognize those obstacles in its assessment of the Permittees' compliance with the Permit.

5.3 Barriers to Regional Approaches to Urban Runoff Management

California is in the midst of a water supply crisis because of extended and extreme drought. Regardless of the drought's ultimate duration, agencies with water management responsibilities, including Permittees, must work together to effectively manage local water supplies. One of the keys to enhancing supply is through the conservation, capture and infiltration of urban runoff. As discussed in Section 4.2.6, provisions in the 2010 Permit limited the opportunity for the Permittees to participate in regional projects where water can be captured and infiltrated to recharge groundwater. The Permittees have requested that this permit language be modified to remove this barrier to allow effective regional water management. Permittees also wish to work with Regional Board staff on the language of the fifth-term Permit to ensure that the Permit facilitates, and not impedes, the use of urban runoff as a local or regional water resource. In this critical time for California, the Permittees and the Regional Board must be partners in the creative use of urban runoff as a water resource.

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Attachment A

MS4 Facility Maps

Maps included in separate folder

Attachment B

Path to Compliance with Dry Weather Wasteload Allocation for Middle Santa Ana River Bacterial Indicator TMDL

Attachment B

Interim Progress Evaluation for Riverside County's Compliance with the Urban Runoff Waste Load Allocation in the Middle Santa Ana River Bacterial Indicator TMDL

Summary

Municipal Separate Storm Sewer System (MS4) Permittees named in the Bacterial Indicator Total Maximum Daily Load (TMDL) for the Middle Santa Ana River (MSAR) must be in compliance with the urban Wasteload Allocation (WLA) for Dry Season conditions by the end of 2015. Riverside County MS4 Permittees will meet this requirement by aggressively implementing the Comprehensive Bacteria Reduction Plan (CBRP) that the Regional Board approved in 2012. By spring of 2016, monitoring data and related source analysis studies will demonstrate that urban runoff is no longer a significant source of controllable bacterial loads in the 303(d)-listed waterbodies in the MSAR watershed.

TMDL Regulatory Requirements

In 2005, the Santa Ana Regional Water Quality Control Board (Regional Board) adopted a TMDL for Bacterial Indicators in the following waterbodies:[1]

Santa Ana River - Reach 3	Chino Creek - Reach 1
Mill Creek (Prado Area)	Chino Creek - Reach 2
Prado Park Lakes	Cucamonga Creek - Reach 1

In the TMDL, the Regional Board established the following numeric target for pathogen indicator bacteria:

> *"E. coli: log mean less than 126 organisms /100 mL based on five or more samples per 30-day period, and not more than 10% of the samples exceed 235 organisms/100 mL for any 30 day period."*[2]

To achieve the numeric target, the Regional Board also approved the following WLA for bacterial indicators in urban runoff:

> *"5-sample/30-day Logarithmic Mean [must be] less than 113 [E. coli] organisms per 100 mL, and not more than 10% of the samples [may] exceed 212 organisms/100 mL for any 30-day period."*

The final compliance date for the WLA for urban runoff during Dry Season conditions (April 1 through October 31) is December 31, 2015. The final compliance date for the WLA for urban runoff during Wet Season conditions (November 1 through March 31) is December 31, 2025. [3]

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[1] R8-2005-0001 (August 26, 2005); the TMDL was subsequently approved by the State Water Resources Control Board (State Water Board) on May 15, 2006; by the Office of Administrative Law on September 1, 2006 and the USEPA on May 16, 2007.

[2] The Regional Board also established a numeric target and WLA for fecal coliform. However, this provision automatically became ineffective when the Basin Plan was amended to delete the Water Quality Objectives for fecal coliform in June 2012 (R8-2012-0001).

[3] The TMDL included similar requirements and deadlines for the regulation of bacteria loads in runoff from Confined Animal Feeding Operations (CAFOs) and other agricultural discharges.

TMDL Implementation Strategy

In early 2006, a MSAR Bacterial Indicator TMDL Task Force (Task Force) was formed to coordinate all TMDL implementation activities.[4] The principal purpose was to develop a water quality monitoring program to identify sources and assess progress toward compliance. That program was approved by the Regional Board in June of 2007.[5] Implementation began immediately and the Task Force continues to meet quarterly to oversee the monitoring effort and to review the results.

The Task Force collects and analyzes at least 175 samples each year to evaluate bacterial indicator levels at the five designated compliance stations. Two reports, one summarizing results for the Dry Season and the other summarizing results for the Wet Season, are submitted annually to the Regional Board.[6]

The Task Force also initiated a large-scale Urban Source Evaluation Plan (USEP) to ascertain the source of bacteria loads discharged to the lakes and streams named in the TMDL. In addition to the five primary compliance sites, water quality samples were collected at 13 additional tributary stations throughout 2007 and 2008. The resulting data (which were reported to the Regional Board[7]) were used to develop a risk-based ranking system to guide all future source identification efforts.

In January 2010, the Regional Board re-issued the MS4 Permit for Riverside.[8] The Permit required the Urban Runoff Management Program to comply with the TMDL by developing and implementing a CBRP. The CBRP was approved by the Regional Board in February 2012.[9]

The CBRP set forth a rigorous water quality monitoring and evaluation process to reduce significant controllable sources of bacterial indicators in urban runoff. Particular emphasis is placed on identifying (and eliminating) high-risk human pathogen sources through the use of molecular DNA analysis. The monitoring data collected from this effort is used to direct Best Management Practices (BMPs) and other remediation strategies throughout the watershed.

The MS4 permit also requires the Permittees named in the TMDL to summarize their implementation efforts and progress toward compliance in a report submitted to the Regional Board every three years. The most recent report was submitted in February 2013.[10]

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[4] Members included all of the MS4 Permittees in both Riverside and San Bernardino County and representatives from the dairy industry and irrigated agriculture community. The Task Force is administered by SAWPA.
[5] R8-2007-0046; June 29, 2007.
[6] Annual reports can be downloaded under the Monitoring tab at: http://www.sawpa.org/collaboration/projects/tmdl-taskforce/.
[7] CDM Smith. Middle Santa Ana River Bacterial Indicator TMDL Data Analysis Report; March 19, 2009.
[8] R8-2010-0033 (NPDES No. CAS618033); January 29, 2010.
[9] R8-2012-0015 (Riverside); February 10, 2012.
[10] CDM Smith. Middle Santa Ana River Bacterial Indicator TMDL Implementation Report; February, 2013.

Basin Plan Amendments

In June of 2012, the Regional Board adopted several amendments to the Water Quality Control Plan (Basin Plan) for the Santa Ana Region that directly affect implementation requirements for the MSAR Bacterial Indicator TMDL.[11] Specifically, the Basin Plan amendments made the following key changes:

1) Established a new numeric Water Quality Objective for *E. coli* in REC1 waters.
2) Established a new narrative Water Quality Objective for human pathogens.
3) Deleted the fecal coliform objectives for freshwaters designated REC1 or REC2.
4) Temporarily suspended REC1 & REC2 standards in certain high flow conditions.
5) Established new procedures to prevent water quality degradation by bacteria.
6) Removed the REC1 & REC2 use designations from Cucamonga Creek - Reach 1

The Basin Plan amendments were the result of a long-term cooperative effort between Regional Board staff and local stakeholders. Thus, some of the changes (such as the adoption of *E. coli* objectives and deletion of obsolete fecal coliform objectives) were already incorporated into the TMDL and the CBRP even before adoption of the Basin Plan amendments.

Other provisions in the Basin Plan amendments have not yet been integrated into the TMDL or the CBRP. For example, the Basin Plan now recognizes that some sources of bacteria (e.g., birds, wildlife, sediment biofilms, etc.) are naturally-occurring and not reasonably controllable. The source evaluation studies conducted by the Task Force indicate that much of the remaining bacteria in local lakes and streams appear to originate from such sources and thus, the TMDL may need to be revised to reflect this new information.

In addition, the TMDL recognized the important distinction between wet weather flows and dry weather flows by establishing different compliance dates for Wet and Dry Seasons. Monitoring conducted since the TMDL's adoption in 2005 shows that while storms are more likely to occur in the winter, they can occur at any time of year. Since the Basin Plan amendments temporarily suspend water quality standards under certain high flow conditions regardless of the season, the TMDL must be revised accordingly.

Finally, because the concrete-lined segment of Cucamonga Creek is no longer designated for recreational uses, the bacteria standards no longer apply in Reach 1 of this stream. It is thus likely that Cucamonga Creek will be removed from the 303(d) list in 2016. Nevertheless, Reach 3 of the Santa Ana River is still designated REC1 and Cucamonga Creek is tributary to this segment. Therefore, the MSAR Permittee members of the Task Force remain committed to implementing BMPs designed to meet water quality standards in the Santa Ana River by reducing controllable sources of bacteria in the urban runoff flowing from Cucamonga Creek to Reach 3.

[11] R8-2012-0001; June 15, 2012. Subsequently approved by the State Water Board Resolution No. 2014-0005 (January 21, 2014) and the Office of Administrative Law (#2014-0520-02 S; July 2, 2014). Basin Plan amendments are now undergoing final review and approval by USEPA.

TMDL Compliance Outlook

The TMDL set a final compliance date of December 31, 2015 for the Dry Season (April 1 through October 31) WLA for bacterial indicators in urban runoff. The Riverside County MSAR Permittees are implementing numerous projects throughout the watershed to meet this date and believe that, as a result, they will have virtually eliminated all controllable sources of bacteria in urban runoff before the start of the Dry Season in 2016.

The Riverside County MSAR Permittees' primary compliance strategy is focused on identifying and eliminating controllable sources of bacteria in urban runoff. Special emphasis has been placed on reducing nuisance runoff, identifying illicit discharges that may contribute to bacteria loading, such as leaking sewers and septic systems or areas with inadequate sanitation, and discouraging transient encampments near the Santa Ana River. This approach is superior because several channels that drain to the Santa Ana River convey not only urban runoff but also potable water, groundwater and/or treated wastewater for habitat support and/or downstream water supply uses. Eliminating and/or rerouting such discharges would cause significant harm to these uses, which are a priority of the Regional Board. Therefore, the Riverside County program has focused on the elimination of controllable, urban sources of runoff pursuant to the Basin Plan.

However, where diversion of low-flow urban runoff would not harm environmental resources or affect water resource needs, the Monitoring Program has also been evaluating opportunities to intercept and divert low-flow urban runoff in certain channels during dry weather conditions. Several pilot projects are in development.

Annual sampling data from Riverside County show that the flow of dry weather urban runoff has declined dramatically (**Figure A-1**). From 1990 to 1999, for example, 5% of all attempts to collect dry weather samples were unsuccessful due to a lack of urban runoff flowing in the storm channel. From 2004 to 2013, 68% of the dry weather sampling sites lacked sufficient flow to collect a water quality sample. Even in very wet years, such as 2005 and 2010, more than half of these sampling sites were dry during the warm weather months. This trend is likely to continue as tiered rates and other water conservation measures further reduce runoff from excess landscape irrigation.

