



# **SAN LUIS REY RIVER WATERSHED**

## **Urban Runoff Management Program**

### **Annual Report for Fiscal Year 2011-12**

Prepared for  
**California Regional Water Quality Control Board**  
**San Diego Region 9**

By the

**City of Oceanside • City of Vista • County of San Diego**

**January 2013**

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URBAN RUNOFF MANAGEMENT PROGRAM  
Annual report for Fiscal Year 2011-12**

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**California Regional Water Quality Control Board  
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By the

**City of Oceanside  
City of Vista  
County of San Diego**

January 2013

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# CITY OF OCEANSIDE

WATER UTILITIES DEPARTMENT

January 28, 2013

**Re: STATEMENT OF CERTIFICATION  
2011-12 Watershed Urban Runoff Management Program Annual Report for  
the San Luis Rey Watershed**

I certify under penalty of law that the 2011-12 Watershed Urban Runoff Management Program Annual Report for the San Luis Rey Watershed was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for knowing violations.

M. A. Lahsaie

**Mo Lahsaie, Ph.D., REHS**  
Environmental Officer  
City of Oceanside

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January 7, 2013

RE: STATEMENT OF CERTIFICATION

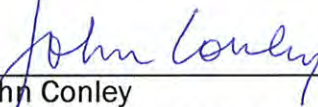
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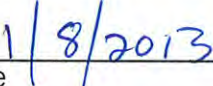
SAN LUIS REY WATERSHED MANAGEMENT AREA

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I certify under penalty of law that the FY 2012 Watershed Urban Runoff Management Program Annual Report for the San Luis Rey Watershed Management Area was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
\_\_\_\_\_  
Patrick Johnson  
City Manager

  
\_\_\_\_\_  
John Conley  
Director of Engineering

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Date

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# County of San Diego

## LAND USE AND ENVIRONMENT GROUP

**SARAH E. AGHASSI**  
DEPUTY CHIEF ADMINISTRATIVE OFFICER

1600 Pacific Highway, Room 212, San Diego, CA 92101  
(619) 531-6256 • Fax: (619) 531-5476  
[www.sdcounty.ca.gov/lueg](http://www.sdcounty.ca.gov/lueg)

January 18, 2013

### **SAN LUIS REY RIVER WATERSHED URBAN RUNOFF MANAGEMENT PROGRAM (WURMP) FY 2011-12 ANNUAL REPORT STATEMENT OF CERTIFICATION**

I certify, under penalty of perjury of law, that the County of San Diego's contributions to this FY 2011-12 San Luis Rey River Watershed Urban Runoff Management Program (WURMP) Annual Report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SARAH E. AGHASSI  
Deputy Chief Administrative Officer  
Land Use and Environment Group  
County of San Diego

Date

1/18/13

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## **EXECUTIVE SUMMARY**

### **Introduction**

This San Luis Rey (SLR) Watershed Urban Runoff Management Program (WURMP) Annual Report (AR) is the fifth annual report by the San Luis Rey Watershed Copermittees (SLR Copermittees) addressing Municipal Storm Water Permit Order Number R9-2007-0001 (Municipal Permit). The SLR Copermittees include the City of Oceanside, the City of Vista, and the County of San Diego. The City of Oceanside serves as the Lead Watershed Copermittee for the SLR Watershed Management Area (WMA). The SLR WURMP AR covers the time period July 1, 2011 – June 30, 2012 (FY 2011-12) and describes the SLR Copermittees collaborative plans and efforts to reduce the impacts of urban activity on receiving water quality within the SLR WMA to the maximum extent practicable.

During this reporting period the SLR Copermittees continued to address the watershed's high priority water quality pollutants identified in the 2008 San Luis Rey WURMP (2008 SLR WURMP) as bacteria and nutrients. This focus is reflected in Section 3.0 - Implementation of Watershed Activities, which enumerates the high-priority-focused watershed water quality and watershed education activities.

The SLR Copermittees will continue to re-evaluate and refine the SLR WURMP by implementing an effectiveness assessment component for the overall program. As more knowledge about pollutant sources and innovative and effective management measures to address those sources become available, the SLR Copermittees will use the Model Watershed Urban Runoff Management strategy to guide selection and implementation of watershed activities. Moreover, the SLR Copermittees will continue to utilize long-term effectiveness assessments to assist in further identifying pollutant sources and focusing program efforts to control those sources.

### **Program Highlights**

During this reporting period the SLR Copermittees made significant progress in developing and implementing watershed water quality and watershed education activities that receive WURMP credit based on the current Municipal Permit. In addition to these activities the SLR Copermittees coordinated other activities that they feel work toward reaching the overall goal of the SLR WURMP.

The goal of the WURMP is to positively affect the water quality of the SLR WMA while balancing economic, social, and environmental constraints. This goal will be pursued and ultimately achieved through the implementation of the following specific objectives:

- Objective #1: Develop and implement a strategic plan to assess and improve water quality within the SLR WMA, which responds to identifiable problems and reflects the beneficial uses of the watershed.
- Objective #2: Integrate watershed principles into land use planning that affects the SLR WMA.

## ***San Luis Rey River Watershed Urban Runoff Management Program FY 2011-12 Annual Report***

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- Objective #3: Enhance public understanding of watershed issues and pollution prevention within the SLR WMA.
- Objective #4: Encourage and enhance public involvement in activities related to urban runoff management within the SLR WMA.

To help reach this goal and the objectives, the SLR Copermittees worked to identify, implement, and assess appropriate watershed water quality, education, and public participation activities, as well as watershed-based land use planning mechanisms, to properly target high priority water quality problems and their sources.

### **Report Organization**

The 2011-12 SLR WURMP AR consists of a total of five sections and is organized as follows:

#### **Section 1.0 – Introduction**

Section 1 summarizes the program background, program approach (including goals and objectives), and applicable regulatory requirements. It briefly describes the watershed and gives a general overview of the organization and content of the report. It also describes Copermittee collaboration during the reporting period.

#### **Section 2.0 – Water Quality and Pollutant Source Assessment**

This section provides an updated assessment and analysis of the watershed's current and past applicable water quality data reports, analyses, and other information, including identification of the watershed's water quality problems and high priority water quality problems during the reporting period. This section also describes the likely sources, pollutant discharges, and other factors causing the high priority water quality problems within the watershed.

#### **Section 3.0 – Implementation of Watershed Activities**

This section includes a summary of all watershed water quality and watershed education activities planned for implementation during the FY 2011-12 reporting period. The Watershed Activity Implementation Sheets for these activities are presented in Appendix A. This section also discusses public participation mechanisms utilized during the reporting period and the parties that were involved. In addition, this section describes the efforts implemented to encourage collaborative watershed based land-use planning amongst the SLR Copermittees. And, Section 3.5 provides an updated five-year strategic plan that the SLR Copermittees have proposed for the SLR WMA.

#### **Section 4.0 – Effectiveness Assessment**

This section focuses on assessing WURMP effectiveness as a whole with consideration of the following:

- An assessment of SLR Copermittee collaboration efforts during the reporting period.
- An assessment of whether watershed activities are focused on the appropriate water quality problems and sources or whether additional information is needed to reach such conclusions.
- A comprehensive assessment of the impact of all WURMP activities (considered collectively) on the watershed's high priority problems, with a focus at the

## **San Luis Rey River Watershed Urban Runoff Management Program FY 2011-12 Annual Report**

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- Hydrologic Area (HA) level. This section includes any documented changes in pollutant loads, urban runoff and discharge quality, and receiving water quality.
- Measurable targeted outcomes and assessment measures will be used to facilitate assessment, whenever possible. Assessment Levels 1-6 will be applied to the watershed as a whole, where applicable and feasible.

### **Section 5.0 – Conclusions and Recommendations**

This section provides conclusions and recommendations as determined by the SLR Copermittees based on the overall Annual Report and assessment.

## **Conclusions and Recommendations**

### **Lower San Luis Hydrologic Area**

#### *Conclusions*

The high priority water quality problems in the Lower San Luis HA identified in the SLR WURMP 2008 are bacteria and nutrients. Water quality data collected during previous reporting periods in FY 2007-08, FY 2008-09, FY 2009-10, and FY 2010-11 provided information specific to the HA. In addition to the historical MLS, a TWAS installed towards the bottom of the Bonsall HSA collected data during fiscal years 2007-08 and 2010-11. Data collected from water quality monitoring activities during FY 2011-12, in addition to the data mentioned above continues to support listing bacteria and nutrients as high priority water quality problems in the Lower San Luis Rey HA.

#### *Watershed Activities*

During FY 2011-12, there were 20 activities in various stages of implementation. Eleven activities focused on water quality and seven focused on education. Four of these activities included both a water quality component and an education component. Of these twenty activities, thirteen receive WURMP credit during this reporting period due to their active implementation stage. In addition, three activities focused on monitoring and/or source identification (SLR-003, SLR-008, and SLR-028), two activities were in planning stages (SLR-007, SLR-026), and two activities were in assessment phases (SLR-010 and SLR-022). All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

#### *Watershed Water Quality Activities*

During FY 2011-12, there were eleven watershed water quality activities in the implementation stage. All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

Monitoring programs throughout the watershed will continue to complement Copermittee data collected as part of the Regional and Jurisdictional Monitoring Programs. These additional programs will likely lead to the implementation of appropriate water quality and education activities targeting identified sources of bacteria and nutrients in the watershed.

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During the next reporting period, FY 2012-13, eight watershed water quality activities are planned to be implemented, with two designed to address water quality problems related to bacteria, two designed to address nutrients, and four that address both bacteria and nutrients.

### *Watershed Education Activities*

During FY 2011-12, the Copermittees implemented seven watershed education activities: one focused on bacteria, one focused on nutrients, and five focused on both bacteria and nutrients. Through these education activities, outreach was conducted to a variety of populations including pet owners, nurseries, and residential and horse property owner/operators.

During the next reporting period, FY 2012-13, eight education activities are planned with one focused on bacteria, one focused on nutrients, and six focused on both bacteria and nutrients.

### *Recommendations*

Monitoring programs throughout the watershed will continue to complement Copermittee data collected as part of the Regional and Jurisdictional Monitoring Programs. These additional programs will likely lead to the implementation of appropriate water quality and education activities targeting identified sources of bacteria and nutrients in the watershed.

Current water quality activities appear to address identified high priority water quality problems. However, sources need to be linked to the high priority pollutants in order to more completely assess the effectiveness of these activities. This may be accomplished via research, current data assessments, and supplemental monitoring specific to these activities. The current monitoring programs under implementation in the watershed are a positive step in establishing this linkage.

Future data collection should focus on MS4 discharges and source characterization. The current Regional Monitoring program focus is largely on receiving water quality characterization and does not provide the watershed groups data to support MS4 investigations and source identification efforts. The development and implementation of the MS4 outfall and Source Identification programs may provide useful information to the WURMPs but will be limited in scope.

Some of the hydrologic areas in the SLR Hydrologic Unit (HU) have no receiving water data. Collection of receiving water data where limited sets exist may assist WURMP Copermittees in developing water quality assessments and prioritizing HAs.

Water quality activities that have proven effective may be expanded to other HAs where funding is available. Education activities are often broad in nature and reach targeted groups throughout the watershed; however, where this is not occurring, other Copermittees may wish to build on the experience gained in some of the specific education activities.

Activities in the watershed appear to be properly focused on identified water quality problems in the HU. Future monitoring should continue to focus on source identification activities in the watershed, especially related to suspected bacteria and nutrient pollution. TWAS data should be examined carefully as it is available to discern between water quality in the upper and lower

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watersheds. At this time, it appears that the focusing of activities in the lower watershed is appropriate.

Elevated TDS concentrations are persistent throughout the SLR HU and most of San Diego County. Sources of the elevated TDS are suspected to be related to the region's reliance on imported water and its relation to groundwater recharge in San Diego aquifers, as shown in the results of WURMP Activity SLR-001, the SLR Watershed Water Quality Monitoring Program reported in previous SLR WURMP annual reports. Because this is a region-wide problem, efforts for source reduction and abatement will likely be addressed on a regional scale rather than by watershed.

**Warner and Monserate Hydrologic Areas**

*Conclusions and Recommendations*

With minimal development in both the Warner and Monserate HAs, it is expected that anthropogenic impacts to water quality are limited. Although water quality data for these HAs is minimal, the available data and amount of development in the lower parts of the watershed support the Copermittees decision to focus efforts elsewhere in the watershed to maximize positive impacts of activities.

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## **1 INTRODUCTION**

The San Luis Rey (SLR) River Watershed Urban Runoff Management Program (WURMP) Annual Report (AR) describes the watershed activities conducted by the City of Oceanside, the City of Vista, and the County of San Diego (SLR Copermittees) from July 1, 2011 through June 30, 2012. During this reporting period, the SLR Copermittees worked extensively to develop and implement activities that address water quality issues affecting the SLR River Watershed Management Area (WMA) based on requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Storm Water Permit (Municipal Permit) for San Diego County Copermittees, Order No. 2007-0001, NPDES No. CAS0108758.

### **Organization and Content of the Report**

This annual report is organized according to the *Standardized Format for Watershed Urban Runoff Management Program Annual Reports* outline included with the updated Watershed Urban Runoff Management Program (WURMP) documents submitted to the Regional Water Quality Control Board (RWQCB) in March 2008. This report endeavors to adhere to the organizational requirements of the Municipal Permit issued to 21 San Diego County Copermittees (County Copermittees) in January 2007.

The 2011-12 SLR WURMP AR consists of a total of five sections and is organized as follows:

#### **Section 1.0 – Introduction**

Section 1 summarizes the program background, program approach (including goals and objectives), and applicable regulatory requirements. It briefly describes the watershed, gives a general overview of the organization and content of the report, and describes Copermittee collaboration during the reporting period.

#### **Section 2.0 – Water Quality and Pollutant Source Assessment**

This section provides an updated assessment and analysis of the watershed's current and past applicable water quality data reports, analyses, and other information, including identification of the watershed's water quality problems and high priority water quality problems during the reporting period. This section also describes the likely sources, pollutant discharges, and other factors causing the high priority water quality problems within the watershed.

#### **Section 3.0 – Implementation of Watershed Activities**

This section includes a summary of all watershed water quality and watershed education activities planned for implementation during the reporting period FY 2011-12. The Watershed Activity Implementation Sheets for these activities are presented in Appendix A. This section also discusses public participation mechanisms utilized during the reporting period and the parties that were involved. In addition, this section describes the efforts implemented to encourage collaborative watershed based land-use planning amongst the SLR Copermittees. And, Section 3.5 provides an updated five-year strategic plan that the SLR Copermittees have proposed for the SLR WMA, including new watershed water quality and education activities.

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### **Section 4.0 – Effectiveness Assessment**

This section focuses on assessing WURMP effectiveness as a whole with consideration of the following:

- An assessment of SLR Copermittee collaboration efforts during the reporting period.
- An assessment of whether watershed activities are focused on the appropriate water quality problems and sources or whether additional information is needed to reach such conclusions.
- A comprehensive assessment of the impact of all WURMP activities (considered collectively) on the watershed's high priority problems, with a focus at the Hydrologic Area (HA) level. This section includes any documented changes in pollutant loads, urban runoff and discharge quality, and receiving water quality.
- Measurable targeted outcomes and assessment measures will be used to facilitate assessment whenever possible. Assessment Levels 1-6 will be applied to the watershed as a whole, where applicable and feasible.

### **Section 5.0 – Conclusions and Recommendations**

This section provides conclusions and recommendations as determined by the SLR Copermittees based on the overall Annual Report and assessment.

### **Regulatory Requirements**

In January 2007, Municipal Storm Water Permit Order Number R9-2007-0001 (Municipal Permit) was issued to the San Diego County Copermittees as a renewal permit for Order No. 2001-01. The Permit was issued to 21 jurisdictions and agencies in San Diego County. The Permit addresses the basic federal requirement for a program that reduces pollutants discharged from municipal separate storm sewer systems (MS4s) to the maximum extent practicable (MEP).

Section E of the Municipal Permit requires that the Copermittees within the SLR River Watershed collaborate to develop and implement a watershed-based program that addresses urban runoff and surface water quality. The rationale for this program is simple: urban runoff does not follow jurisdictional boundaries and often travels through multiple jurisdictions while flowing to receiving waters. Therefore, the actions of various municipalities within a watershed regarding urban runoff can have a cumulative impact upon shared receiving waters. The Municipal Permit directs San Diego County Copermittees with land use authority within the watershed to collaborate in developing and implementing the WURMP, the purpose of which is to identify and address the watershed's highest priority water quality problems. In addition, the Municipal Permit requires that the Copermittees develop activities that address education, public participation, and watershed-based land use planning.

Section E of the Municipal Permit defines the Copermittees within the nine regional watersheds, as well as a Lead Copermittee for each watershed. The following Copermittees are included in the SLR River Watershed:

- City of Oceanside
- City of Vista
- County of San Diego

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The Municipal Permit designates the City of Oceanside as the default Lead Copermittee for the SLR River Watershed, and the City of Oceanside has agreed to continue to fulfill this role. The Municipal Permit requires that the Lead Watershed Copermittee be responsible for producing and submitting the WURMP and subsequent annual reports. They are also responsible for coordinating meetings among watershed Copermittees to facilitate the development and implementation of watershed activities. During this reporting period the City of Oceanside coordinated meetings at least quarterly to discuss and implement the various watershed activities and coordinate required regulatory submittals.

In accordance with Section E of the Municipal Permit, the Copermittees listed for each watershed must participate in the development and implementation of a WURMP. The requirements for the WURMP are listed in the Municipal Permit and include the following:

- Mapping the watershed and identifying all receiving waters, all impaired receiving waters, land uses, highways, jurisdictional boundaries, and inventoried commercial, industrial, construction, municipal sites, and residential areas.
- Assessing the water quality of all receiving waters in the watershed based on existing data and eventually performing watershed-based water quality monitoring activities.
- Identifying and prioritizing major water quality problems in the watershed caused or contributed to by discharges from MS4s, including potential sources of the problems.
- Developing and implementing a strategy of water quality and educational activities needed to address the highest priority water quality problems.
- Identifying which Copermittees are responsible for implementing each recommended watershed activity.
- Developing and implementing a mechanism for public participation in watershed activities.
- Developing and implementing watershed-based education activities.
- Developing a mechanism to facilitate collaborative watershed-based land use planning with other Copermittees in the watershed.
- Developing a long-term strategy for assessing the effectiveness of the WURMP.
- Submitting annual WURMP reports which shall document the Copermittees' activities during the preceding year. At a minimum, the annual report must include:
  - A comprehensive description of all watershed activities conducted by the Watershed Copermittees for permit compliance.
  - Public participation mechanisms utilized during implementation.
  - Watershed-based land use planning mechanism description.
  - Effectiveness assessment of the WURMP.
  - Summary of watershed-related data not already included in the annual monitoring report.
  - Identification of water quality improvements or degradation.

### **SLR WURMP Goals and Objectives**

The goal of the WURMP is to positively affect the water quality of the SLR WMA while balancing economic, social, and environmental constraints. This goal will be pursued and ultimately achieved through the implementation of the following specific objectives:

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- Objective #1: Develop and implement a strategic plan to assess and improve water quality within the SLR WMA, which responds to identifiable problems and reflects the beneficial uses of the watershed.
- Objective #2: Integrate watershed principles into land use planning that affects the SLR WMA.
- Objective #3: Enhance public understanding of watershed issues and pollution prevention within the SLR WMA.
- Objective #4: Encourage and enhance public involvement in activities related to urban runoff management within the SLR WMA.

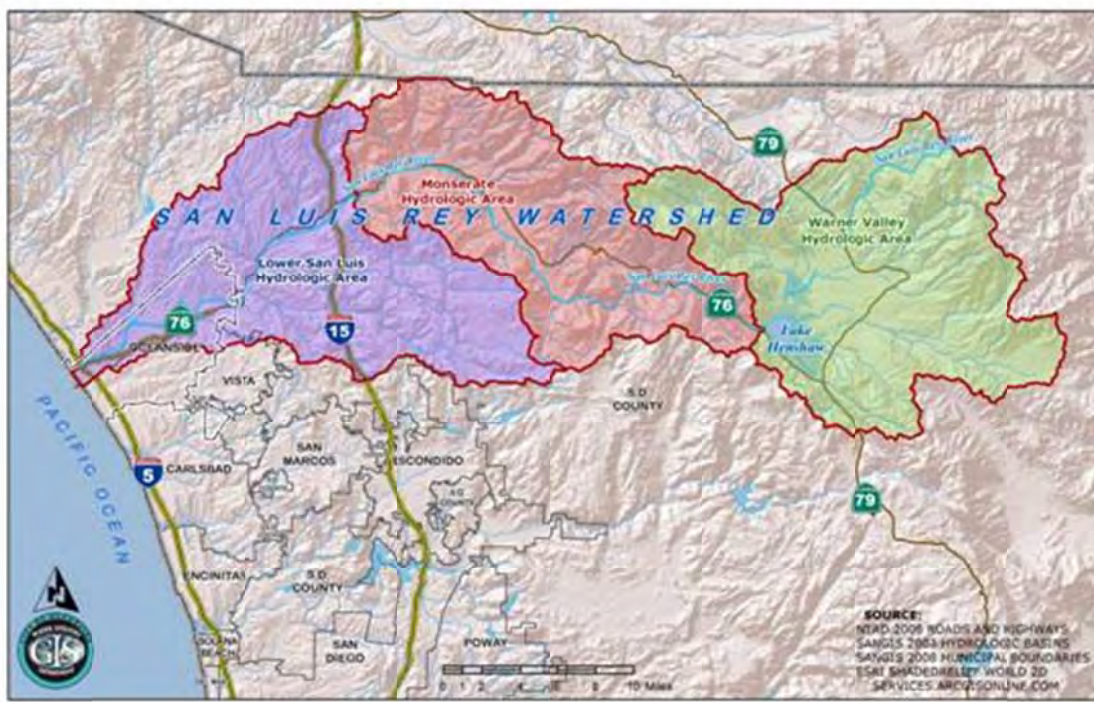
To help reach this goal and the objectives, the SLR Copermittees work collaboratively to identify, implement, and assess appropriate watershed water quality, education, and public participation activities, as well as watershed-based land use planning mechanisms, to properly target high priority water quality problems and their sources.