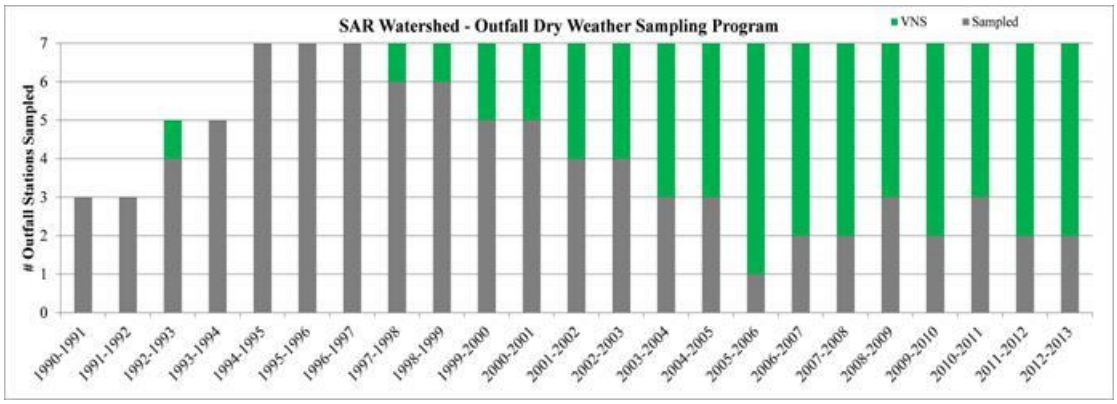

Figure A-1. Summary of Successful Dry Weather Sample Collection in Riverside Co. (1990-2013). (Note: VNS = "Visited, Not Sampled" due to insufficient flow in the flood control channel).

Using data collected in 2007-08, the Task Force previously estimated that non-MS4 and non-POTW sources could account for 85% of the bacterial load in Chino Creek, 96% of the bacterial load in Mill/Cucamonga Creek, and nearly half of the bacterial load in Reach 3 of the Santa Ana River (**Figure A-2**).

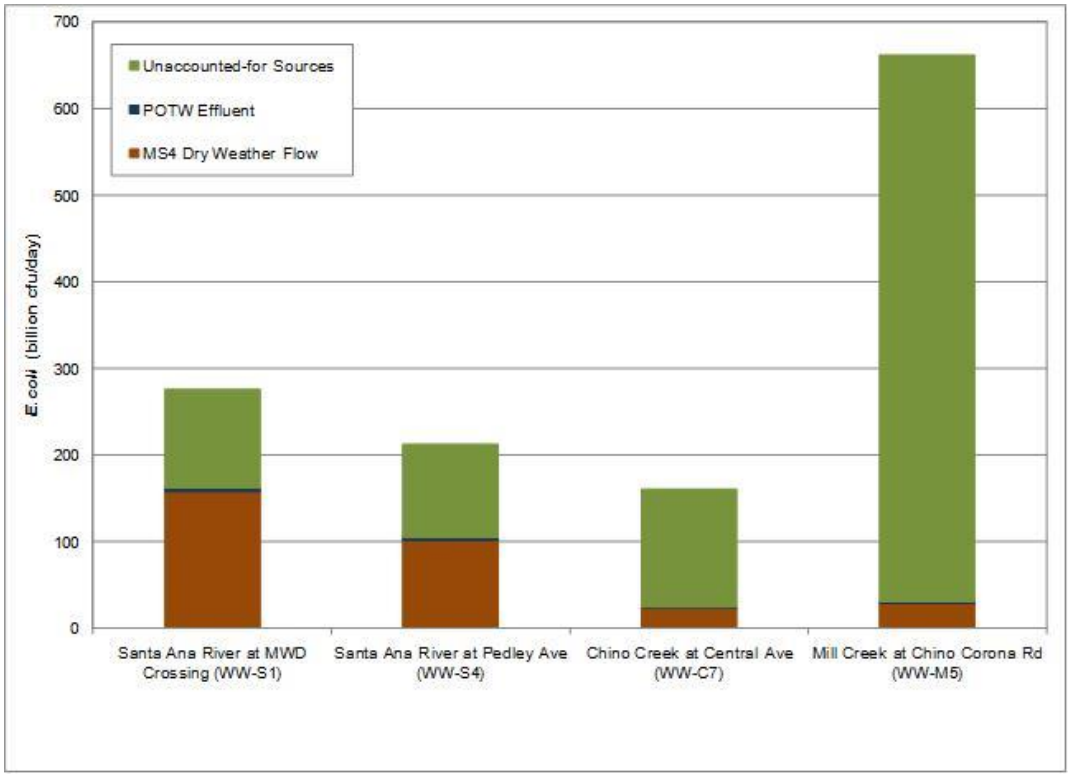

Figure A-2. Estimated Relative Sources of Bacterial Indictors at Watershed-wide Compliance Sites (Source: Figure 6-2, CBRP, June 28, 2011).

A recent update of the CBRP analysis (discussed above) continues to point to substantial "unknown," non-MS4/non-POTW components to bacterial loading. More than half of the bacterial load measured in Chino Creek (@ Central Ave.) and in Reach 3 of the Santa Ana River (@ MWD crossing) originates from sources other than urban runoff or POTW effluent (**Figures A-3 and A-4**). And, long-term water quality monitoring data suggest that instream bacteria concentrations tend to increase throughout the summer months even as the flow of dry weather urban runoff is declining to its lowest level of the year.

In 2015, the Task Force intends to initiate several new studies to confirm and quantify the bacterial loads attributable to uncontrollable natural sources (such as birds, wildlife and sediment biofilms). In the interim, the County programs will continue to utilize the risk-based source evaluation system and intensive water quality monitoring to identify and eliminate controllable sources of bacteria in urban runoff.

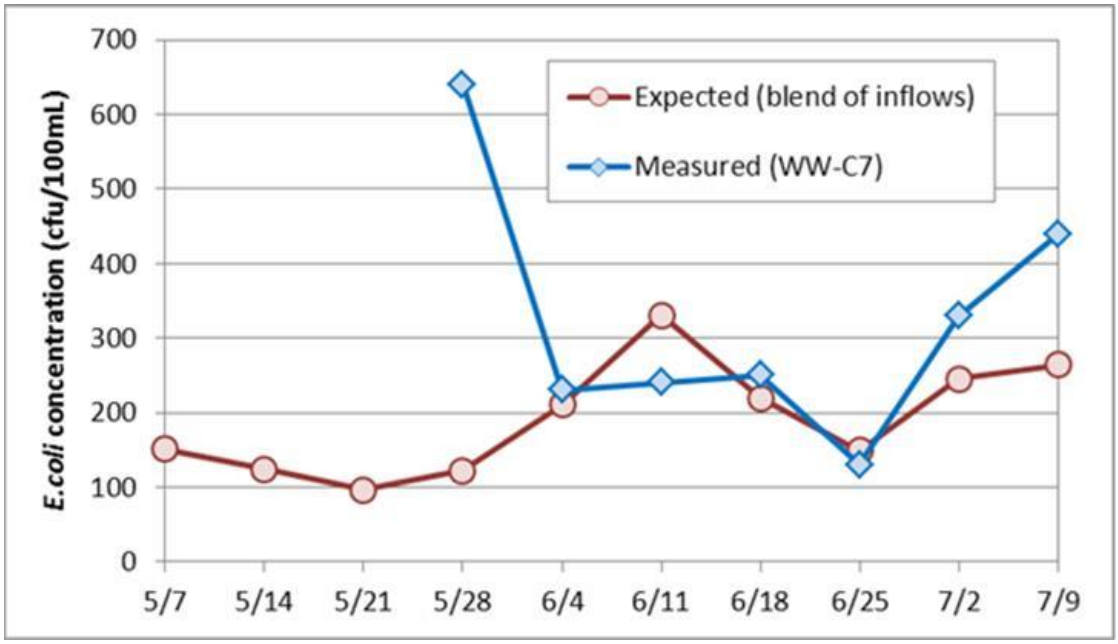

Figure A-3. Comparison of Estimated Blended E. coli Concentration of MS4 and Clean POTW Effluent with Downstream Watershed-Wide Compliance Monitoring Data for Chino Creek at Central Avenue (Source: Figure 3-11, CBRP TMDL Implementation Report, February 2013).

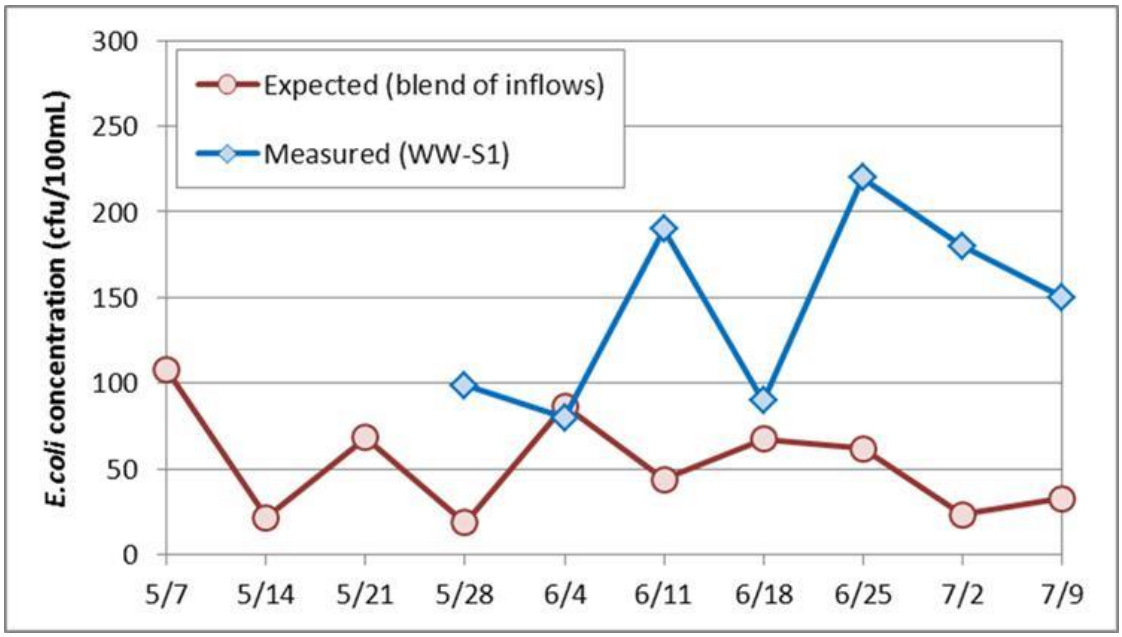

Figure A-4. Comparison of Estimated Blended E. coli Concentration of MS4 and Clean POTW Effluent with Downstream Watershed-Wide Compliance Monitoring Data for Santa Ana River at MWD Crossing (Source: Figure 3-17, CBRP TMDL Implementation Report, February 2013).

Attachment C

Receiving Waters Limitations Language Supporting Documentation

This attachment includes the following District letters regarding State Water Board activities involving development of Receiving Water Limitations language in MS4 Permits:

- Comment Letter on Receiving Water Language Workshop to Clerk to the State Water Board, dated November 13, 2012.
- SWRCB/OCC File A-2236(a) through (kk) – Questions Concerning Los Angeles County MS4 Permit to the Office of Chief Counsel, State Water Board, dated August 15, 2013

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

November 13, 2012

Honorable Members of the State Water Resources Control Board
Attn: Ms. Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Dear Honorable Board Members and Ms. Townsend:

Re: Comment Letter – Receiving Water Limitations Language Workshop

I am writing on behalf of the Riverside County Flood Control and Water Conservation District ("District") regarding the State Water Resources Control Board's consideration of Receiving Water Limitations ("RWL") language in MS4 permits. This review was triggered by a decision of the Ninth Circuit United States Court of Appeals in *Natural Resources Defense Council v. County of Los Angeles* (9th Cir. 2011) 673 F.3d 880, *cert granted,* __ U.S. __ (June 25, 2012) ("*NRDC*"). This letter is being submitted in advance of the State Board's November 20, 2012 workshop on reform of the RWL language to be incorporated into MS4 permits as a matter of statewide policy.