### **San Luis Rey Watershed Description**

The SLR River Watershed is located along the northern border of San Diego County. It is bordered to the north by the Santa Margarita River Watershed and to the south by the Carlsbad and San Dieguito River Watersheds. The SLR River originates in the Palomar and Hot Springs Mountains, both over 6,000 feet above mean sea level (MSL), and extends west over 55 miles to form a watershed with an area of approximately 360,000 acres, or 562 square miles (see Figure 1-1). The river ultimately discharges to the Pacific Ocean at the western boundary of the City of Oceanside. Of the nine major watersheds in the San Diego region, the SLR River Watershed is the third largest in terms of land area (SANDAG 1998).

The SLR River Watershed or SLR Hydrologic Unit (HU) (903.00) is comprised of three HAs, which have been delineated by the San Diego Regional Water Quality Control Board (RWQCB) based on drainage patterns: Lower San Luis (HA 903.1), Monserate (HA 903.2), and Warner Valley (HA 903.3) (see Figure 1-1). Over 54% of the land in the watershed is vacant or undeveloped. The next largest land uses in the watershed are residential (15%) and agriculture (14%). The highest concentration of population is located in the Lower San Luis HA. There are six federally recognized Tribal Indian Reservations with land in the watershed. The highest point in the San Luis Rey Watershed (and in San Diego County) is Hot Springs Mountain with an elevation of 6,533 feet (1,991 meters).

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**Figure 1-1. San Luis Rey Watershed Hydrologic Areas.**

About half (49%) of the land in the watershed is privately owned. Publicly owned land accounts for approximately 37% of the area, and the remaining 14% consists of numerous reservations in the watershed. In the western half of the watershed, private ownership dominates. Moving east through the watershed, public lands increase and dominate in the Warner Valley HA. The Vista Irrigation District (VID) is the single largest landowner in the watershed.

Five jurisdictions have land use authority in the SLR Watershed and include the Cities of Escondido, Oceanside and Vista and the Counties of San Diego and Riverside. A number of other governmental agencies also administer lands within the unincorporated areas of San Diego County. A general breakdown of jurisdictional areas within the watershed is shown in Table 1-1.

**Table 1-1. Watershed Acreages by Jurisdiction.**

<b>Jurisdiction</b>	<b>Acres</b>	<b>Percentage of Watershed (%)</b>
Escondido	52	0.0
Oceanside	15,883	4.4
Vista	743	0.2
Unincorporated San Diego County	342,566	95.2
Riverside County	649	0.2
<b>Total</b>	<b>359,893</b>	<b>100.0</b>

Source: SANDAG 1998. (Note: Of the sources reviewed, values for total size of the watershed and the breakdown of the watershed by jurisdictions were similar but often different. Therefore, the values provided in this table are for general purposes only and should be verified if used for other purposes.)

## **1.1 Copermittee Collaboration**

The Cities of Oceanside and Vista and the County of San Diego share the implementation responsibilities for the SLR WURMP. Using the watershed approach, the SLR Copermittees aim to positively affect the water quality of the SLR River Watershed in a cost effective, environmentally sensitive, and collaborative manner.

The San Diego County Copermittees have developed a Model Watershed Urban Runoff Management Strategy (Strategy) to guide the selection and implementation of Watershed Activities that appropriately addresses each watershed Copermittees' contribution to the high priority water quality problems in their WMA. Data analyzed to date for the SLR Watershed suggests that bacteria and nutrients are high priority water quality problems in the Lower San Luis HA.

Having used the watershed strategy as the basis for developing the activities, the SLR Copermittees have focused activity efforts on the potential sources that are most likely to be contributing the pollutants that are causing the high priority water quality problems in the SLR WMA. Where receiving water conditions and pollutant sources were not clearly characterized, monitoring and source identification activities were planned and implemented.

### **1.1.1 San Luis Rey WURMP Meetings**

In order to effectively develop the 2008 SLR WURMP Update required by Municipal Permit Order R9-2007-0001 and to plan and implement the San Luis Rey WURMP in current and subsequent years the SLR Copermittees met six times during FY 2011-12. See Table 1-2 for dates of these meetings and pertinent agenda items discussed at these meetings. The SLR Copermittees developed and prioritized water quality activities that address pollutants of concern in the watershed, exchanged ideas on how to address high priority water quality pollutants in the watershed, evaluated the effectiveness of actions, collaborated on development of a Comprehensive Load Reduction Plan (CLRP) for the Bacteria I TMDL, and collaborated on development of required submittals to the RWQCB.

The general watershed meetings of the San Luis Rey WURMP workgroup were led by the City of Oceanside. Activities and tasks developed by the Copermittees were then carried out by the Copermittees within the structure of their jurisdictional organization. Task completion was then tracked and assessed at the workgroup meetings and is being reported in this Annual Report.

**Table 1-2. SLR WURMP Meeting Dates and Agenda Items Discussed.**

<b>Date</b>	<b>Agenda Item Topics</b>
8/16/11	Bacteria I TMDL Comprehensive Load Reduction Plan development update; Copermittee SLR watershed monitoring program update; Report of Waste Discharge development update; Watershed activity updates; Annual report schedule.
10/18/11	Overview of Regional Monitoring Programs specific to SLR Watershed (Weston Solutions); Bacteria I TMDL Comprehensive Load Reduction Plan development update; Annual report assignments and schedule; Review of FY 11-12 activities.
12/20/11	(Via conference call) WURMP Annual Report section updates; Watershed activity review and updates; meeting schedule.



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Date	Agenda Item Topics
1/15/12	Annual report development and feedback.
1/17/12	Review of Final SLR WURMP Annual Report (via conference call)
05/15/12	Draft of new MS4 Administrative Permit; Comprehensive Load Reduction Plan development update; Monitoring, scheduling, and deliverables related to the Bacteria 1 TMDL; Potential grant/funding opportunities; watershed activity updates.

In addition to the meetings listed above, the San Luis Rey Copermittees met several times during FY 2011-12 to address requirements of the Bacteria Total Maximum Daily Load (TMDL) for Beaches and Creeks. The San Luis Rey Copermittees began developing a Comprehensive Load Reduction Plan (CLRP) for the San Luis Rey River Watershed. The CLRP outlines a proposed program of activities that will be capable of achieving TMDL-specified bacteria load reductions. For more information, refer to Activity SLR-026 in Appendix A of this report.

### **1.1 Watershed Map Updates**

Section J.2. of the Municipal Permit requires that the WURMP provide an accurate map of the watershed that identifies the following: All receiving waters (including the Pacific Ocean); Clean Water Act section 303(d) impaired receiving waters; land uses; MS4s, major highways, jurisdictional boundaries; and inventoried commercial, industrial and municipal sites. In a letter dated September 23, 2008, the Regional Water Quality Control Board requested Copermittees increase the size of the watershed maps to no smaller than 36 inches by 24 inches. See Appendix B of the 2007-08 WURMP AR for a copy of the increased map size.

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## **2 WATER QUALITY AND POLLUTANT SOURCE ASSESSMENT**

This section presents a current assessment of surface water quality and potential pollutant sources within the SLR WMA. The SLR Copermittees participate in a regional monitoring program, which rotates between the northern and southern watersheds of San Diego County every other year. During the FY 2011-12 reporting period, regional monitoring efforts were focused in the southern watersheds. A detailed review of all monitoring activities taking place within the SLR watershed over the current reporting period can be found in the *2011-12 Urban Runoff Monitoring Annual Report* (Regional Monitoring Report). The pollutant source assessment is based on land use coverages, facility source inventories, as well as past and present source characterization efforts.

### **2.1 Watershed Water Quality Assessment**

This section provides an updated assessment of applicable water quality data reports, analyses, and other information, including identification of the watershed's high priority water quality problems.

#### **2.1.1 2011-12 WATER QUALITY PROGRAMS AND DATA**

Table 2-1 identifies the active water quality monitoring programs within the SLR WMA and briefly summarizes monitoring activity during FY 2011-12.

For further details on the following programs, please refer to the Regional Monitoring Report, which is submitted under separate cover:

- Stormwater Monitoring Coalition (SMC) Program
- Jurisdictional Dry Weather Monitoring (DWM)
- Coastal Storm Drain Monitoring (CSDM)

Jurisdictional DWM Program results are also discussed in individual Jurisdictional Urban Runoff Management Program (JURMP) Annual Reports. CSDM Program results are also included as an attachment to the 2011-12 Regional Monitoring Report.

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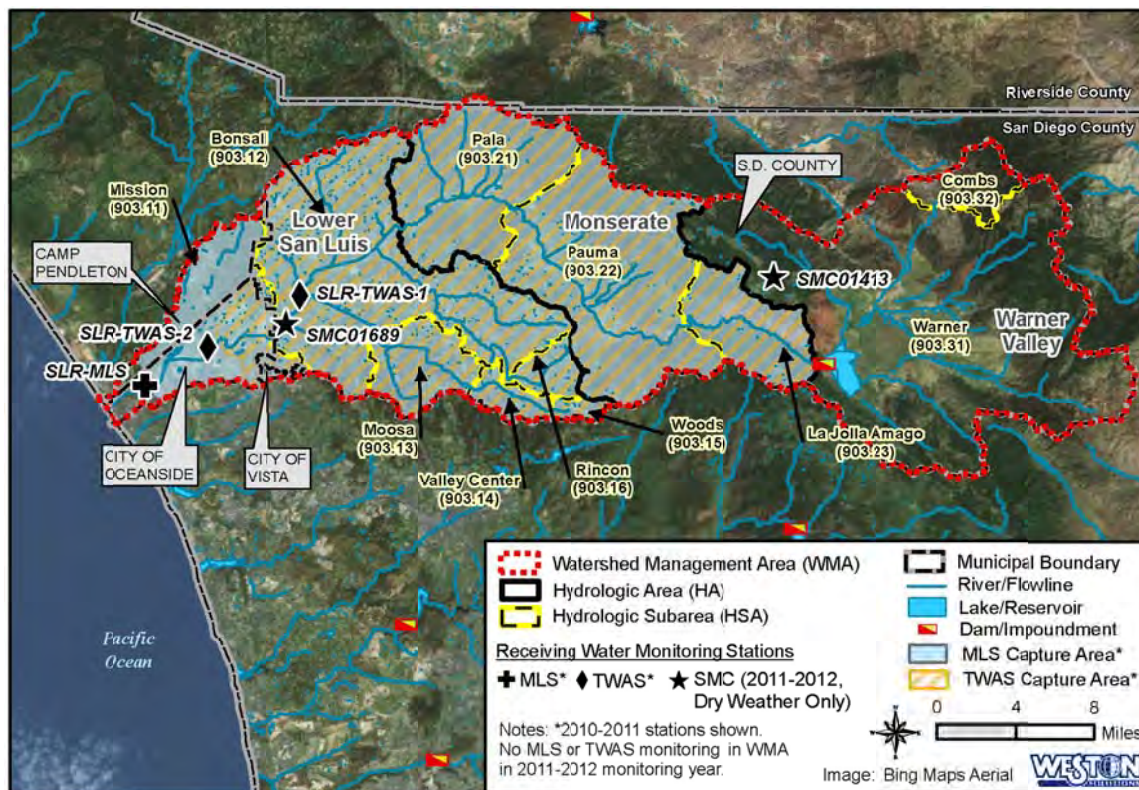
**Table 2-1. Water Quality Monitoring Activities in the San Luis Rey River WMA (FY 2011-12).**

Program Data Set	Data Assessed	Number of Sites Assessed
<b>Receiving Water Monitoring</b>		<b>8</b>
Ambient (Dry) Monitoring	Water chemistry, toxicity, bacteria, rapid stream bioassessment, and trash	0
SMC Regional Monitoring	Water chemistry, toxicity, and rapid stream bioassessment	2-SMC*
Wet Weather Monitoring	Water chemistry, bacteria, toxicity, and trash	0
Post-Storm Sediment Pyrethroid Monitoring	Grain size, synthetic pyrethroid pesticides, and TOC	0
Third-Party Data (Coastkeeper)	General chemistry and bacteria	4-Coastkeeper
<b>Urban Runoff Monitoring</b>		<b>119</b>
Jurisdictional Dry Weather Monitoring	Field and analytical chemistry	37
Jurisdictional Dry Weather Monitoring –Trash Assessment	Trash	50
MS4 Outfall Random Dry Weather Monitoring	Chemistry and bacteria	6
MS4 Outfall Random Wet Weather Monitoring	Chemistry and bacteria	6
MS4 Outfall Targeted Dry Weather Monitoring	Chemistry, metals, and bacteria	14
MS4 Outfall Targeted Wet Weather Monitoring	Chemistry, metals, pesticides, and bacteria	0
CSDM Program	Coastal Outfall and Receiving Waters	6
SMC – Stormwater Monitoring Coalition TOC – total organic carbon MS4 - municipal separate storm sewer systems CSDM – coastal storm drain monitoring *The SMC Monitoring Program uses a random stratified program design and is one sample from a 425 sample point program to be collected over 5 years ( <a href="http://socalsmc.org/ProjectThree.aspx">http://socalsmc.org/ProjectThree.aspx</a> ).		

**2.1.2 2011-12 WATER QUALITY MONITORING RESULTS**

Figure 2-1 below presents a map of the San Luis Rey River WMA, including monitoring sites, jurisdictional boundaries, and drainage areas.

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**Figure 2-1. San Luis Rey River WMA 2011-12 Monitoring Locations.**

Table 2-2, Table 2-3, and Table 2-4 below summarize the annual monitoring results and identify relationships between receiving water and municipal separate storm sewer system (MS4) outfall results during both wet and dry weather. Each of the tables describes a specific catchment area:

- Table 2-2: SLR Mass Loading Station (SLR-MLS),
- Table 2-3: SLR Temporary Watershed Assessment Station 2 (SLR-TWAS-2), and
- Table 2-4: SLR Temporary Watershed Assessment Station 1 (SLR-TWAS-1).

The constituents listed in these tables represent medium and high priority constituents based on the *Methodology for Annual and Long-Term Data Assessments for San Diego County Watershed Management Areas*, Final Draft-Version 1 (SDCRC, 2010).

Key findings from the monitoring data collected at these stations include the following:

- **Receiving Water** – The WMA is off-rotation, and therefore no Permit-required NPDES receiving water data were collected. Receiving water data were collected under the SMC program at two locations during dry weather. The SMC site located above Lake Henshaw in the most upstream watershed (SMC01413) is not representative of the drainage areas monitored in the NPDES program (MLS and TWAS are below the reservoir), and therefore data from this station are not presented in the tables. The results from SMC01413 indicate overall good water quality with no constituents exceeding the benchmarks. Biology as rated by the bioassessment Index of Biotic Integrity (IBI) score was also Good. The second SMC site (SMC01689) represents receiving water conditions in the Bonsal hydrologic subarea (HSA) upstream from the MLS and SLR-TWAS-2, but

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located below SLR-TWAS-1 and Lake Henshaw. For SMC01689, the high priority constituents identified for dry weather flows included total phosphorus and total dissolved solids (TDS). The IBI score was Very Poor. SMC analysis does not include indicator bacteria.

- MS4 – Wet vs. Dry Weather – The results from the 2011-2012 monitoring of MS4 outfalls indicated that fecal coliform is a high priority during wet weather; and, fecal coliform, *Enterococcus*, nutrients, and TDS are high-priority constituents during dry weather. These results represent MS4 outfall conditions in the MLS and both TWAS drainage areas below Lake Henshaw. The MS4 results for this WMA indicate similar results to regional MS4 priorities in both wet and dry weather, and corresponding priorities in regional receiving water quality based on historic and current data from southern (on-rotation) WMAs. Chloride was also identified as a high priority in dry weather MS4 flows. This constituent was added to the NPDES Program to better assess TDS exceedances. Chloride is a component of TDS.
- Bioassessment Monitoring: The SMC location above Lake Henshaw in the Warner HSA (SMC01413) was rated by the bioassessment Index of Biotic Integrity (IBI) as Good. At the SMC site located in the lower watershed (SMC01689), toxicity to *C. dubia* reproduction (but not acute or chronic survival) was observed.

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**Table 2-2. Summary of San Luis Rey River MLS Drainage Area Assessment Findings.**

San Luis Rey River MLS			
System Assessed	Dry Weather Priority Constituents <sup>1</sup>	Wet Weather Priority Constituents <sup>1</sup>	Core Management Question(s) Addressed
Receiving Water Monitoring (MLS, TWAS, SMC)	<u>NPDES Program</u> <ul style="list-style-type: none"> <li>• No data</li> </ul> <u>SMC Program (One Station, SMC01689)*</u> <ul style="list-style-type: none"> <li>• Chemistry – No Priority constituents identified</li> <li>• Toxicity – <i>C. dubia</i> reproduction (Med)</li> <li>• Biology – Very Poor IBI</li> <li>• Bacteria – Not analyzed</li> <li>• Nutrients – <b>Total Phosphorus</b></li> <li>• TDS – <b>TDS</b></li> </ul> <u>Third-Party Data – (Coastkeeper)<sup>2</sup></u> The following constituents did not meet Basin Plan benchmarks: <ul style="list-style-type: none"> <li>• Bacteria – <u><i>Enterococcus</i></u>, <i>E. coli</i></li> </ul>	<u>NPDES Program</u> <ul style="list-style-type: none"> <li>• No data</li> </ul> <u>Synthetic Pyrethroids in Sediment</u> <ul style="list-style-type: none"> <li>• No data</li> </ul>	1, 2
Urban Runoff Monitoring (MS4 Outfall)	<u>MS4 Program</u> <ul style="list-style-type: none"> <li>• Chemistry – Chloride</li> <li>• Bacteria – Fecal Coliform, <u><i>Enterococcus</i></u></li> <li>• Nutrients – Total Nitrogen, <b>Total Phosphorus</b>, Dissolved Phosphorus</li> <li>• TDS – <b>TDS</b></li> </ul>	<u>MS4 Program</u> <ul style="list-style-type: none"> <li>• Chemistry – TSS (Med)</li> <li>• Bacteria – <u>Fecal Coliform</u></li> <li>• Nutrients – No priority constituents identified</li> <li>• TDS – <b>TDS (Med)</b></li> </ul>	3, 4
Lagoon/ Estuary/ Bay Monitoring	Not Applicable	Not Applicable	1, 2
<b>Trends<sup>3</sup></b>			
<b>Increasing<sup>4,5,6,7</sup></b>		<u>Fecal Coliform</u> , Total Coliform, <u><i>Enterococcus</i></u> , Ammonia, pH, Turbidity, Dissolved Phosphorus	5
<b>Decreasing</b>		Conductivity, Total Hardness, <b>TDS</b>	
Note: All results included in this table reflect data collected above the receiving water station and below Lake Henshaw. Priority constituents that are common to both the MS4 outfall monitoring and receiving water results are shown in blue.			
<sup>1</sup> Priority constituents are determined using the WMA Assessment Methodology (SDCRC, 2010a). High-priority and medium-priority constituents are defined for each monitoring program. When no priority constituents were identified for a constituent group, “no priority constituents identified” was stated to allow clear and consistent comparisons among assessment tables. In the case of toxicity “no observed toxicity” was stated.			
<sup>2</sup> For third-party data, underlined constituents did not meet the Basin Plan water quality benchmark (WQB) for >50% of samples. Constituents that are not underlined did not meet the WQB for >25% to 50% of samples. Constituent list for third-party data are provided in Appendix M. Indicator bacteria analyzed include: <i>E. coli</i> , <u><i>Enterococcus</i></u> , total coliform.			
<sup>3</sup> Trends based on wet weather historical data. Due to rotational structure of the monitoring program, receiving water data for this station are not available for the 2011-2012 monitoring year.			
<sup>4</sup> Fecal coliform and TDS results have consistently been above the WQB.			
<sup>5</sup> Ammonia and dissolved phosphorus concentrations have consistently been below the WQB.			
<sup>6</sup> Turbidity was below the WQB for the past two years monitored.			
<sup>7</sup> pH exceeded the WQB in one sample from the 2010-2011 monitoring year; however, it is historically below the WQB.			
*One sample used in analysis.			
IBI – Index of Biotic Integrity Med – medium-priority constituent MLS – mass loading station MS4 – municipal separate storm sewer system		NPDES – National Pollutant Discharge Elimination System SMC – Stormwater Monitoring Coalition TDS – total dissolved solids TSS – total suspended solids TWAS – temporary watershed assessment station WQB – water quality benchmark	

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**Table 2-3. Summary of San Luis Rey River TWAS 2 Drainage Area Assessment Findings.**

San Luis Rey River TWAS-2			
System Assessed	Dry Weather Priority Constituents <sup>1</sup>	Wet Weather Priority Constituents <sup>1</sup>	Core Management Question(s) Addressed
Receiving Water Monitoring (MLS, TWAS, SMC)	<p><u>NPDES Program</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul> <p><u>SMC Program (One Station, SMC01689)*</u></p> <ul style="list-style-type: none"> <li>Chemistry – No Priority constituents identified</li> <li>Toxicity – <i>C. dubia</i> reproduction (Med)</li> <li>Biology – Very Poor IBI</li> <li>Bacteria – Not analyzed</li> <li>Nutrients – <b>Total Phosphorus</b></li> <li>TDS – <b>TDS</b></li> </ul> <p><u>Third-Party Data – (Coastkeeper)<sup>2</sup></u></p> <p>The following constituents did not meet Basin Plan benchmarks:</p> <ul style="list-style-type: none"> <li>Bacteria – <u><i>Enterococcus</i></u></li> </ul>	<p><u>NPDES Program</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul> <p><u>Synthetic Pyrethroids in Sediment</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul>	1, 2
Urban Runoff Monitoring (MS4 Outfall)	<p><u>MS4 Program</u></p> <ul style="list-style-type: none"> <li>Chemistry – Chloride Dissolved Oxygen (Med)</li> <li>Bacteria – Fecal Coliform, <u><i>Enterococcus</i></u></li> <li>Nutrients – Total Nitrogen, <b>Total Phosphorus</b>, Dissolved Phosphorus</li> <li>TDS – <b>TDS</b></li> </ul>	<p><u>MS4 Program</u></p> <ul style="list-style-type: none"> <li>Chemistry – TSS (Med)</li> <li>Bacteria – Fecal Coliform</li> <li>Nutrients – No priority constituents identified</li> <li>TDS – TDS (Med)</li> </ul>	3, 4
Lagoon/ Estuary/ Bay Monitoring	Not Applicable	Not Applicable	1, 2
<p>Note: All Results included in this table reflect data collected above the receiving water station and below Lake Henshaw. Priority constituents that are common to both the MS4 outfall monitoring and receiving water results are shown in <b>blue</b>.</p> <p><sup>1</sup> Priority constituents are determined using the WMA Assessment Methodology (SDCRC, 2010a). High-priority and medium-priority constituents are defined for each monitoring program. When no priority constituents were identified for a constituent group, “no priority constituents identified” was stated to allow clear and consistent comparisons among assessment tables. In the case of toxicity “no observed toxicity” was stated.</p> <p><sup>2</sup> For third-party data, underlined constituents did not meet the Basin Plan water quality benchmark (WQB) for &gt;50% of samples. Constituents that are not underlined did not meet the WQB for &gt;25% to 50% of samples. Constituent list for third-party data is provided in Appendix M. Indicator bacteria analyzed include <i>E. coli</i>, <i>Enterococcus</i>, and total coliform.</p> <p>*One sample used in analysis.</p>			
IBI – Index of Biotic Integrity Med – medium-priority constituent MS4 – municipal separate storm sewer system NPDES – National Pollutant Discharge Elimination System MLS – mass loading station		SMC – Stormwater Monitoring Coalition TDS – total dissolved solids TSS – total suspended solids TWAS – temporary watershed assessment station WQB – water quality benchmark	