The District is the Principal Permittee for three Phase I MS4 permits applicable to municipalities across Riverside County: Order R8-2010-0033, issued by the Santa Ana Regional Water Board to municipalities within the Santa Ana River Region of Riverside County; Order R9-2010-016, issued by the San Diego Regional Water Board to municipalities within the Santa Margarita Region of Riverside County; and Order R7-2008-0001, issued by the Colorado River Regional Water Board to municipalities within the Whitewater River Region of Riverside County. Given our unique perspective as the manager of three Phase 1 MS4 permits, the District and its staff thus, have considerable experience and expertise in developing and administering MS4 permits, and a keen understanding of the issues that the above mentioned court case creates.

The District strongly supports reform of the RWL language to make clear the State Board's often-expressed intention that MS4 Permittees' compliance with RWL be effectuated through an iterative process. However, under the Ninth Circuit's interpretation, any MS4 discharge that causes or contributes to an exceedance of a Water Quality Standard subjects the MS4 Permittee to civil penalty liability, injunctive relief and the payment of attorneys' fees in an action brought by a citizen plaintiff, even where the Permittee is fully implementing the programmatic requirements of their MS4 Permit.

The District supports the California Stormwater Quality Association's ("CASQA") efforts to obtain RWL language that ensures that the iterative process favored by the State Board is honored. The District also supports the comments of the California State Association of Counties, and believes the proposed RWL language attached to those comments is a step in the right direction.

This letter contains additional District comments about the RWL language and the iterative process. We believe that they are best expressed in terms of correcting misperceptions regarding the current RWL language, as interpreted by the Ninth Circuit.

Misperception Number One: Strict compliance with Water Quality Standards is required of MS4 Permittees by the Clean Water Act.

The Clean Water Act provides that MS4 discharges must control pollutants in discharges from the MS4 to the "Maximum Extent Practicable" (33 U.S.C. § 1342(p)(3)(B)(iii)). Unlike the case with other NPDES Permittees, the Clean Water Act does not require that municipalities strictly comply with Water Quality Standards, as determined by the Ninth Circuit in *Browner v. Defenders of Wildlife*. The State Board's own precedential Order WQ 2001-15 recognizes this fact and states that the RWL language was intended to be consistent with the *Browner* case. In that Order, which interpreted RWL language similar to that in *NRDC*, the Board stated:

> *[O]ur language, similar to the U.S. EPA's permit language discussed in the Browner case, does not require strict compliance with water quality standards. Our language requires that storm water management plans be designed to achieve compliance with water quality standards. Compliance is to be achieved over time, through an iterative approach requiring improved BMPs. As pointed out by the Browner court, there is nothing inconsistent between this approach and the determination that the Clean Water Act does not mandate strict compliance with water quality standards. [Order WQ 2001-15 at 7 (emphasis added)].*

Unfortunately, the Ninth Circuit completely disregarded this language, and the Order, in holding that strict compliance was required of MS4 Permittees.

USEPA itself has issued MS4 permits (in non-delegated states) that do not contain RWL language requiring strict compliance with Water Quality Standards. Therefore, it is clear that such compliance is not required by the Clean Water Act nor is such compliance established by USEPA policy. The most prominent example of a recent MS4 permit promulgated by USEPA is that for the District of Columbia ("DC Permit") (relevant portions of which are attached as Exhibit A), which was adopted in 2011.

Part 1.4 of the DC Permit contains the requirements relating to Water Quality Standards and provides, in relevant part: "Compliance with the performance standards and provisions contained in Parts 2 through 8 of the permit shall constitute adequate progress towards compliance with DCWQS [water quality standards] and WLAs [established under TMDLs] for this permit term." The DC Permit Fact Sheet explains the rationale for that language as follows [DC Permit Fact Sheet, Pages 5-6, emphasis added, attached as Exhibit B]:

> *Comments on the language in Part 1.4 varied widely. Some commenters did not believe it was reasonable to require discharges to meet water quality standards. Other commenters believed this to be an unambiguous requirement of the Clean Water Act.*

Today's Final Permit is premised upon **EPA's longstanding view that the MS4 NPDES permit program is both an iterative and an adaptive management process for pollutant reduction and for achieving applicable water quality standard and/or total maximum daily load (TMDL) compliance.** *See generally, "National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges," 55 F.R. 47990 (Nov. 16, 1990).*

EPA is aware that many Permittees, especially those in highly urbanized areas such as the District, likely will be unable to attain all applicable water quality standards within one or more MS4 permit cycles. *Rather the attainment of applicable water quality standards* **as an incremental process** *is authorized under section 402(p)(3)(B)(iii) of the Clean Water Act, 33 U.S.C. § 1342(p)(3)(B)(iii), which requires an MS4 permit "to reduce the discharge of pollutants to the maximum extent practicable" (MEP) "and such other provisions" deemed appropriate to control pollutants in municipal stormwater discharges.* **To be clear, the goal of EPA's stormwater program is attainment of applicable water quality standards, but Congress expected that many municipal stormwater dischargers would need several permit cycles to achieve that goal.**

Specifically, the Agency expects that attainment of applicable water quality standards in waters to which the District's MS4 discharges, requires staged implementation and increasingly more stringent requirements over several permitting cycles. During each cycle, EPA will continue to review deliverables from the District to ensure that its activities constitute sufficient progress toward standards attainment. With each permit reissuance EPA will continue to increase stringency until such time as standards are met in all receiving waters. **Therefore today's Final Permit is clear that attainment of applicable water quality standards and consistency with the assumptions and requirements of any applicable WLA are requirements of the Permit, but, given the iterative nature of this requirement under CWA Section 402(p)(3)(B)(iii), the Final Permit is also clear that "compliance with all performance standards and provisions contained in the Final Permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term" (Section 1.4).**

USEPA is now proposing clarifying changes to this language and to other sections of the DC Permit as the result of a settlement with various parties. However, those changes do not require strict compliance with Water Quality Standards, but rather compliance through the programs developed under the Permit.

The State Board is thus, free to adopt new RWL language that effectuates its previously expressed intent that MS4 permits not require strict compliance with Water Quality Standards with regard to contributions from discharges from MS4s.

Misperception Number Two: The MS4 Permittees are Seeking a "Safe Harbor" that would Insulate them from Responsibility Under the Clean Water Act.

While State Board staff's "Issue Paper" uses the term "safe harbor" in describing the iterative process, the District believes that this is fundamentally misleading. Even a cursory review of the terms of a typical MS4 permit in California reveals that it is full of compliance points. In the three MS4 Permits in which the District serves as Principal Permittee, literally every sentence is a separate point of compliance.

This fact is supported by the language of the Permits themselves. For example, in Order R8-2010-0033 Part XX.G provides: **"The Permittees must comply with all terms, requirements, and conditions of this Order. Any violation of this Order constitutes a violation of the CWA, its regulations and the California Water Code, and is grounds for enforcement action . . . ."** (emphasis added). Similar provisions are contained in the other two Riverside County MS4 Permits. Even without the strict Water Quality Standard language imposed under the Ninth Circuit's opinion, there is no "safe harbor" from liability under the Clean Water Act or, where applicable, the California Water Code, for any Permittee that fails to fully implement each the detailed and prescriptive requirements of its MS4 Permit.

There is a fundamental difference however, between fully complying with activities within the control and responsibility of the Permittees, such as monitoring, implementing BMPs and performing other programmatic requirements of the MS4 Permit; and being forced to guarantee that MS4 discharges will not cause or contribute to exceedances of Water Quality Standards in Receiving Waters, a guarantee that the Permittees' have no ability to make.

What the District and other MS4 Permittees seek is relief from what is essentially "guaranteed non-compliance" where a Permittee can be found in violation of their MS4 Permit even if the exceedance occurs at no fault of or failure by the Permittee, or put another way, even in circumstances where there is nothing a Permittee could have done to prevent that exceedance from occurring. In such a case, the Permittee can be held liable for potentially millions of dollars in legal costs, penalties and other expenses. We note that the City of Malibu, a city of only 13,000 residents, spent more than $2 million in defending against a citizen suit filed with respect to its MS4 Permit and more than $6 million to settle the case, including payment of $750,000 in attorney fees to plaintiffs. Given the tremendous financial challenges faced by every California municipality, including the District, the County of Riverside and the Permittee cities within the County, such a diversion of resources that otherwise would be directed at clean water programs or other vital municipal programs is a poor policy choice. And, as noted, it is not a policy choice that is required by the Clean Water Act, nor is it required by USEPA in their own Permits.

The District recognizes that regulatory enforcement actions and citizen suits are authorized by the Clean Water Act and that such suits may be an appropriate remedy where, for example, a Permittee has failed to comply with the programmatic requirements of its MS4 Permit. Where, however, the Permittees are complying with those requirements in good faith but, due to circumstances beyond

their control, their MS4 discharge causes or contributes to a Water Quality Standard exceedance in Receiving Waters, a citizen suit based on those exceedances potentially throws away the work done by the Permittees and the Water Boards under the MS4 Permit, as discussed below.

Misperception Number Three: MS4 can achieve compliance with strict Water Quality Standards.

MS4 Permittees cannot guarantee that discharges from their MS4s will in fact, not cause or contribute to an exceedance of Water Quality Standards in a Receiving Water. The monitoring conducted under our MS4 Permits reflects exceedances of various Water Quality Standards in Receiving Waters, and we understand that such results are typical for MS4 discharges around the state (please see Pages 2-3 of the CASQA comment letter dated November 2, 2012). The extreme variability of stormwater quality and quantity itself (which, in Southern California, arrives infrequently and from widely varying storm sizes) combined with a multitude of potential pollutant sources beyond a Permittee's ability to truly "control", make it impossible for a municipality to ensure that no discharges from its MS4 will ever cause or contribute to exceedances of Water Quality Standards in Receiving Waters. This was recognized by the Issue Paper released by State Board staff in preparation for the November 20th workshop, which found that as "the storm water management programs of municipalities have matured, **an increasing body of monitoring data indicates that water quality standards are in fact not being met by many MS4s**" (Issue Paper, Page 2 (emphasis supplied)).

Thus, even if municipal Permittees are to be held strictly liable for the ensuring that no discharges from their MS4s cause or contribute to an exceedance of Water Quality Standards, as the Ninth Circuit has interpreted the current RWL language, those Permittees have no ability to attain those standards. The reasons are several-fold and include the following:

1) Unlike an industrial NPDES Permittee, a municipal Permittee is not typically the source of the pollutants in the MS4 discharge (whether wet or dry). The municipality can regulate sources to some degree (through, for example, the operation of structural and non-structural BMPs and implementation of an Illegal Connection/Illicit Discharge program), but the municipality cannot guarantee that pollutants will not enter the MS4 and then be discharged into the Receiving Waters.

2) Municipalities cannot control natural sources of pollutants that are discharged through the MS4. Monitoring has indicated that many pollutants are likely from natural and not anthropogenic sources.

3) While Permittees conduct extensive public education programs as part of their MS4 programs, municipalities cannot "control" human behavior, or "prevent" an individual from taking an action that might cause pollution to enter the MS4. As an example, a resident may, despite all ordinances, regulations, potential penalties or enforcement, public outreach, available BMPs, etc., choose not to pick up after their pets, and

stormwater may, through no fault of the Permittee, pick up animal waste and deposit into the MS4.

4) MS4 Permittees cannot "prevent" flows from entering their MS4. To protect the health and property of their residents, MS4 operators must allow the legitimate flows of water into their drains. This is especially true for the District, which is charged directly by the Legislature [in Water Code App. §48-9] with the task of taking necessary steps to protect the people, properties and watersheds of Riverside County from the negative impacts of flooding. The District cannot, in effect, cause flooding by preventing flows from entering their storm drain, simply because such flows may contain pollutants that cause a violation of the Receiving Waters Limitation provisions of their MS4 Permits. In fact, California law requires downstream property owners (such as MS4 operators) to accept flows from upstream property owners.

5) Further, the authorities granted to flood control districts, such as this District, by the Legislature are narrow and do not include the authority to condition or regulate the quality or nature of stormwater runoff discharged from up gradient properties. This responsibility is appropriately assigned by the Legislature to the Regional Boards.

Similarly, MS4 Permittees cannot guarantee compliance with Water Quality Standards in dry weather. "Alternative 4" in the staff's Issue Paper suggests an alternative RWL approach that would not extend the iterative approach to dry weather discharges. The District submits that this alternative does not reflect the reality of urban runoff. Monitoring conducted under the Riverside County MS4 Permits reflects exceedances of Water Quality Standards during dry weather as well as wet weather. There is no justification for imposition of strict liability for exceedances during such conditions, for the following reasons:

1) During dry weather, other NPDES-permitted discharges continue to flow into the Receiving Waters. For example, much of the flow in the Santa Ana River during dry weather conditions is from non-MS4 sources, such as publicly owned treatment works. Additionally, numerous other separate NPDES-permitted discharges will occur, potentially at concentrations of pollutants that exceed Water Quality Standards. Evidence generated during the *NRDC* case involving the County of Los Angeles, for example, indicated that NPDES permits covering hundreds of these dischargers, including POTWs allowed the discharge of pollutants at concentrations *greater* than Water Quality Standards. Because of these discharges, which are legal and authorized by the Regional Boards, the MS4 Permittees have essentially no more control over compliance with Water Quality Standards in dry weather than they would have during wet weather conditions.

2) Accidental or even intentional illicit discharges by third parties into the MS4 obviously can occur during dry weather as well as wet weather. Such discharges would potentially have an even greater impact on sampling, since they are not diluted by large volumes of stormwater. For example, a vehicular accident recently caused hundreds of gallons of

asphalt tar to enter Sandia Creek, a Receiving Water in Riverside County. While this spill was not discharged through an MS4, if the vehicular accident had occurred in another portion of the watershed, the spill could feasibly have entered into and been discharged from an MS4. Similarly in many places throughout the State, sanitary sewer systems are owned and operated by special districts that have no relation to the MS4 Permittees that own or operate the MS4 systems. Nevertheless, an overflow of such sanitary sewer systems may cause an unavoidable discharge into, and from a Permittee-owned MS4. Such accidental or illicit discharges cannot be "prevented" or "controlled" by the Permittees except to the extent that they can be cleaned up or blocked if promptly reported. However, if the discharge has reached Receiving Waters and caused a measured exceedance of Water Quality Standards, under the Ninth Circuit's interpretation, liability for civil penalties, injunctive relief and attorneys fees will attach to the MS4 Permittee.

3) Enforcing strict Water Quality Standard limits in dry or wet weather is counter-productive to the watershed planning-based MS4 Permits currently being promulgated by many regional water boards. Enforcing such limits will divert Permittee attention and resources from watershed-based, monitoring-heavy compliance programs, as will be discussed in greater detail below.

In essence, under the Ninth Circuit's interpretation of the current RWL language, the District, and potentially every other MS4 Permittee in the state, is in violation of its Permit any time that an exceedance of a Water Quality Standard is recorded and attributed to a discharge from its MS4. This means that the Regional Water Boards have issued, and continue to adopt permits that include RWL language **which cannot be complied with**. The Clean Water Act, however, does not require Permittees to achieve the impossible. *See, e.g., Hughey v. JMS Development Corp.* (11th Cir. 1996) 78 F.3d 1523, 1530 ("In interpreting the liability provisions of the CWA, we realize that Congress is presumed not to have intended absurd (impossible) results.").

Misperception Number Four: The Current RWL Language is more Protective of Receiving Water Quality.

This statement is not only untrue but maintaining the current RWL language actually **impedes** efforts to protect Receiving Water Quality.

We understand that some stakeholders believe that there should be Numeric Effluent Limitations (NELs) contained in the MS4 Permits for purposes of accountability. In response, we note that many MS4 permits now contain numeric Stormwater and Non-stormwater Action Levels ("SALs" and "NALs") or other numeric targets or goals, the exceedance of which trigger specific compliance responses by the Permittees. It is these action levels (which were advocated by the Blue Ribbon Panel established by the State Board to investigate the appropriateness of NELs in MS4 permits) which provide such "numeric" accountability. This is in addition to the numerous other compliance documentation and reporting provisions required of MS4 Permittees that also provide measures of accountability.

More importantly, the current RWL language as interpreted by the Ninth Circuit actually impedes efforts by municipalities to protect water quality. First, by requiring immediate compliance, the language undermines efforts to bring Water Quality Standard-impaired waterbodies into compliance through the Total Maximum Daily Load ("TMDL") program. TMDLs are designed with the recognition that, due to the complexity of the issues causing the waterbody to be impaired in the first place, meeting these requirements cannot be achieved immediately. Therefore, TMDL compliance plans include timelines to achieve such compliance over periods of years and sometimes decades.

Second, most MS4 permits have begun incorporating sophisticated watershed management plans, which prioritize pollutants by waterbody and attempt, through aggressive monitoring and source identification efforts, to identify and address the sources of those prioritized pollutants. Municipalities subject to strict RWL language will have no ability to prioritize pollutants, since they must address any pollutant that exceeds a Water Quality Standard, irrespective of the relative impact that that discharge may have had upon the environment or beneficial uses. Moreover, these watershed management plan approaches employ cooperative monitoring and other watershed-based approaches. Permittees faced with potential liability for any exceedance of Water Quality Standards in Receiving Waters that may be caused or contributed to by discharges of their MS4s, will not likely volunteer to cooperate on any watershed-based approach, if cooperation could subject them to additional unnecessary liability.

Third, in a citizen suit brought under the Clean Water Act, a federal judge is free to impose any appropriate injunctive relief to enforce a permit (33 U.S.C. § 1365(a)). Thus, for example, a court could ignore the provisions of a MS4 permit in ordering municipal defendants to address Water Quality Standard exceedances in Receiving Water. This means that the thousands of people-hours invested in the Permit's development, implementation and oversight by municipalities, the Regional Water Boards and other stakeholders would be wasted. In essence, under the Ninth Circuit's reading of the RWL language, all other language in an MS4 permit appears to be superfluous, since the RWL language would control all compliance efforts. This result, of course, is not required by plain language of the Clean Water Act.

Fourth, if a municipality is in unavoidable and automatic non-compliance with the requirements of its MS4 Permit, it will be unable to justify budgeting for water quality management programs and BMPs otherwise required by the Permit as the municipality will simply receive no benefit from making compliance investments. To gain public support for stormwater programs, a municipality must demonstrate to its residents that such investments will constitute compliance with the Permit.

Discussion of Alternatives

The State Board staff's Issue Paper sets forth five alternatives for consideration. Alternative 1, no change in the current RWL language, is completely unacceptable to the District (and, we believe, to other municipalities across the state) because it fails to address the "guaranteed non-compliance" problem of the current language.

Alternative 2, which proposes to maintain the language that puts the MS4 Permittees in a situation of unavoidable and potentially "guaranteed" non-compliance, but would add greater specification as to how the iterative process might be carried out, is also unacceptable as the MS4 Permittees will still have no viable means to ensure their compliance with the RWL language. While the District does not object in principle to RWL language that spells out clearly, and in achievable terms, what is required of MS4 Permittees when exceedances are recorded, such a change alone does not address the fundamental issues identified in this letter.

Alternative 3, which proposes to provide an iterative process for compliance with the RWL only for pollutants being addressed by dischargers in compliance with an approved TMDL, is better than the first two alternatives, but is still entirely insufficient. By failing to provide a viable means for compliance with the RWL language for non-TMDL pollutants, this alternative language would force Permittees into unavoidable non-compliance, and require them to redirect their efforts and resources away from the TMDL activities, to those other pollutants, due to the strict liability attached to those exceedances. This would be a poor policy choice, as pollutants that are not subject to a TMDL may have significantly less, or even no impact on beneficial uses in the Receiving Waters, as noted in the CASQA comment letter.

Alternative 4, which excludes dry weather discharges from the iterative process to comply with the RWL, is unacceptable for the reasons previously set forth regarding an MS4 Permittees inability to truly "prevent" or "control" accidental or illegal dry weather discharges.

Alternative 5, which provides viable means for compliance with the RWL, for all types of MS4 discharges, is the only viable solution among the alternatives presented by State Board staff. In an era of limited budgets, the only and best way to make progress toward improving the quality our Receiving Waters, is to provide MS4 Permittees the ability to prioritize their efforts, as required in the Watershed Management Plan provisions contained in the most recent MS4 Permits, including the Los Angeles County Permit and the proposed Regional Permit for the San Diego Regional Water Board. As previously discussed, such prioritization cannot occur in the context of strict liability for the exceedance of Water Quality Standards in the Receiving Waters. For all of the reasons set forth in this letter, no other alternative makes policy sense or is congruent with the Maximum Extent Practicable standard in the Clean Water Act.

The District would add that Alternative 5 should additionally incorporate the concept of achieving RWL compliance through watershed management plans, and requests the Board to direct staff to work with stakeholders to ensure that any revised RWL language does not force intermittent or minor exceedances of Water Quality Standards to become de-facto higher priorities than those set by the watershed stakeholders.

In summary, the District supports CASQA, the California State Association of Counties and other municipal stakeholders in advocating for a fully iterative and viable approach to compliance with RWL language in both wet and dry weather conditions. Only when such an approach is in place and endorsed by the State Board will Permittees, including the District, feel confident that they can focus

fully on efforts to address pollutants in discharges into and from their MS4s, and not on preparing for costly and pointless litigation.

The District therefore, respectfully requests the State Board direct its staff to commence development of new language providing for an enforceable, iterative and viable process for MS4 Permittees to comply with the RWL language included in MS4 permits.

We wish to thank you and State Board staff for your consideration of these comments and any further comments, written or oral, that the District may make on these important issues.

Very truly yours,

Steve Thomas

For WARREN D. WILLIAMS
General Manager-Chief Engineer

CP:cw
P8/150189

EXHIBIT A

NPDES Permit No. DC0000221

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*

Government of the District of Columbia
The John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

is authorized to discharge from all portions of the municipal separate storm sewer system owned and operated by the District of Columbia to receiving waters named:

Potomac River, Anacostia River, Rock Creek and stream segments tributary to each such water body

in accordance with the Stormwater Management Program(s) dated February 19, 2009, subsequent updates, and related reports, strategies, effluent limitations, monitoring requirements and other conditions set forth in Parts I through IX herein.

The effective issuance date of this permit is: October 7, 2011.