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**Table 2-4. Summary of San Luis Rey River TWAS 1 Drainage Area Assessment Findings.**

San Luis Rey River TWAS-1			
System Assessed	Dry Weather Priority Constituents <sup>1</sup>	Wet Weather Priority Constituents <sup>1</sup>	Core Management Question(s) Addressed
Receiving Water Monitoring (MLS, TWAS, SMC)	<p><u>NPDES Program</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul> <p><u>SMC Program</u></p> <ul style="list-style-type: none"> <li>No samples collected upstream of SLR-TWAS-1</li> </ul> <p><u>Third-Party Data – (Coastkeeper)<sup>2</sup></u></p> <p>The following constituents did not meet Basin Plan benchmarks:</p> <ul style="list-style-type: none"> <li>Bacteria – <i>Enterococcus</i>, <i>E. coli</i></li> </ul>	<p><u>NPDES Program</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul> <p><u>Synthetic Pyrethroids in Sediment</u></p> <ul style="list-style-type: none"> <li>No data</li> </ul>	1, 2
Urban Runoff Monitoring (MS4 Outfall)	<p><u>MS4 Program</u></p> <ul style="list-style-type: none"> <li>Chemistry – Chloride</li> <li>Bacteria – Fecal Coliform, <i>Enterococcus</i></li> <li>Nutrients – Total Nitrogen, Total Phosphorus, Dissolved Phosphorus</li> <li>Nitrate as N (Med), Nitrate/Nitrite as N (Med)</li> <li>TDS – TDS</li> </ul>	<p><u>MS4 Program</u></p> <ul style="list-style-type: none"> <li>Chemistry – TSS (Med)</li> <li>Bacteria – Fecal Coliform</li> <li>Nutrients – No priority constituents identified</li> <li>TDS – TDS (Med)</li> </ul>	3, 4
Lagoon/ Estuary/ Bay Monitoring	Not Applicable	Not Applicable	1, 2
<p>Note: All results included in this table reflect data collected above the receiving water station and below Lake Henshaw. Priority constituents that are common to both the MS4 outfall monitoring and receiving water results are shown in blue.</p> <p><sup>1</sup> Priority constituents are determined using the WMA Assessment Methodology (SDCRC, 2010a). High-priority and medium-priority constituents are defined for each monitoring program. When no priority constituents were identified for a constituent group, “no priority constituents identified” was stated to allow clear and consistent comparisons among assessment tables. In the case of toxicity “no observed toxicity” was stated.</p> <p><sup>2</sup> For third-party data, underlined constituents did not meet the Basin Plan water quality benchmark (WQB) for &gt;50% of samples. Constituents that are not underlined did not meet the WQB for &gt;25% to 50% of samples. Constituent list for third-party data is provided in Appendix M. Indicator bacteria analyzed include <i>E. coli</i>, <i>Enterococcus</i>, and total coliform.</p>			
<p>MLS – mass loading station Med – medium priority constituent MS4 – municipal separate storm sewer system NPDES – National Pollutant Discharge Elimination System</p>		<p>SMC – Stormwater Monitoring Coalition TDS – total dissolved solids TSS – total suspended solids TWAS – temporary watershed assessment station WQB – water quality benchmark</p>	

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Table 2-5 summarizes the 303(d) listed water bodies and constituents within the San Luis Rey River WMA, and identifies whether available data support the listings. Table 2-5 also identifies where there are no data, and whether total maximum daily loads (TMDLs) have been developed. As identified in the table, there are listed waterbodies where data may be needed to verify impairments.

**Table 2-5. San Luis Rey River WMA Assessment Conclusions in Relation to 2008 Section 303(d) Listings.**

Waterbody Name	HSA	HSA No.	303(d) Listed Pollutant/ Stressor	Supported by Regional Data	Supported by SMC/ Third-Party Data	TMDL
Pacific Ocean Shoreline	Mission	903.11	Enterococcus and total coliform	✓	✓	✓
Lower San Luis Rey River	Mission	903.11	Chloride, TDS, <i>Enterococcus</i> , fecal coliform, phosphorus, nitrogen, and toxicity	✓	✓	
Guajome Lake	Mission	903.11	Eutrophic	No data	No data	
Upper San Luis Rey River	Bonsall	903.12	Nitrogen	No data	✓	
Keys Creek	Bonsall	903.12	Selenium	No data	No data	

Source: SWRCB, 2011.

HSA – hydrologic subarea  
SMC – Stormwater Monitoring Coalition  
SWRCB – State Water Resources Control Board  
TDS – total dissolved solids  
TMDL – total maximum daily load

Answers to the five Core Management Questions are provided below.

**Core Management Question 1.**

**Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?**

Core Management Question 1 aims to link water and habitat quality and species toxicity to the many beneficial uses of the San Luis Rey River Watershed. This question is best addressed using a long-term assessment in addition to a more detailed look at the linkage between priority constituents and specific beneficial uses. The Long-Term Effectiveness Assessment (LTEA) five-year analysis was completed during FY 2010-11. The LTEA analysis offers the opportunity to compare annual water quality conditions with longer term trends in receiving water and habitat quality. This comparison is best addressed by comparing the FY 2010-11 data collected at the MLS and TWAS stations and evaluating the similarities in priority constituent ratings with the LTEA dataset. Both assessments use a triad approach for receiving water that includes chemistry, toxicity, and benthic community assessments. The triad approach provides a more holistic assessment of the overall health and conditions protective of beneficial uses, rather than just identifying priorities based solely on chemistry results. In addition, historical bacteria, nutrients, and dissolved minerals monitoring results associated with WURMP Activity SLR-001 also inform the discussion of the conditions in the San Luis Rey River.

During wet weather, fecal coliforms and TDS have consistently been identified as high priority constituents historically in the LTEA and in the FY 2010-11 regional data assessments. TSS, turbidity, and the pesticide, bifenthrin, have been identified intermittently as medium or high priorities during previous assessments.

Toxicity is not a high priority during wet weather. It is identified as a medium priority at all sites during the FY 2010-11 regional monitoring and at the TWAS-1 station in the LTEA assessment. It was identified as a low priority at the MLS in the LTEA assessment.

During ambient conditions, Enterococcus, dissolved phosphorous, total phosphorous, total nitrogen and TDS stood out as consistent high or medium priority analytes in the LTEA and the FY 2010-11 regional monitoring data assessment at all sites assessed. The previous monitoring conducted jointly between the City of Oceanside and the County of San Diego as WURMP Water Quality Activity SLR-001 provides additional ambient data for bacteria, TDS, and nutrients for eight main stem sites of the San Luis Rey River. The data supports the high-priority designations of indicator bacteria, nutrients, and TDS.

Toxicity surveys conducted in wet and dry weather resulted in low to medium priority ratings indicating that there is no evidence of persistent toxicity. TDS is consistently observed above the benchmark throughout the Lower San Luis and Monserate HAs and it has been demonstrated that several aquatic organisms (e.g., *C. dubia*) have a low tolerance to elevated TDS and ion imbalance (Mount et al., 1997). This may be the cause of the intermittent toxicity to test organism reproduction.

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Bioassessment surveys assess the biological indicators within the receiving waters. The surveys are conducted in ambient conditions, but results apply to overall benthic conditions year round. Biological indicators, as measured by IBI scores, are rated as a high priority in both the LTEA and the FY 2010-11 regional monitoring assessments.

In summary, exceedances of bacteria, nutrients, and dissolved mineral Water Quality Objectives (WQOs) and poor rapid stream bioassessment results indicate that conditions in the San Luis Rey River may not be protective of some beneficial uses. The receiving water monitoring results support the selection of bacteria and nutrients as high priority constituents and therefore support the activities in active implementation and those planned for future implementation within the Watershed.

### **Core Management Question 2.**

#### **What is the extent and magnitude of the current or potential receiving water problems?**

As identified in previous years through multiple receiving water monitoring programs, the priority constituents during wet weather are TDS and bacteria. The priority constituents during dry weather are bacteria, nutrients, and TDS. Core Management Question 2 was addressed with magnitude of exceedance ratios and spatial analysis of priority constituents using the FY 2010-11 regional monitoring ambient and wet weather assessments in the receiving waters. The joint monitoring conducted by the County of San Diego and the City of Oceanside also provides a spatial extent of exceedances for bacteria, TDS and chloride, and nutrients for mean results from 2004 through 2011 to supplement the regional data.

The magnitude of the receiving water problems can be assessed by reviewing the frequency that the results are above the benchmark, which is how the constituent priorities are determined, and by the ratio of the measured concentration to the appropriate benchmark. The constituent priorities are addressed in Core Management Question 1. During wet weather, the highest median ratio to benchmark for TDS is 2.8 at SLR-TWAS-1 and the highest median ratio to benchmark for fecal coliform was 629 at SLR-MLS. During ambient conditions, the median ratio to benchmark for TDS is 2.9 at all three locations in the watershed. The highest median ratio to benchmark for Enterococcus is 7.28 at the MLS. The highest median ratios to benchmark for nutrients are 3.89 for total nitrogen at the MLS, 1.80 for total phosphorus at TWAS-2, and 1.55 for dissolved phosphorus at the MLS and TWAS-2.

The MLS and TWAS stations are located within the lower 12 miles of the San Luis Rey River. Therefore, the discussion of the extent of the spatial receiving water problems are confined to the discussion presented in Core Management Question 1 and the discussion on magnitude above. Overall, the high priority constituents are uniform throughout the sampling area during wet and dry weather. The SMC Program, which uses a random sample selection method and samples during ambient conditions, includes sites that are within this lower 12 mile area and some that are upstream, depending on the monitoring year's selection. The SMC results have generally supported the priority ratings used in the LTEA and the Regional Monitoring Program assessments. In the FY 2011-12 monitoring year, two SMC sites were sampled in the receiving waters during dry weather. One site was located above Lake Henshaw in the upper watershed and is not representative of the drainage areas monitored in the NPDES program (MLS and TWAS are located below the impoundment). The second SMC site was located in the Bonsall hydrologic subarea (HSA) upstream of the MLS and TWAS-2 stations, but below the TWAS-1

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station. The high priority constituents identified for dry weather flows included total phosphorus and TDS, which is consistent with the NPDES monitoring results in the sampling area.