This permit and the authorization to discharge shall expire at midnight, on: October 7, 2016.

Signed this 30th day of September, 2011.

Jon M. Capacasa, Director
Water Protection Division
U.S. Environmental Protection Agency
Region III

1. DISCHARGES AUTHORIZED UNDER THIS PERMIT

1.1 Permit Area

This permit covers all areas within the jurisdictional boundary of the District of Columbia served by, or otherwise contributing to discharges from, the Municipal Separate Storm Sewer System (MS4) owned or operated by the District of Columbia. This permit also covers all areas served by or contributing to discharges from MS4s owned or operated by other entities within the jurisdictional boundaries of the District of Columbia unless those areas have separate NPDES MS4 permit coverage or are specifically excluded herein from authorization under the District's stormwater program. Hereinafter these areas collectively are referred to as "MS4 Permit Area".

1.2 Authorized Discharges

This permit authorizes all stormwater point source discharges to waters of the United States from the District of Columbia's MS4 that comply with the requirements of this permit. This permit also authorizes the discharge of stormwater commingled with flows contributed by process wastewater, non-process wastewater, or stormwater associated with industrial activity provided such discharges are authorized under separate NPDES permits.

This permit authorizes the following non-stormwater discharges to the MS4 when appropriate stormwater activities and controls required through this permit have been applied and which are: (1) discharges resulting from clear water flows, roof drainage, dechlorinated water line flushing, landscape irrigation, ornamental fountains, diverted stream flows, rising ground waters, uncontaminated ground water infiltration to separate storm sewers, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation waters, springs, footing drains, lawn watering, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, wash water, fire fighting activities, and similar types of activities; and (2) which are managed so that water quality is not further impaired and that the requirements of the federal Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*, and EPA regulations are met.

1.3 Limitations to Coverage

1.3.1 Non-stormwater Discharges

The permittee, as defined herein, shall effectively prohibit non-stormwater discharges into the MS4, except to the extent such discharges are regulated with an NPDES permit.

1.3.2 Waivers and Exemptions

This permit does not authorize the discharge of any pollutant from the MS4 which arises from or is based on any existing waivers and exemptions that may otherwise apply and are not consistent with the Federal Clean Water Act and other pertinent guidance, policies, and regulations. This narrative prohibition on the applicability of such waivers and exemptions extends to any activity that would otherwise be authorized under District law, regulations or

ordinance but which impedes the reduction or control of pollutants through the use of stormwater control measures and/or prevents compliance with the narrative /numeric effluent limits of this permit. Any such discharge not otherwise authorized may constitute a violation of this permit.

1.4 Discharge Limitations

The permittee must manage, implement and enforce a stormwater management program (SWMP) in accordance with the Clean Water Act and corresponding stormwater NPDES regulations, 40 C.F.R. Part 122, to meet the following requirements:

1.4.1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with existing District of Columbia Water Quality Standards (DCWQS);

1.4.2. Attain applicable wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with 33 U.S.C. § 1342(p)(3)(B)(iii); 40 C.F.R. § 122.44(k)(2) and (3); and

1.4.3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with the performance standards and provisions contained in Parts 2 through 8 of this permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term.

2. LEGAL AUTHORITY, RESOURCES AND STORMWATER PROGRAM ADMINSTRATION

2.1 Legal Authority

2.1.1 The permittee shall use its existing legal authority to control discharges to and from the Municipal Separate Storm Sewer System in order to prevent or reduce the discharge of pollutants to achieve water quality objectives, including but not limited to applicable water quality standards. To the extent deficiencies can be addressed through regulation or other Executive Branch action, the permittee shall remedy such deficiencies within 120 days. Deficiencies that can only be addressed through legislative action shall be remedied within 2 years of the effective date of this permit, except where otherwise stipulated, in accordance with the District's legislative process. Any changes to or deficiencies in the legal authority shall be explained in each Annual Report.

2.1.2 No later than 18 months following the effective date of this permit, the District shall update and implement Chapter 5 of Title 21 of District of Columbia Municipal Regulations (Water Quality and Pollution) ("updated DC Stormwater Regulations"), to address the control of stormwater throughout the MS4 Permit Area. Such regulations shall be consistent with this

EXHIBIT B

FACT SHEET

National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4)
Permit No. DC0000221 (Government of the District of Columbia)

NPDES PERMIT NUMBER: DC0000221 (Reissuance)

FACILITY NAME AND MAILING ADDRESS:

Government of the District of Columbia
The John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

MS4 ADMINISTRATOR NAME AND MAILING ADDRESS:

Director, District Department of the Environment
1200 First Street, N.E., 6th Floor
Washington, D.C. 20002

FACILITY LOCATION:

District of Columbia's Municipal Separate Storm Sewer System (MS4)

RECEIVING WATERS:

Potomac River, Anacostia River, Rock Creek, and Stream Segments Tributary
To Each Such Water Body

INTRODUCTION:

Today's action finalizes reissuance of the District of Columbia Municipal Separate Storm Sewer System (MS4) Permit. In the Final Permit EPA has continued to integrate the adaptive management approach with enhanced control measures to address the complex issues associated with urban stormwater runoff within the corporate boundaries of the District of Columbia, where stormwater discharges via the Municipal Separate Storm Sewer System (MS4).

Since the United States Environmental Protection Agency, Region III (EPA) issued the District of Columbia (the District) its first MS4 Permit in 2000, the Agency has responded to a number of legal challenges involving both that Permit (as well as amendments thereto) and the second-round MS4 Permit issued in 2004. For the better part of ten years, the Agency has worked with various parties in the litigation, including the District and two non-governmental organizations, Defenders of Wildlife and Friends of the Earth, to address the concerns of the various parties. The Agency has engaged in both litigation and negotiation, including formal

mediation.[1] These activities ultimately led to an enhanced stormwater management strategy in the District, consisting of measurable outputs for addressing the issues raised during the litigation and mediation process.

FACILITY BACKGROUND AND DESCRIPTION:

The Government of the District of Columbia owns and operates its own MS4, which discharges stormwater from various outfall locations throughout the District into its waterways.[2]

On April 21, 2010 EPA public noticed the Draft Permit. The Draft Fact Sheet published with that Draft Permit contains more extensive permit background information, and the reader is referred to that document for the history of the District of Columbia MS4 permit.

The public comment period closed on June 4, 2010. EPA received comments from 21 individual commenters and an additional 53 form letters. The Draft Permit, Draft Fact Sheet, and comments received on those documents are all available at: http://www.epa.gov/reg3wapd/npdes/draft_permits.html. The Final Permit reflects many of the comments received. EPA is simultaneously releasing a responsiveness summary responding to these comments.

ACTION TO BE TAKEN:

EPA is today reissuing the District of Columbia NPDES MS4 Permit. The Final Permit replaces the 2004 Permit, which expired on August 18, 2009 and has been administratively extended since that time. The Final Permit incorporates concepts and approaches developed from studies and pilot projects that were planned and implemented by the District under the 2000 and 2004 MS4 permits and modifying Letters of Agreement, and implements Total Maximum Daily Loads (TMDLs) that have been finalized since the prior permit was issued, including the Chesapeake Bay TMDL. A number of applicable measurable performance standards have been incorporated into the Final Permit. These and other changes between the 2004 Permit and today's Final Permit are reflected in a Comparison Document that is part of today's Permit issuance.

WATER QUALITY IN DISTRICT RECEIVING WATERS:

The District's *2008 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act*[3] documents the serious water

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1 A procedural history of Permit appeals can be viewed at the EPA Environmental Appeals Board web: http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/77355bee1a56a5aa8525711400542d23/b5e5b68e89edabe98525714f00731c6f!OpenDocument&Highlight=2,municipal.

2 Portions of the District are served by a combined sanitary and storm sewer system. The discharges from the combined sewer system are not subject to the MS4 permit, but are covered under NPDES Permit No. xxxx issued to the District of Columbia Water and Sewer Authority.

3 District Department of the Environment, *The District of Columbia Water Quality Assessment, 2008 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act* (hereinafter "2008 Integrated Report").

quality impairments in the surface waters in and around the District. A number of the relevant designated uses are not being met, *e.g.*, aquatic life, fish consumption, and full body contact, and there are a number of specific pollutants of concern that have been identified (for additional discussion on relevant TMDLs *see* Section 4.10 of this Final Fact Sheet).

Commenters on the Draft Permit expressed some frustration over very slow progress or even lack of progress after a decade of implementation of the MS4 program and even longer for other water quality programs. EPA appreciates this concern. Although the District's receiving waters are affected by a range of discharge sources, discharges from the MS4 are a significant contributor of pollutants and cause of stream degradation. EPA also recognizes, however, that stormwater management efforts that achieve a reversal of the ongoing degradation of water quality caused by urban stormwater discharges entail a long term, multi-faceted approach.

Consistent with the federal stormwater regulations for characterizing discharges from the MS4 (40 C.F.R. §122.26(d)(2)(iii)), the first two permit terms for the District's MS4 program required end-of-pipe monitoring to determine the type and severity of pollutants discharging via the system. The monitoring program was not designed to evaluate receiving water quality *per se*, therefore detection of trends or patterns was not reasonably possible. Today's Final Permit includes requirements for a Revised Monitoring Program, and one of the objectives for the program is to use a suite of approaches and indicators to evaluate and track water quality over the long-term (*see* discussion of Section 5.1 in this Final Fact Sheet).
There have been identified improvements in some areas. For example the *2008 Integrated Report* noted improvements in the diversity of submerged aquatic vegetation in the Potomac River, as well as improvements in fish species richness in Rock Creek. Biota metrics are often the best indicators of the integrity of any aquatic system.

EPA also notes that there are a variety of indirect measures indicative of improvement. The federal stormwater regulations foresaw the difficulty, especially in the near-term, of detecting measurable improvement in receiving waters, and relied instead on indirect measures, such as estimates of pollutant load reductions (40 C.F.R. §122.26(d)(2)(v)). The District documents these types of indirect measures in its annual reports, *e.g.*, tons of solids collected from catch basin clean-outs, amount of household hazardous waste collected, number of trees planted, square footage of green roofs installed, and many other measures of success.[4]

EPA believes that documenting trends in water quality, whether improvements, no change, or even further degradation, is an important element of a municipal water quality program. Today's Final Permit recognizes this principle, both in the types of robust measures required as well as the transition to new monitoring paradigms. EPA encourages all interested parties to provide the District with input during the development of these program elements.

THIS FACT SHEET:

(http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/water.reg.leg/DC_IR_2008_Revised_9-9-2008.pdf

4 District MS4 Annual Reports can be found at: http://ddoe.dc.gov/ddoe/cwp/view.a.1209.q.495855.asp

This Final Fact Sheet is organized to correspond with the chronological organization and numbering in today's Final Permit. Where descriptions or discussions may be relevant to more than one element of the Final Permit the reader will be referred to the relevant section(s).

To keep today's Final Fact Sheet of readable length, many of the elements included in the fact sheet published with the Draft Permit (Draft Fact Sheet) on April 21, 2010 have not been repeated, but are referenced. Readers are referred to the Draft Fact Sheet published with the Draft Permit for additional discussion on provisions that have been finalized as proposed.[5] The Final Fact Sheet does discuss significant changes since the 2004 Permit (even if discussed in the Draft Fact Sheet). The Final Fact Sheet also contains additional explanation of the Final Permit where commenters requested additional clarification. In addition, this Final Fact Sheet explains modifications to the Final Permit where provisions were changed in response to comments.

In many cases EPA made a number of very simple modifications to the Final Permit, *e.g.*, a word, phrase, or minor reorganization, simply for purposes of clarification. These modifications were not intended to change the substance of the permit provisions, only to clarify them. Most of those types of edits are not discussed in this Final Fact Sheet, but EPA has provided a Comparison Document of the Draft and Final Permits for readers who would like that level of detail.

Many commenters noted that the Draft Permit was not logically organized. EPA agrees. The major reorganization principles include:

1) There is a new Section 3, Stormwater Management Program (SWMP) Plan consolidating the various plans, strategies and other documents developed in fulfillment of permit requirements.
2) All implementation measures, *i.e.*, those stipulating management measures and implementation policies, are included in Section 4 of today's Final Permit. This includes "Source Identification" elements (Section 3 in the Draft Permit) and "Other Applicable Provisions" elements (Section 8 in the Draft Permit), which included TMDL requirements.
3) All monitoring requirements are consolidated in Section 5 of the Final Permit.
4) All reporting requirements are consolidated in Section 6 of the Final Permit.

EPA also refers readers to the Responsiveness Summary released today along with the Final Permit and Final Fact Sheet, for responses to comments and questions received on the Draft Permit. That document contains additional detailed explanations of the rationale for changes made to the Draft Permit in the Final Permit.

Finally, EPA made significant effort to avoid appending or incorporating by reference other documents containing permit requirements into the Final Permit. In the interest of clarity

5 The Permit and Fact Sheet proposed on April 21, 2010 can be viewed at: http://www.epa.gov/reg3wapd/npdes/draft_permits.html

and transparency EPA, to the extent possible, has included all requirements directly in the permit. Thus, EPA reviewed a variety of documents with relevant implementation measures, *e.g.*, TMDL Implementation Plans and the 2008 Modified Letter of Agreement to the 2004 permit[6], and translated elements of those plans and strategies into specific permit requirements that are now contained in the Final Permit. This Fact Sheet provides an explanation of the sources of provisions that are significant and are a direct result of one of those strategies.

1. DISCHARGES AUTHORIZED UNDER THIS PERMIT

(1.2 Authorized Discharges): The Final Permit authorizes certain non-stormwater discharges, including discharges from water line flushing. One commenter noted that many of these discharges, especially from potable water systems, contain concentrations of chlorine that may exceed water quality standards. EPA agrees, and has therefore clarified that dechlorinated water line flushing is authorized to be discharged under the Final Permit.

(1.4 Discharge Limitations): Comments on the language in Part 1.4 varied widely. Some commenters did not believe it was reasonable to require discharges to meet water quality standards. Other commenters believed this to be an unambiguous requirement of the Clean Water Act.

Today's Final Permit is premised upon EPA's longstanding view that the MS4 NPDES permit program is both an iterative and an adaptive management process for pollutant reduction and for achieving applicable water quality standard and/or total maximum daily load (TMDL) compliance. *See generally,* "National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges," 55 F.R. 47990 (Nov. 16, 1990).

EPA is aware that many permittees, especially those in highly urbanized areas such as the District, likely will be unable to attain all applicable water quality standards within one or more MS4 permit cycles. Rather the attainment of applicable water quality standards as an incremental process is authorized under section 402(p)(3)(B)(iii) of the Clean Water Act, 33 U.S.C. § 1342(p)(3)(B)(iii), which requires an MS4 permit "to reduce the discharge of pollutants to the maximum extent practicable" (MEP) "and such other provisions" deemed appropriate to control pollutants in municipal stormwater discharges. To be clear, the goal of EPA's stormwater program is attainment of applicable water quality standards, but Congress expected that many municipal stormwater dischargers would need several permit cycles to achieve that goal.

Specifically, the Agency expects that attainment of applicable water quality standards in waters to which the District's MS4 discharges, requires staged implementation and increasingly more stringent requirements over several permitting cycles. During each cycle, EPA will continue to review deliverables from the District to ensure that its activities constitute sufficient progress toward standards attainment. With each permit reissuance EPA will continue to increase

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6 District Department of the Environment, *Modification to the Letter of Agreement dated November 27, 2007 for the NPDES Municipal Separate Storm Sewer (MS4) Permit DC0000222* (2008) http://www.epa.gov/reg3wapd/npdes/pdf/DCMS4/Letter.PDF

stringency until such time as standards are met in all receiving waters. Therefore today's Final Permit is clear that attainment of applicable water quality standards and consistency with the assumptions and requirements of any applicable WLA are requirements of the Permit, but, given the iterative nature of this requirement under CWA Section 402(p)(3)(B)(iii), the Final Permit is also clear that "compliance with all performance standards and provisions contained in the Final Permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term" (Section 1.4).

EPA believes that permitting authorities have the obligation to write permits with clear and enforceable provisions and thus the determination of what is the "maximum extent practicable" under a permit is one that must be made by the permitting authority and translated into provisions that are understandable and measurable. In this Final Permit EPA has carefully evaluated the maturity of the District stormwater program and the water quality status of the receiving waters, including TMDL wasteload allocations. In determining whether certain measures, actions and performance standards are practicable, EPA has also looked at other programs and measures around the country for feasibility of implementation. Therefore today's Final Permit does not qualify any provision with MEP thus leaving this determination to the discretion of the District. Instead each provision has already been determined to be the maximum extent practicable for this permit term for this discharger.

EPA modified the language in the Final Permit to provide clarity on the expectations consistent with the preceding explanation. Specifically Section 1.4.2 of the Final Permit requires that discharges 'attain' applicable wasteload allocations rather than just 'be consistent' with them, since the latter term is somewhat ambiguous.

In addition, the general discharge limitation 'no increase in pollutant loadings from discharges from the MS4 may occur to receiving waters' was removed because of the difficulty in measuring, demonstrating and enforcing this provision. Instead, consistent with EPA's belief that the Final Permit must include all of the enforceable requirements that would achieve this principle, the following discharge limitation is substituted: "comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit."

In addition, EPA made the following modifications: "Compliance with <u>the</u> performance standards and provisions contained in <u>Parts 2 through 8 of</u> this permit shall constitute adequate progress towards compliance with DCWQS <u>and WLAs for this permit term</u>" (*underlined text added*) (Section 1.4 of the Final Permit). EPA eliminated circularity with the addition of "Parts 2 through 8", clarifying that this requirement does not circle back to include the statements in 1.4.1 and 1.4.2, but rather interprets them. Also, although WLAs are a mechanism for attainment of water quality standards, EPA added the specific language "and WLAs" to make this concept explicit rather than just implicit. In addition this revised language emphasizes that the specific measures contained in the Final Permit, while appropriate for this permit term, will not necessarily constitute full compliance in subsequent permit terms. It is the expectation that with each permit reissuance, additional or enhanced requirements will be included with the objective

of ensuring that MS4 discharges do not cause or contribute to an exceedance of applicable water quality standards, including attainment of relevant WLAs.

2. LEGAL AUTHORITY, RESOURCES, AND STORMWATER PROGRAM ADMINISTRATION

(2.1 Legal Authority): Several commenters pointed out that there were a number of requirements in the Draft Permit without clear compliance schedules or deadlines, or with deadlines that did not correspond well to others in the permit. In the Final Permit, EPA has made several revisions to address these comments. For example, EPA changed a requirement that deficiencies in legal authority must be remedied "as soon as possible" to a 120-day requirement for deficiencies that can be addressed through regulation, and two years for deficiencies that require legislative action (Section 2.1.1). Also, EPA increased the compliance schedule for updating the District's stormwater regulation from twelve months to eighteen months, *id.*, so that this action could be adequately coordinated with the development of the District's new offsite mitigation/payment-in-lieu program (for more discussion see Section 4.1.3 below).

(2.2 Fiscal Resources): One commenter suggested eliminating the reference to the District's Enterprise Fund since funding was likely to come from a number of different budgets within the District. EPA agrees with this comment and has removed this reference.

On the other hand, many commenters noted that the implementation costs of the District's stormwater program will be significant. EPA agrees. The federal stormwater regulations identify the importance of adequate financial resources [40 C.F.R. §122.26(d)(1)(vi) and (d)(2)(vi)]. In addition, after seeing notable differences in the caliber of stormwater programs across the country, EPA recognizes that dedicated funding is critical for implementation of effective MS4 programs.[7,8,9] In 2009 the District established, and in 2010 revised, an impervious-based surface area fee for service to provide core funding to the stormwater program[10] (understanding that stormwater-related financing may still come from other sources as they fulfill multiple purposes, *e.g.*, street and public right-of-way retrofits). In conjunction with the 2010 rule-making to revise the fee the District issued a Frequently Asked Questions document[11] that indicates the intent to restrict this fee to its original purpose, *i.e.*, dedicated funding to implement the stormwater program and comply with MS4 permit requirements. EPA believes this action is essential, and he expects that the District will maintain a dedicated source of funding for the stormwater program.

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7 National Research Council, *Urban Stormwater Management in the United States* (2009) National Academy of Sciences http://www.nap.edu/catalog.php?record_id=12465

8 National Association of Flood and Stormwater Agencies, Funded by EPA, *Guidance for Municipal Stormwater Funding* (2006) http://www.nafsma.org/Guidance%20Manual%20Version%202X.pdf

9 EPA, *Funding Stormwater Programs* (2008) http://www.epa.gov/npdes/pubs/region3_factsheet_funding.pdf

10 District of Columbia, Rule 21-566 Stormwater Fees, http://www.dcregs.dc.gov/Gateway/RuleHome.aspx?RuleID=474056

11 District of Columbia, FAQ Document *Changes to the District's Stormwater Fee* (2010) http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/water.reg.leg/Stormwater_Fee_FAQ_10-5-10_-final.pdf

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RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

August 15, 2013

Ms. Emel G. Wadhwani, Esq.
Senior Staff Counsel
Office of Chief Counsel
State Water Resources Control Board
1001 I Street, 22nd Floor
Sacramento, CA 95814
ewadhwani@waterboards.ca.gov

Dear Ms. Wadhwani:

Re: SWRCB/OCC File A-2236(a) through (kk) – Questions Concerning Los Angeles County MS4 Permit

This letter is provided on behalf of the communities participating in the Riverside County Stormwater Program, (collectively, the "Riverside County Communities")[1] to respond to your letter dated July 8, 2013 regarding the above-referenced petitions. The Riverside County Communities appreciate this opportunity to provide comments on the important issue of how communities regulated by municipal separate storm sewer system ("MS4") permits in California can obtain a path of compliance with receiving water limitations ("RWL") requirements in those permits. This letter addresses your two questions, and also discusses additional reasons for reform of the current RWL language.

The District addressed these issues in our November 13, 2012 response to the State Water Resources Control Board's (State Board) call for comments in advance of its November 20, 2012 workshop on RWL language reform. The Riverside County Communities have attached this letter and its attachments as Exhibit 1 and request that it be added to the record in the Los Angeles County MS4 Permit ("LA MS4 Permit") appeal.