Analysis of the 2004 through 2011 data collected by the joint monitoring program, SLR-001, also found that total nitrogen concentrations were consistent, and actually greater, at the most upstream site while total phosphorus concentrations increased gradually from upstream to downstream. The joint monitoring program results show TDS and chloride increasing from east to west, with a slightly lower mean result at Douglas and a larger increase at Benet. All stations exceed the Basin Plan water quality objectives for TDS and all but the most upstream site exceeded the Basin Plan water quality objectives for chloride. The joint monitoring program also concluded that indicator bacteria means are typically lowest at the eastern and western most sampling stations, with a peak at the Douglas sampling location.

Historical stream bioassessment monitoring conducted in the WMA indicates a Very Poor benthic community at both MLS and TWAS locations. The consistent rating of Very Poor at both the MLS and TWAS since 2001 suggests that the extent of the impairment on the benthic community is not isolated only to a single location. The SMC 2011-12 bioassessment results collected in the Bonsall HSA indicate a Very Poor benthic community at the site closest to the MLS and TWAS stations. However, the SMC site located upstream of Lake Henshaw had a Good rating that suggests some variability in biological conditions spatially.

Toxicity results were a medium priority at all MLS and TWAS wet weather sites during the FY 2010-11 monitoring year. However, while slight toxicity to *C. dubia* reproduction was observed at the MLS and TWAS-1, *C. dubia* survival and reproduction and toxicity to *H. Azteca* survival was observed during one monitoring event at TWAS-2. TSS, turbidity, and two banned pesticides, malathion and diazinon, were found in the water chemistry during the same event and are likely linked to the toxicity results. During ambient monitoring, toxicity to *C. daphnia* reproduction was observed during one event at the MLS and TWAS-2 creating a medium priority. FY 2011-12 SMC sampling at the station located above the MLS and TWAS-2 also indicated toxicity to *C. daphnia* reproduction.

Residential and agricultural land uses make up the highest percentage in the Lower San Luis HA whereas open space and vacant land make up most of the Monserate and Warner Valley HAs. Thus the extent of the current and potential receiving water problems are likely concentrated in the Lower San Luis HA, and coincide with more intensive monitoring. Bacteria and nutrients have the highest median ratio to benchmark results from the monitoring, which indicate a higher magnitude of exceedance, and are therefore designated as high priority constituents. Lower HA results indicate that total nitrogen concentrations tend to decrease downstream, while bacteria increase. TDS also increases as the River flows towards the ocean.

### **Core Management Question 3**

#### **What is the relative urban runoff contribution to the receiving water problem(s)?**

Core Management Question 3 is partially answered through the MS4 Outfall Monitoring Program. During the FY 2011-12 monitoring program, the San Luis Rey River WMA MS4 was assessed through the random dry, random wet, and targeted dry components of the MS4 Outfall Monitoring Program. The CSDM results and historical data from WURMP Activity SLR-001

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provide supplemental information to address the relative urban runoff contribution to the receiving water problems.

In wet weather, MS4 outfall data indicates that the indicator bacteria fecal coliform is a priority constituent for wet weather flows. There is a linkage between MS4 outfall priorities for this indicator bacteria with receiving water wet weather flows based on historical data trends at the MLS. Fecal coliform was identified as a priority in receiving water in the previous Annual Reports and the LTEA based on data from the MLS and TWAS in the lower watershed below Lake Henshaw. TDS was identified as a medium priority for wet weather flows from MS4 outfalls. The LTEA identified TDS as a high priority in dry weather flows in receiving water at the MLS, indicating a potential linkage with MS4 results. TDS is generally a dry weather issue in the San Diego region. Higher TDS concentrations in wet weather flows may be influenced by the longer dry periods and lower rainfall that result in a greater build-up of natural minerals. Drier wet seasons might also be influenced by dry weather flows that may be from imported sources of water for irrigation and other purposes.

In dry weather, MS4 outfall data indicated priority constituents include indicator bacteria (*Enterococcus*), nutrients and TDS. These constituents were also identified as priorities for receiving water dry weather flows based on select SMC data and past receiving water data within the drainage areas above the MLS and TWAS and below Lake Henshaw. *Enterococcus*, nutrients, and TDS are regional issues in developed areas of the County based on the LTEA. Fecal coliform was also identified as a high priority in dry weather MS4 outfalls, which is not consistent with regional dry weather priorities. This indicator bacteria is typically a priority for wet weather flows in both MS4 outfalls and receiving water. Chloride was also identified as a priority constituent in dry weather flows and is associated with the TDS priority rating.

Historical CSDM results indicate that coastal storm drains do not appear to be effecting bacterial concentrations in the coastal receiving waters during dry weather conditions among the sites sampled.

Data collected through the joint monitoring program (SLR-001) from 2004 to 2011 also provides information on both tributary and receiving water quality. The total and fecal coliform relative mean concentration results remained below the AB411 single sample standard at all main stem sites. While there are peaks in the spatial data, none appear to correlate with the tributary results. The site with the highest mean concentration of *Enterococcus* (Douglas) had no visible tributaries or outfalls between it and the next upstream main stem site (Murray).

All of the tributaries sampled in the joint monitoring program have a relative mean concentration greater than the Basin Plan objective for TDS and all but one have relative mean concentrations greater than the objective for chloride. Two tributaries in the Mission HSA (Sleeping Indian and Pilgrim Creek) have been identified as having higher TDS concentrations than the other sampling sites. Pilgrim Creek was also identified as having the highest chloride concentration. Results at both main stem sites downstream of these tributaries have a slight increase in TDS and chloride levels. However, mineral composition of TDS at Pilgrim Creek renders that tributary characteristically different from the others. The mean concentrations of the main stem samples are very similar to the mean groundwater concentrations, which indicate that groundwater is influencing water quality in the main stem.

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Bacteria, nutrients, and dissolved minerals are identified as priority constituents in the receiving water and the MS4 indicating that there is the potential for urban runoff contribution to the receiving water. Currently, four of the five years of data for the random wet MS4 program have been collected. The probability-based random monitoring program was developed to assess the data after a five-year period when the data set is complete. Therefore, this question may be answered with a higher level of confidence with the five-year assessment required by the MS4 Outfall Monitoring Workplan.

### **Core Management Question 4**

#### **What are the sources of urban runoff that contribute to receiving water problem(s)?**

Core Management Question 4 is addressed through the previously completed Regional Source Identification Monitoring Program, Land-use Based Water Quality Monitoring (SLR-028), and also from the completion of the Lower San Luis Rey Bacteria Source Identification Project, a State Clean Beaches Initiative Grant.

In 2009-10, the County of San Diego conducted land-use based monitoring activities (SLR-028) to characterize water quality in catchments consisting primarily of agricultural and rural residential land uses. Two of the sites included in this sampling effort were located in the San Luis Rey Watershed. The Couser Canyon site, located in the Monserate HA (903.2), was composed primarily of agricultural land uses (86 percent); of which orchard and vineyard agricultural uses accounted for 75 percent of the watershed's land uses. Water quality data collected at this site suggest that agricultural parcels within the study area contributed bacteria, ammonia as nitrogen, nitrogen, phosphorus, TDS, iron, and manganese at levels above water quality benchmarks during storm events. Dry weather results indicate that parcels within the study area contributed bacteria, ammonia as nitrogen, nitrogen, phosphorus and TDS. The Valley Center sampling location, also located in the Monserate HA (903.2) consisted of a mix of spaced rural residential and agricultural land uses (primarily orchard and vineyard). Water quality data collected at this site suggest that during wet weather events runoff exceeded bacteria, nitrogen, and TDS water quality benchmarks. Additional sampling, conducted in the San Diego River Watershed, Blossom Valley sampling site, indicate that spaced rural residential land uses within the study area contributed bacteria, ammonia as nitrogen, nitrogen, phosphorus, and lead at levels greater than water quality benchmarks.

Similar studies were conducted in 2010-11 (Regional Source Identification Program) to assess dry weather and wet weather runoff from single-family residential areas. The studies were conducted at two locations, one within the San Luis Rey Watershed (Mission HSA) in the City of Oceanside. Wet weather results from the site within the San Luis Rey Watershed indicate that residential parcels within the study area contributed bacteria, dissolved copper, and pesticides (specifically bifenthrin) above water quality benchmarks during storm events. Dry weather results indicate that residential parcels within the study area contributed nutrients, dissolved and suspended solids (TSS, TDS, and turbidity), bacteria, and dissolved copper above water quality benchmarks during ambient conditions.

During 2010-11, the City of Oceanside, with match funding from the County of San Diego and the City of Vista, completed a three year, grant-funded bacteria source tracking study in the Lower San Luis Rey River. Genetic bacterial analysis focused primarily on identifying if there

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were bacteria from human and avian sources in the main stem and tributaries of the lower watershed. The results of the project did point to both human and avian sources present during wet and dry weather at the river mouth and human sources (avian sources were not tested) in main stem and tributary locations of the Lower San Luis Rey River. Other sources are likely present (pets, other animals, and/or vegetation), but the quantification or division of percentage of these sources is not available from the project.

### **Core Management Question 5**

#### **Are conditions in receiving waters getting better or worse?**

Core management question 5 is addressed using the trend results evaluated during the 2010-2011 Annual Monitoring Report (SDCRC, 2011a). Trend analysis is conducted on historical wet weather data collected at the MLS. Trend results do not typically change from year to year; therefore, they can be tracked on a less frequent basis in receiving waters. As of 2011, conductivity, hardness, and TDS were significantly decreasing trends. TDS has generally been below the benchmarks, but was above in MS4 outfall and SMC receiving water sites monitored in the 2011-2012 monitoring period. Significantly increasing constituents included fecal coliform, total coliform, *Enterococcus*, dissolved phosphorus, ammonia, pH, and turbidity. Of these constituents, fecal coliform has consistently been above the benchmarks. Ammonia, dissolved phosphorus, and turbidity have consistently been below the water quality benchmarks.

The bioassessment ratings at the San Luis Rey MLS and TWAS have been Very Poor in nearly all assessments conducted between 2001 and 2012 in the Lower San Luis HA and there are no apparent trends in the benthic community.

Toxicity has rarely been observed in samples collected from the San Luis Rey MLS. Between 2001 and 2011, toxicity was observed during just three storm events. The dry weather SMC data collected in the Lower San Luis HA indicated toxicity to *C. dubia* reproduction (but not acute or chronic survival). There are no significant trends for toxicity in the data set and toxicity is not a persistent issue in the Watershed.

### **2.1.3 WATERSHED WATER QUALITY PROBLEMS**

Section 3.1.3 of the March 2008 WURMP identifies criteria to be used by the SLR Copermittees to identify priority and high priority water quality problems within the SLR WMA (SLR WURMP 2008). Based on these criteria, Table 2-6 identifies all the watershed water quality problems, including high priorities, and provides a brief explanation of the supporting information used to make each decision.