In assessing how RWL language might be reformed, it is important to highlight the progress that has been made in improving receiving water quality in California towards achieving the Clean Water Act's stated goal of fishable and swimmable waters. Improvements in sewage treatment, industrial wastewater discharges, and stormwater management have resulted in significant improvements to receiving water quality and protection of beneficial uses. In Riverside County, the regulated communities have worked with the State Board, the Regional Water Quality Control Board's (RWQCBs) and other stakeholders to successfully develop programs to address water quality impairments. However, due to numerous factors, including the very complexity of pollutant sources

[1] Riverside County Flood Control and Water Conservation District ("District"), County of Riverside, Coachella Valley Water District, and the Cities of Banning, Beaumont, Calimesa, Canyon Lake, Coachella, Corona, Cathedral City, Desert Hot Springs, Hemet, Indian Wells, Indio, Lake Elsinore, La Quinta, Menifee, Moreno Valley, Murrieta, Norco, Palm Desert, Palm Springs, Perris, Rancho Mirage, Riverside, San Jacinto, Temecula, and Wildomar.

(including from sources beyond the control of the regulated communities, such as motor vehicles, natural sources, and other non-MS4 sources), regulations that predate the science necessary to fully understand the impacts of stormwater on beneficial use attainment (particularly for nutrients and bacterial indicators), the lack of technology to effectively control pollutant sources, the continuing need to promote significant behavioral changes in various segments of society, and the wide variability of the magnitude of storm events, regulated communities are not in a position to ensure that MS4 discharges do not cause or contribute toward RWL exceedances.

For example, of the over 300 potential pollutants monitored in receiving waters in Riverside County, only a handful may exceed water quality objectives from time to time. Some of these pollutants, such as nutrients, bacterial indicators, iron, and manganese are challenging to address because they are both naturally and anthropogenically sourced. Metals such as copper, lead and zinc also exceed water quality objectives, yet are most typically linked to motor vehicles that are outside the authority of the regulated communities to control, as is toxicity that may be caused by lawfully applied pyrethroid pesticides. The proper management of these sources will require a combination of federal and state regulatory adjustments, public education, and local controls that will not be accomplished within the term of a single MS4 permit term, or even several permit terms. For these reasons, an adaptive management approach, such as that being reviewed by the State Board, is critical.

Overview of Riverside County MS4 Permits and Communities

Riverside County is under the jurisdiction of the Colorado River, Santa Ana, and San Diego RWQCBs and is subject to three different MS4 permits[2], each of which has specific watershed and water quality issues. However, these watersheds share certain common characteristics. They are located inland, and either semi-arid or arid. The Whitewater River Region, which includes the Coachella Valley and is regulated by the Colorado River RWQCB, is one of the most arid regions in the nation. A summary of some of the local conditions, opportunities and constraints of these three regions can help inform the need for additional RWL language flexibility.

The Riverside County Communities in the Whitewater River Region are located in the Coachella Valley, a desert area with less than 4 inches of annual rainfall on average. The communities governed by this MS4 permit have a total population of under 500,000 residents. Soils within the urbanized area of this region are extremely porous, with 85% of area soils exhibiting permeability properties of at least 1 inch per hour, and the majority of these soils exhibiting permeability properties between 6 and 20 inches per hour. Only one TMDL is effective in this Region (relating to bacterial indicators in the Coachella Valley Stormwater Channel), and only one community is named as a responsible party in that TMDL. There are no other waterbodies listed as impaired for any pollutant under Clean Water Act Section 303(d). Due to the unique climatic, hydrologic, geologic

[2] The District is the Principal Permittee for these three MS4 Permits: Order No. R8-2010-0033 of the Santa Ana RWQCB (covering the Santa Ana Region in northwestern Riverside County); Order No. R9-2010-016 of the San Diego RWQCB (covering the Santa Margarita River Region in southwestern Riverside County); and Order No. R7-2013-0011 of the Colorado River Basin RWQCB (covering the Whitewater River Region in the desert portions of central Riverside County).

and water quality conditions in this region, development of new and extensive programs to identify and address pollutants of concern (as are set forth in the LA MS4 Permit) are not required and would be an inappropriate use of limited public fiscal resources.

The Santa Margarita Region also has a small population (less than 400,000 residents) and rural character. Approximately half of the region is ultimately planned for designated conservation zones intended to protect rare and endangered species. During proceedings to adopt the current MS4 Permit for this region, Marine Corps Base Camp Pendleton, which is located downstream and which relies on runoff from the Santa Margarita Region for its water supply, raised several concerns with permit requirements for onsite retention of stormwater runoff. Camp Pendleton was concerned that the installation of significant infiltration BMPs could have a detrimental impact on their adjudicated water rights (this issue is presently before the State Board in a petition filed by Camp Pendleton with regard to the 2010 MS4 Permit).

Studies are ongoing to assess the impacts of onsite retention on the Camp Pendleton water supply and to determine the need for modifications to the Permit that may relax or remove requirements for new developments and redevelopments to retain stormwater runoff onsite. As stormwater retention is typically one of the most effective management measures to address stormwater quality issues, the lack of an ability to use it as a tool to address both existing and new developments could significantly impact the cost and timing of ongoing community efforts to manage stormwater sources. Further, reliance on an Enhanced Watershed Management Plan strategy in this region would be problematic, as BMPs could not rely on retention for RWL compliance. The communities would need an alternative pathway to compliance that recognizes the unique hydrologic and water resource limitations of this region. The communities are, in the mean time, continuing to look for other innovative means to meet RWLs through integrated regional programs that may be able to address and balance water rights, water quality, flood management, and habitat conservation goals and objectives.

Most of Riverside County's population is located in the Santa Ana Region (1.2 million residents). Two TMDLs are effective in this region, the Middle Santa Ana River Bacterial Indicator TMDL, and the Canyon Lake and Lake Elsinore Nutrient TMDL. The MS4 Permit adopted in 2010 for the Riverside County Communities in this region requires the development and implementation of an iterative and cooperative compliance plan option for these TMDLs, which provides the Riverside County Communities in the Santa Ana Region and other parties the opportunity (and responsibility) to develop plans to attain the final waste load allocations. In many ways, these plans serve as pollutant and waterbody specific Enhanced Watershed Management Plans, such as those set forth in the LA MS4 Permit except that they do not require retention.

The studies required for the Canyon Lake and Lake Elsinore Nutrient TMDL and Middle Santa Ana River Bacterial Indicator TMDLs were complicated, expensive, and time consuming to implement. Each study cost several hundred thousand dollars and took approximately two years to complete. Implementation of the Comprehensive Nutrient Reduction Plan (CNRP) for the lakes and Comprehensive Bacteria Reduction Plan (CBRP) for the river will also be phased over multiple

years. However, the process of developing and implementing these compliance plans provides a valuable example of adaptive management over an entire MS4 permit area, with solutions focused on attaining the beneficial uses, which should be the goal of any regulatory program governing MS4s. Water supply issues also impact this area, as Lake Elsinore, the largest natural waterbody in southern California, is a declining lake where evaporation rates of over 6 feet per year exceed the natural rate of replenishment. For this reason, programs aimed at extensive onsite retention of stormwater were not considered in development of the CNRP as the best option to minimize potential impacts on lake recreational uses. Similarly, the CBRP did not rely on retention of runoff in an effort to minimize potential impacts to other beneficial uses of the Santa Ana River that may have been impacted by reductions in dry weather base flows.

The CNRP and CBRP provide examples of how RWL compliance could be effectively achieved without the need for reliance upon retention requirements. Conversely, though the CNRP and CBRP also provide a cautionary example of the potential cost and time commitments necessary to develop such plans. RWL compliance options need to consider the costs of attempting to replicate these efforts at watershed scales for all pollutant-waterbody combinations and the fiscal impact on the regulated communities that will ultimately be required to develop them.

These differences in the MS4 permit regions just within Riverside County illustrate the need for flexibility in the State Board's ultimate statewide RWL policy. Onsite retention of stormwater, a BMP that may be appropriate in some areas, may be inappropriate in other areas due to water supply and/or other environmental factors. In the Santa Ana and Santa Margarita Regions, runoff is needed to provide for maintenance of lake levels and stream base flows and to meet downstream water rights, so compliance cannot be solely based on stormwater retention requirements. In the Coachella Valley, the receiving waters are primarily dry desert washes, the existing drainage infrastructure relies on significant infiltration of stormwater, and there is only one 303(d)-listed waterbody. Therefore, development of new and extensive programs to identify and address pollutants of concern is not warranted.

Finally, the resources required to adopt an extensive stormwater quality management program, such as that set forth in the LA MS4 Permit, are not as available in less affluent and less densely populated counties nor is there an existing compliance knowledge base, such as is generated in the development of multiple TMDLs (which is the case in Los Angeles County). Any new State Board policy must provide for prioritization and scheduling flexibility to recognize the differing water quality needs and the complexity of stormwater quality management. As will be discussed below, the Riverside County Communities believe that the model language proposed by the California Stormwater Quality Association ("CASQA") can form the basis for a precedential ruling by the State Board, applicable throughout California.

Before discussing the CASQA model language, we wish to emphasize the importance of two Ninth Circuit decisions that compel the State Board to act.

Ninth Circuit Decisions Drive the Need for Reform

Under the most authoritative interpretation, the State Board has stated that the current RWL language "does not require strict compliance with water quality standards. Our language requires that storm water management plans be designed to achieve compliance with water quality standards over time, through an iterative approach requiring improved BMPs . . . ." Order WQ 2001-15 at 7. This interpretation reflected language requiring regulated communities to comply with this requirement (and a companion requirement prohibiting discharges from causing or contributing to a condition of nuisance) "through timely implementation of control measures and other actions to reduce pollutants in storm water discharges in accordance with this Order . . . ." *E.g.,* Order R9-2010-016, Part A.3.a.

That language, however, was completely disregarded by the United States Circuit Court of Appeals for the Ninth Circuit in *Natural Resources Defense Council v. County of Los Angeles,* 673 F.3d 880 (9th Cir. 2011), *reversed on other grounds,* 133 S. Ct. 710 (2013), *reinstated and amended on other grounds,* No. 10-56017 (slip op. August 8, 2013). In its first decision, the Ninth Circuit ruled that the language prohibiting discharges which "cause or contribute" to a violation of a water quality standard must be interpreted on its own, without reference to the iterative process language contained in the standard RWL language endorsed by the State Board in Order Nos. 99-05 and 2001-15. 673 F.3d at 892. This meant that regulated communities are strictly and immediately liable for any such violations.

The Ninth Circuit's opinion was reversed on other grounds by the United States Supreme Court, which remanded the case back to the Ninth Circuit. The Supreme Court did not rule on the Ninth Circuit's strict compliance interpretation. However, in a decision issued only last week, the Ninth Circuit pushed liability for MS4 permit violations in a new and radical direction, holding that there was no need for a plaintiff to even prove that a discharge from the MS4 was causing or contributing to the water quality standard violation. The court held that if receiving water monitoring reflected an exceedance of a water quality standard, even at a mass emission monitoring station located miles from the discharge and which monitored literally hundreds of separately permitted discharges (including non-MS4 discharges), that was sufficient to establish a community's liability for violation of the permit and the Clean Water Act. Slip op. at 32-33.

These decisions put every regulated community in California into even greater potential jeopardy for immediate violations of the Clean Water Act, even though every responsible agency, including U.S. EPA, the State Board and the RWQCBs, has recognized that MS4 discharge compliance with water quality standards cannot be immediate.

The need for reform of the RWL language is now even more critical.