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**Table 2-6. Water Quality Problems in the San Luis Rey WMA.**

<b>Water Quality Problem</b>	<b>WURMP High Priority?</b>	<b>Explanation</b>
Bacteria	Yes	- TMDL for bacterial indicators at the Pacific Ocean Shoreline, San Luis Rey River mouth - 303(d) listing for Enterococcus and fecal coliform for the Lower San Luis Rey River - Persistent exceedances of bacterial indicators benchmarks at the MLS and TWAS.
Nutrients	Yes	- 303(d) listing for Eutrophication at Guajome Lake - 303(d) listing for Total Nitrogen and Total Phosphorus for the Lower San Luis Rey River. - 303(d) listing for Total Nitrogen for the Upper San Luis Rey River. - Persistent exceedances of nutrient-related constituents at the MLS and TWAS.
Dissolved Minerals (TDS & Chloride)	No	- 303(d) listings for TDS and chloride for Lower San Luis Rey River - Persistent exceedances of TDS benchmarks observed at the MLS and TWAS.
Benthic Alteration	No	- Consistent "Poor" or "Very Poor" IBI scores and O/E ratio results at the MLS and TWAS
Selenium	No	- 303(d) listing for Eutrophication at Keys Creek
Toxicity	No	- 303(d) listing for Lower San Luis Rey River

## 2.2 Pollutant Source Assessment

This section describes the likely sources, pollutant discharges, and other factors causing the high priority water quality problems within the watershed. Land use and facility source data have been examined and mapped for the entire watershed in order to identify the potential pollutant sources contributing to the watershed's high priority water quality problems presented in Appendix A, Figure 3-4 of the 2008 San Luis Rey WURMP (SLR WURMP 2008). Table 2-7 presents an overview of the land use distribution for major land use categories and potential sources within each HSA. This table supports the Watershed Copermittees' focus on activities in the Lower SLR Hydrologic Area. The Monserate and Warner Valley HAs consist of over 70% vacant land, open space, and preserve. Urban pollutant sources and anthropogenic influences appear to be very limited in the upper portions of the watershed. Moreover, there are only a few monitoring stations in these areas and very few exceedances have been observed to date. Figure 3-1 in Appendix A of the SLR WURMP 2008 provides a map of sampling locations in the SLR Watershed (SLR WURMP 2008).

Table 2-7 shows the contrast between the lower and upper watershed. Residential and agriculture land uses make up the highest percentage in the lower watershed whereas open space and vacant land make up most of the upper watershed.

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**Table 2-7. Overview of Major Land Uses for San Luis Rey River WMA.**

Hydrologic Sub Area	Major Land Use Categories <sup>1</sup>													
	Residential		Commercial / Industrial		Agriculture		OS/Preserve		Vacant		Military		Total Area Accounted for	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%		%
Lower San Luis HA (903.1)														
Mission HSA (903.11)	7,700	26	1,000	3	3,900	12	2,500	8	2,000	7	9,600	32	88	
Bonsall HSA (902.12)	24,000	37	1,800	3	20,900	32	1,100	2	14,000	21	400	<1	96	
Moosa HSA (903.13)	8,400	38	600	3	5,400	21	500	2	6,600	28	0	0	92	
Valley Center (903.14)														
Woods HSA (903.15)														
Rincon HSA (903.16)														
Monserate HA (903.2)	9,200	9	800	1	18,300	17	14,000	13	64,200	59	0	0	99	
Warner Valley HA (903.3)	4,300	3	400	<1	3,600	3	14,200	9	108,600	82	0	0	98	
Total Land Area	53,600				52,100		32,300		195,400					

1. Source: County of San Diego based on SANDAG 2006 data, land use categories have been grouped for demonstration purposes.

**2.2.1 Potential Bacteria Sources**

The Baseline Long Term Effectiveness Assessment (BLTEA) represented the Copermitees’ first attempt to identify sources of bacteria in the SLR River Watershed. Table 2-8 presents the BLTEA’s list of “Likely” and “Unknown” bacteria sources that were identified based on the development of source loading potential (SLP) ratings (WESTON, LWA, & MOE 2005). Table 2-9 lists the number of potential bacteria sources by HSA in addition to relevant land uses with the greatest potential to generate bacteria. Potential bacteria sources for which facility inventories have been developed are shown on maps in the SLR WURMP 2008, Appendix A, Figures 3-5 through 3-10 (SLR WURMP 2008).

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**Table 2-8. Potential Bacteria Sources for the SLR River Watershed (From BLTEA).**

Potential Bacteria Sources	Number of Sources	Source Loading Potential
Botanical or zoological gardens and nurseries/greenhouses	315	Likely
Eating or drinking establishments	277	Likely
Animal Facilities	47	Likely
POTWs (water and wastewater)	17	Likely
Landscaping - parks, golf courses, cemeteries, etc.	15	Likely
Home automobile associated activities, home and garden care activities, waste disposal	-	Likely
Roads, streets, highways, and parking facilities	-	Likely
Sites for disposing and treating sewage sludge	-	Likely
Development subject to SUSMPs	115	Unknown
Active or closed municipal landfills	5	Unknown
Automobile wholesale	5	Unknown
Motor Freight	2	Unknown
Auto parking lots and storage facilities	-	Unknown
Pest Control Services	49	Unknown
Flood management projects and flood control devices	-	Unknown
MS4s	-	Unknown
Park and Recreational facilities	-	Unknown

“-” signifies that no inventory information is available  
Inventory data provided by the County of San Diego – 2005

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**Table 2-9. Potential Bacteria Sources by Hydrologic Sub-Area.**

HSA	Potential Bacteria Source	Number of Facilities or % Land Use
Mission HSA 903.11	Food Establishments	198
	Commercial Animal Facilities	66
	Auto Facilities	7
	Nurseries	54
	% Residential	26%
	% Agricultural	12%
Bonsall HSA 903.12	Food Establishments	48
	Commercial Animal Facilities	168
	Auto Facilities	34
	Nurseries	15
	% Residential	37%
	% Agricultural	32%
Moosa HSA 903.13 Valley Center HSA 903.14 Woods HSA 903.15 Rincon HSA 903.16	Food Establishments	20
	Commercial Animal Facilities	47
	Auto Facilities	4
	Nurseries	15
	% Residential	38%
	% Agricultural	21%
Monserate HSA 903.20	Food Establishments	9
	Commercial Animal Facilities	34
	Auto Facilities	1
	Nurseries	4
	% Residential	9%
	% Agricultural	17%
Warner Valley HSA 903.30	Food Establishments	7
	Commercial Animal Facilities	0
	Auto Facilities	1
	Nurseries	2
	% Residential	3%
	% Agricultural	3%

There is currently only one location within the watershed where an adequate source identification study has been performed to characterize the bacterial pollutant source: the Oceanside Harbor Boat Wash outfall. The City of Oceanside performs routine sampling at the

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harbor boat wash and recreational vehicle sewage dump area as part of its CSDM Program. This monitoring has revealed high levels of bacteria in samples collected from the boat wash outfall. The outfall drains a short storm drain system where the only influence is from the public boat wash area which borders the sewage dump area for recreation vehicles. Educational signage and the installation of structural BMPs have decreased the exceedances of benchmark values at this site.

To identify other sources of bacteria specifically related to beach closures at the mouth of the SLR River the City of Oceanside was awarded a Proposition 50 Clean Beaches Initiative grant. With grant funding and matching funds from the City of Oceanside, County of San Diego and City of Vista, the bacteria source tracking project focused on identifying the presence or absence of human bacteria sources where human health risks were highest; at the river mouth. Therefore, river mouth specific sampling was prioritized, although additional sampling in the main stem and tributaries was also conducted. In addition, a weight of evidence approach to determining the presence of human bacteria sources was used at all sites, as well as a gull marker utilized at the river mouth.

The results of the project did point to both human and avian sources present during wet and dry weather at the river mouth and human sources (avian sources were not tested) in main stem and tributary locations of the Lower San Luis Rey River. Other sources are likely, but the quantification or division of percentage of these sources is not available from the Project. However, the results indicate and steer recommendations for the City and other Watershed stakeholders to prioritize future management action and studies on activities that may result in human bacteria, such as sewer infrastructure, on-site wastewater systems, and homeless encampments.

### **2.2.2 Potential Nutrient Sources**

The BLTEA represented the Copermitttees' first attempt to identify sources of nutrients in the SLR River Watershed. Table 2-12 presents the BLTEA's list of "Likely" and "Unknown" sources that were identified based on the development of source loading potential (SLP) ratings (WESTON, LWA, & MOE, 2005).

Table 2-10 lists the number of potential nutrient sources by HSA in addition to relevant land uses with the greatest potential to generate nutrients. Table 2-11 lists the number of potential nutrient sources by HAS in addition to relevant land uses with the greatest potential to generate nutrients. Potential nutrient sources for which facility inventories have been developed are shown on maps in the SLR WURMP 2008, Appendix A, Figures 3-11 through 3-16 (SLR WURMP 2008). Preliminary investigations into land uses in the Guajome Lake drainage area have identified potential sources of nutrients to include residential, agricultural sources, commercial nurseries and agriculture, commercial horse facilities, and residential horse facilities.

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**Table 2-10. Potential Nutrient Sources for the SLR River Watershed (From BLTEA).**

Potential Nutrient Sources	Number of Sources	Source Loading Potential
Botanical or zoological gardens and nurseries/greenhouses	315	Likely
Commercial Animal Facilities	47	Likely
Landscaping - parks, golf courses, cemeteries, etc.	15	Likely
Home automobile associated activities, home and garden care activities, waste disposal	-	Likely
Roads, streets, highways, and parking facilities	-	Likely
Park and Recreational facilities	-	Likely
Eating or drinking establishments	277	Unknown
Development subject to SUSMPs	115	Unknown
Auto mechanical repair, maintenance, fueling, or cleaning	57	Unknown
POTWs (water and wastewater)	17	Unknown
Active or closed municipal landfills	5	Unknown
Automobile wholesale	5	Unknown
Corporate yards (incl. maintenance/storage yards)	4	Unknown
Fabricated metal	4	Unknown
Equipment mechanical repair, maintenance, fueling, or cleaning	3	Unknown
Chemical and allied products	2	Unknown
Airfields	2	Unknown
Motor Freight	2	Unknown
Primary metal	1	Unknown
Auto parking lots and storage facilities	-	Unknown
Mobile carpet, drape, or furniture cleaning	76	Unknown
Pool and Fountain cleaning	60	Unknown
Sites for disposing and treating sewage sludge	-	Unknown

“-” signifies that no inventory information is available  
Inventory data provided by the County of San Diego – 2005

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**Table 2-11. Potential Nutrient Sources by Hydrologic Sub-Area.**

HSA	Potential Nutrient Source	Number of Facilities or % Land Use
Mission HSA 903.11	Commercial Animal Facilities	7
	Nurseries	66
	% Residential	26%
	% Agricultural	12%
	% Open Space	8%
	% Industrial/Commercial	3%
Bonsall HSA 903.12	Commercial Animal Facilities	34
	Nurseries	168
	% Residential	37%
	% Agricultural	32%
	% Open Space	2%
	% Industrial/Commercial	3%
Moosa HSA 903.13 Valley Center HSA 903.14 Woods HSA 903.15 Rincon HSA 903.16	Commercial Animal Facilities	4
	Nurseries	47
	% Residential	38%
	% Agricultural	21%
	% Open Space	2%
	% Industrial/Commercial	3%
Monserate HSA 903.20	Commercial Animal Facilities	1
	Nurseries	34
	% Residential	9%
	% Agricultural	17%
	% Open Space	13%
	% Industrial/Commercial	1%
Warner Valley HSA 903.30	Commercial Animal Facilities	1
	Nurseries	0
	% Residential	3%
	% Agricultural	3%
	% Open Space	9%
	% Industrial/Commercial	<1%

### **2.2.3 Other Potential Pollutant Sources**

In addition to the potential pollutant sources discussed in the preceding sections, there are other likely pollutant sources that contribute to water quality degradation in the San Luis Rey River WMA. These sources include natural groundwater, imported water supply, aerial deposition, wildlife impacts, natural erosion, transportation corridors, and military facilities and activities. These potential sources present very unique and difficult challenges in their identification, quantification and assessment of either degradation or improvement. Also noteworthy is the Copermittees' jurisdictional and regulatory inability to control these sources or regulate their impacts and contribution to water quality degradation in the watershed.