Responses to Questions Raised in July 8, 2013 Letter

In answer to the questions raised in your July 8, 2013 letter, the Riverside County Communities believe that the LA MS4 Permit's watershed management program/enhanced watershed management program alternative is a significant step forward from the current RWL language, as interpreted by the Ninth Circuit. The Los Angeles RWQCB has attempted to address key concerns of the regulated communities in that region while encouraging projects that will benefit both water quality and achieve other societal objectives. The Riverside County Communities believe that the provisions in the LA MS4 Permit set forth what may be an appropriate approach to implementing RWL requirements in heavily urbanized watersheds with significant TMDL coverage, such as those found in Los Angeles County.

In particular, the Riverside County Communities support key aspects of the LA MS4 Permit, including voluntary participation in the watershed programs; strategic compliance planning conducted on either a watershed or jurisdictional basis; BMP-based compliance with numeric water quality standards; prioritization of pollutant waterbody combinations; adaptive management of BMPs; processes for stakeholder input; the establishment of the enhanced watershed management program with its allowance for the 85th percentile design storm; and, perhaps most importantly, the ability for regulated communities to be deemed compliant with RWL and discharge prohibition provisions from the date of their notification of intent to participate in the strategic compliance process. This last provision avoids a potential "liability trap" during the period while RWQCBs are working to approve the strategic compliance programs submitted by the communities.

Considering the fiscal realities faced by the regulated communities in California, the iterative process promotes collaborative projects which are scientifically based and which create tangible results in addressing water quality impairments. In Riverside County, such collaborative work has repeatedly brought state and federal dollars for water quality projects that have and will make a difference. Absent an iterative process, efforts would likely be piecemeal and ineffective. In that, all stakeholders are committed to improving water quality, the State Board, the RWQCBs, the regulated communities, and the public alike should support a policy for attaining RWLs which fosters collaboration and as a result, brings critically needed resources to bear to address water quality impairments.

While the LA MS4 Permit may present a superior alternative to the current RWL language and appears suited for that highly urbanized, coastal and TMDL-rich county, the specific requirements of that Permit are less useful as a model for less populated and affluent regulated communities that do not discharge to coastal beaches with intense recreational use. Further, RWL attainment strategies focused on the capture of stormwater runoff may not be appropriate for areas where retention is not viable (and potentially detrimental) due to water rights issues, hydrologic, geologic or other factors (as noted above). Finally, the RWL attainment requirements ultimately adopted must recognize that some potential pollutant issues will require state and/or federal regulatory intervention, either in the form of product reformulation requirements or potentially adjustments to water quality standards, to

ensure that the water quality standards properly assess the impacts of stormwater on beneficial use attainment.

For these reasons, the Riverside County Communities favor the model language proposed by CASQA. This language, like that in the LA MS4 Permit, provides flexibility in managing MS4 discharges. This flexibility is provided through provisions for voluntary participation, structuring of the strategic compliance program on a watershed/subwatershed or jurisdictional basis, prioritization of pollutants/waterbodies, BMP-based compliance approaches, explicit provision for an adaptive management process, opportunities for stakeholder and public input, identification of the 85th percentile "design storm" and provision for regulated communities to obtain a determination that they comply with RWL and discharge prohibitions provisions in the MS4 permit so long as the communities comply with the requirements of the strategic compliance program.

The CASQA model language, moreover, provides both additional flexibility and structure, which makes it more useful as precedential requirements for the differing watershed conditions and varying water quality issues experienced throughout the state. The CASQA language allows existing programs in a MS4 permit to be recognized as a strategic compliance program and provides flexibility in determining the requirements for such a program, within the general framework of the model language.

The CASQA model language also provides needed structure to ensure that the strategic compliance program is technically based, adaptive and allows resources to be focused on watershed water quality priorities. While the regulated communities seek a "path to compliance," having an actual "pathway" to compliance set forth in the MS4 permit is equally important. The structure inherent in a strategic compliance program (as opposed to the current simple prohibitory RWL language), provides the regulated communities, the RWQCBs and stakeholders with that pathway to compliance, a pathway that is rigorous, based on the highest threats to water quality, is adaptable and is designed to attain water quality standards. This structure gives both the regulated communities and the RWQCBs (as well as the public) clear guideposts as to their mutual responsibilities and provides all stakeholders with specific scheduling requirements that ensure continued accountability.

A clearly defined pathway to compliance, such as that outlined in CASQA's model Strategic Compliance Program also ensures that the expectations of the RWQCB and the public can be met in a structured and orderly manner. As interpreted by the Ninth Circuit, the current RWL language does not link achievement of water quality standards with a specific iterative process and provides no pathway to compliance. This is a far less transparent and structured process than the one set forth in the model CASQA language. Further, the current RWL provisions do not allow prioritization of resources to address problem pollutant-waterbody combinations. As noted above, in Riverside County of the approximately 300 pollutants being monitored as part of the MS4 monitoring programs, only a handful are proving to be persistent in certain waterbodies. It is not good public policy to require regulated communities to "chase" the source of every pollutant that may show up in a monitoring program. Instead, as called for in CASQA's strategic compliance program, regulated

communities should first prioritize those pollutants which are the subjects of TMDLs or where data indicate are creating exceedances of RWLs or discharge prohibitions.

For all of these reasons, the Riverside County Communities support the CASQA model language as providing the basis for the State Board's reform of the current RWL language.

The Riverside County Communities Are Not Seeking a "Safe Harbor"

The remainder of our letter focuses on some additional reasons why a strategic compliance program, such as that set forth in the model CASQA language, is appropriate and required to move the stormwater regulatory landscape from one leading to litigation and confrontation to one that provides systematic procedures to cooperatively address priority water quality impairments. To explore those issues, the letter addresses the most common objection made by opponents of RWL language reform: that the regulated communities simply want a "safe harbor" from regulation.

The "safe harbor" objection assumes that the issuance of an MS4 permit is a "license to pollute" with no consequences to the regulated communities. This is not supported by the facts or the law. First, regulated communities are tasked to promote and ensure public health and safety both in terms of pollutant reduction and also flood control (which is the primary function of MS4s. They must accomplish these mandates (as well as other societal needs) with finite fiscal resources.

Moreover, every aspect of an MS4 permit, every condition and requirement, is enforceable. For example, Order R8-2010-0033, Part XX.G, provides: "The Permittees must comply with all terms, requirements, and conditions of this Order. Any violation of this Order constitutes a violation of the CWA, its regulations and the California Water Code, and is grounds for enforcement action . . . ."

Each MS4 permit requires, at minimum, the six categories of control measures set forth in 22 CFR § 122.26(d)(2)(iv). MS4 permits require a stormwater management plan, the requirements of which are enforceable. MS4 permits typically require numerous reports, proposed programs and other submittals to be made to the RWQCBs; any failure to timely submit is enforceable. If a regulated community fails to comply with such requirements, it can be subject to enforcement.

The achievement of water quality standards in receiving waters is, however, a very different problem, one that is fundamentally beyond the immediate control of the regulated communities. This fact was recognized by the State Water Board's own Blue Ribbon Panel in 2006, long after the RWL language at issue was incorporated into most MS4 permits. The Blue Ribbon Panel specifically found that it was not possible to set a numeric effluent limit for a catchment not treated by a structural or treatment BMP. Given that most of the waters flowing into the MS4 are not so treated, the enormity of this task is readily apparent.

Only recently, David Gibson, Executive Officer of the San Diego RWQCB, in testimony on the adoption of the regional MS4 Permit (which contained a version of the current RWL language), noted that the RWLs could not be complied with as of its adoption:

> "The receiving water quality objectives are already being exceeded. That condition of vulnerability exists today, even without this tentative order, and that condition will most likely continue for some time".

Transcript of Proceedings, May 8, 2013, San Diego RWQCB Hearing, page 75:22-page 76:1.

Thus, the San Diego RWQCB's regional MS4 permit (and other MS4 permits across the state that contain the standard RWL provisions) require instant, continuous and strict liability from the moment of adoption. This conclusion is inescapable in light of the *NRDC* case.

Unless MS4 permits provide for an iterative compliance provision, such as that set forth in the CASQA model language, those permits will remain impossible to comply with, in violation of the Clean Water Act. *See, e.g., Hughey v. JMS Development Corp.* (11th Cir. 1996) 78 F.3d 1523, 1530 ("In interpreting the liability provisions of the CWA, we realize that Congress is presumed not to have intended absurd (impossible) results.").

What the Riverside County Communities, and other regulated communities across California, seek is not a "safe harbor" but a means in which to achieve water quality standards through an orderly process that is governed by science and engineering, not lawyers and judges, and which prioritizes and addresses significant problems, not chases random pollutants. CASQA's model language establishes such a program. This program requires assessment of the prioritized water quality issues, development (and RWQCB approval) of a program to address the issues, implementation of the program and measurement of the progress to meet program goals (through monitoring and other means), and continuous reassessment of compliance strategies. It provides a pathway to assure the regulated communities, RWQCBs and the public that progress is being made to address water quality impairments caused by MS4 discharges.

The current "one strike and you're out" liability scheme created by the Ninth Circuit also diminishes the ability of the regulated communities to innovate. During the development of the "regional permit," San Diego RWQCB's staff repeatedly stated that they wanted the regulated communities to "fail" in efforts to achieve better stormwater quality. By this, staff meant that the regulated communities should be encouraged to try new strategies to achieve better water quality and, if those strategies fail, to try alternatives. In essence, RWQCB staff was advocating the iterative process. The Riverside County Communities strongly agree with San Diego RWQCB staff on the importance of being able to "fail." Due to the extreme difficulty in attaining water quality objectives or waste load allocations, the regulated communities must be able to experiment with different BMP approaches through an iterative approach. This iterative approach is set forth in the CASQA model language. Being allowed to "fail" is, of course, impossible when failure is punishable by a potential citizen suit, in which a successful plaintiff can force the payment of civil penalties, obtain injunctive relief and win attorneys' fees.

The awarding of injunctive relief is of particular concern, because a federal district judge is not bound by the terms of the MS4 permit. The court can order a remedy that is entirely separate from the MS4

permit, potentially rendering the permit's terms meaningless and the thousands of person-hours invested by the RWQCBs, the regulated communities and other stakeholders in developing those terms a complete waste of time.

Additional reasons for RWL language reform are set forth in the District's November 13, 2012 letter (attached), and we request that State Water Board staff consider that letter and its attachments as part of the preparation for the State Board workshop.

Conclusion

Much has been achieved in California to improve receiving water quality under the Clean Water Act. The remaining impairments have multiple sources, many of which are not related to urban runoff and/or are not under the control of the regulated communities. The sources are not fully understood, many are not under the control of the regulated communities, and the technology required for the management of water quality are, in many cases, not developed or technically/economically infeasible. As described, control of many sources will require state and federal regulation. Therefore, any requirements established by the State Water Board to attain RWLs must provide flexibility and a pathway to compliance that provides for orderly development of effective water quality management programs.

The Riverside County Communities request the State Water Board to reform the current RWL language, language which through Ninth Circuit interpretation has been turned unworkable and an impediment to achieving water quality improvements. We believe that the strategic compliance program approach proposed by CASQA provides a framework for collaborative success that can provide the needed flexibility and path to compliance with RWLs.

The Riverside County Communities appreciate the State Water Board's outreach to interested parties and look forward to the workshop to be held on this important issue. If you or any of State Water Board staff have any questions, please contact David Garcia at 951.955.1330 dhgarcia@rcfloo.org.

JASON UHLEY
David Garcia for

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Enclosures: Comment Letter to SWRCB –
Receiving Water Limitations Language
Workshop

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