### **3 IMPLEMENTATION OF WATERSHED ACTIVITIES**

Per the requirements of the Municipal Permit, the SLR Copermittees are required to identify and implement Watershed Activities that address the high priority water quality problems in the WMA. Watershed Activities shall include both Watershed Water Quality Activities and Watershed Education Activities. These activities may be implemented individually or collectively, and may be implemented at the regional, watershed, or jurisdictional level.

#### *Activity Selection Process*

During the planning process for the SLR WURMP 2008 the SLR Copermittees identified Watershed Activities that address the high priority water quality problems specific to the SLR WMA. Activity planning was conducted using the Collective Watershed Strategy which is a component of the Model Watershed Urban Runoff Management strategy found in the Regional Urban Runoff Management Program (RURMP). This process allows for the San Diego County Copermittees to establish and prioritize activities through the integration of water quality data to the loading potential of sources within the watershed and sub-watershed areas.

The first step in the strategy is to identify water quality problems watershed-wide and in each HA, where sufficient data is available. The second step is to identify the sources that are most likely contributing to the high priority water quality problems. The process used for the selection of potential sources that can contribute particular pollutants to the MS4 is outlined in the BLTEA document created by the San Diego County Copermittees in 2005. Based on the available data and the assessment of the four years of completed activities under the current Municipal Permit, the SLR Copermittees made appropriate management decisions when selecting and designing watershed water quality and watershed education activities. The overall goal of these activities is to reduce the discharge of pollutants causing the high priority water quality problems.

#### *Activity Implementation*

WURMP activities may be implemented individually or collectively, but do not need to be implemented watershed wide. WURMP activities can be implemented by one or more jurisdictions in the watershed yet should be a part of an overall watershed strategy collaboratively developed by the watershed Copermittees. Some of the activities the SLR Copermittees conducted or planned during this reporting period were implemented jurisdictionally while others were implemented watershed-wide or regionally. See Section 3.5 below for an updated five-year strategic plan. This plan provides summary information about each of the proposed watershed activities (both water quality and education) including, the watershed priority pollutants targeted by the activity and an implementation schedule for that activity.

The Copermittees have made significant progress in developing and implementing programs aimed at improving stormwater and urban runoff quality in the watershed during this reporting period. See Section 3.1 for information about Watershed Water Quality Activities implemented and Section 3.2 for Watershed Education Activities implemented during this reporting period.

During FY 2011-12, there were 20 activities in various stages of implementation. Eleven activities focused on water quality and seven focused on education. Four of these activities

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included both a water quality component and an education component. Of these twenty activities, thirteen receive WURMP credit during this reporting period due to their active implementation stage. In addition, three activities focused on monitoring and/or source identification (SLR-003, SLR-008, and SLR-028), two activities were in planning stages (SLR-007, SLR-026), and two activities were in assessment phases (SLR-010 and SLR-022). All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

### 3.1 Watershed Water Quality Activities

The SLR Copermittees are responsible for identifying and implementing Watershed Water Quality Activities that address the high priority water quality problems in the WMA. These activities may be implemented individually or collectively, and may be implemented at the regional, watershed, or jurisdictional level. The activity selection process is briefly described above and more fully in the SLR WURMP 2008.

During this reporting period, the SLR Copermittees implemented eleven water quality activities. Table 3-1 lists the activities that were in active implementation during the reporting period. Details of the each activity, including the effectiveness assessment for each activity, can be found in Appendix A – Activity Implementation Summary Sheets.

**Table 3-1. Watershed Water Quality Activities.**

ID #	Activity Type <sup>1</sup>	Status <sup>2</sup>	Activity/Project Name
SLR-004	WQ	I	Pet Waste Removal Pilot Project Along San Luis Rey Recreation Trail
SLR-005	WQ	I	Pet Waste Bag Dispenser Program in County Parks
SLR-009	WQ	I	Nutrient Source Identification and Abatement: Guajome Lake
SLR-012	WQ	I	Land Acquisitions
SLR-014	WQ	I	Harbor Boat Wash Coin Operated Water Dispenser
SLR-015	WQ	I	Focused Horse Property Outreach in the SLR River Watershed
SLR-016	WQ	I	Focused Grove and Nursery Outreach in the SLR River Watershed
SLR-017	WQ	I	Focused Onsite Wastewater System Outreach in the SLR River Watershed
SLR-021	WQ	I	Fallbrook Community Center Artificial Turf
SLR-024	WQ	I	Water Smart Incentive for Outdoor Water Efficiency
SLR-025	WQ	I	Live Turf Replacement Incentive Program

<sup>1</sup>WQ = Watershed Water Quality Activity

<sup>2</sup>I = Implemented

### 3.2 Watershed Education Activities

This section describes actions implemented by the SLR Copermittees during the 2011-12 reporting period to enhance the general public’s understanding of basic watershed principles and sources of water pollution. The Copermittees are responsible for identifying and implementing Watershed Education Activities that address the high priority water quality problems in the San Luis Rey WMA.

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During the reporting period, the Copermittees implemented seven watershed education activities. Table 3-2 below lists the activities that were in active implementation during the reporting period. Details of the each activity, including the effectiveness assessment for each activity, can be found in Appendix A – Activity Implementation Summary Sheets.

**Table 3-2. Watershed Education Activities.**

ID #	Activity Type <sup>1</sup>	Status <sup>2</sup>	Activity/Project Name/Copermittee(s)
SLR-004	WE	I	Pet Waste Removal Pilot Project Along San Luis Rey Recreation Trail
SLR-015	WE	I	Focused Horse Property Outreach in the SLR River Watershed
SLR-016	WE	I	Focused Grove and Nursery Outreach in the SLR River Watershed
SLR-017	WE	I	Focused Onsite Wastewater System Outreach in the SLR River Watershed
SLR-018	WE	I	Sports Park Watershed Educational Signage
SLR-023	WE	I	Residential Smart Landscape Evaluation Program
SLR-024	WE	I	Water Smart Incentive for Outdoor Water Efficiency

<sup>1</sup> WE = Watershed Education Activity

<sup>2</sup> I = Implemented

### 3.2.1 Additional Watershed Activities

In addition to the Watershed Water Quality and Watershed Education activities that qualify for WURMP credit, the SLR Copermittees implemented, planned or assessed seven activities that they feel are important to implementation of the WURMP and development of future activities but don't receive WURMP credit. Table 3-3 below lists the activities for which tasks were implemented, planned, or assessed during this reporting period. Details of each activity can be found in the Activity Implementation Sheets located in Appendix A.

**Table 3-3. Additional Watershed Activities.**

ID #	Activity Type*	Activity/Project Name/Copermittee(s)
SLR-003	M	Modular Wetland Installation of Oceanside Harbor Boat Wash Outfall
SLR-007	P	Water Quality Runoff Management and Agricultural Waiver Workshop
SLR-008	M, S	Guajome Lake Water Quality Monitoring Program
SLR-010	A, S	Lower SLR River Bacteria Source Tracking Study
SLR-022	A	Residential Rain Barrel Subsidies and Distribution
SLR-026	P	Comprehensive Load Reduction Plan
SLR-028	M	Land Use Based Water Quality Monitoring

M = Watershed Water Quality Monitoring Activity; S = Source Identification/Characterization Activity

A = Assessment; P = Activity in Planning Stages

In addition to the above activities the SLR Copermittees implemented various public participation and collaborative planning efforts that they feel are notable and should be reported in this WURMP Annual Report. The Copermittees feel that these additional activities are vital to

the implementation of the overall WURMP and are complementary to the activities that qualify to receive WURMP credit. Details of each of these additional activities can be found Section 3.3.

### **3.3 Public Participation Activities**

The SLR Copermittees are responsible for implementing a watershed-specific public participation mechanism within the watershed. The mechanism encourages participation from other organizations within the watershed which could include other agencies, private companies, non-governmental organizations, environmental groups, etc. Several opportunities are available to the public to engage them in the implementation of the WURMP. Below is a summary of these opportunities and information about how they were implemented during this reporting period.

#### **Outreach Events**

The SLR Copermittees collaborated to staff informational booths at special events and coordinate cleanup events throughout the watershed. During this reporting period SLR Copermittees staffed booths at the following events and disseminated storm water related educational materials.

- July 5, 2011 – Morning After Mess
- August 5-7, 2011 – Rod Run 21 Annual Car Show & Smokin' Q Classic BBQ
- September 17, 2011 – California Coastal Cleanup Day
- September 24-25, 2011 – Oceanside Harbor Days
- November 5, 2011 – San Luis Rey River Cleanup
- November 12, 2011 – Vista Invitational Band Tournament
- December 15, 2011 – Day Without A Bag
- March 24, 2012 – Vista Community Clinic Fundraiser
- March 25, 2012 – Paws in the Park
- April 23-29, 2012 – Oceanside Green Week
- April 28, 2012 – Oceanside Green Fair (Oceanside Amphitheatre)
- April 28, 2012 – Creek to Bay Cleanup
- April 28, 2012 – Alta Vista Gardens Earth Day
- April 28, 2012 – Vista Library Re-dedication
- May 27, 2012 – City of Vista Strawberry Festival and Street Fair
- June 23, 2012 – San Diego County Fair - Enviro Fair
- June 27, 2012 – Taste of Vista

#### **Educational Materials Distributed**

The SLR Watershed Copermittees collaborated on the dissemination of stormwater education pieces at outreach events. These materials were developed by the Copermittees, the Regional Education and Residential Sources Workgroup (ERS Workgroup) or developed in previous years by the North County Storm Water Program (NCSWP). Below is a summary of the materials distributed by the SLR Copermittees during this reporting period.

- Construction brochure highlighting construction site BMPs
- BMP posters specifically for restaurant activities
- BMP posters specifically for automotive repair and auto body repair activities
- General BMP brochure for residents

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- Door hangers for residents with observed violations
- Click-message pens
- Pencils with Regional Stormwater Hotline
- Integrated Pest Management (IPM) Tip Cards, English and Spanish
- Personal pet waste bag dispensers
- Fats, oil and grease (FOG) education materials
- Regional Think Blue San Diego Stormwater Pollution Calendars
- Storm water coloring book and crayons

**River, Creek, and Beach Cleanup Events**

River, creek, and beach cleanup events are an excellent way to get the public involved with water quality programs and to educate them about how pollutants, including trash, reach the waterways through the storm drain system. During this reporting period there were six major cleanup events that had staging sites at several locations throughout the SLR watershed. A total of 958 volunteers removed approximately 6,881 pounds of trash and debris from coastal beaches and inland sites in the San Luis Rey River Watershed. Table 3-4 below provides summary information about these cleanup events.

**Table 3-4. River, Creek and Beach Cleanup Event Summary.**

Date	Name	Location	# of Participants		Total # of Participants	# of Pounds Removed
			Inland Sites	Coastal Sites		
7/05/2011	Morning After Mess	Oceanside Harbor		77	77	225
9/17/2011	Oceanside Beach Cleanup	South side of Pier and Harbor		454	454	955
11/05/2011	San Luis Rey River Cleanup	Inland River Sites	82		82	2,000
11/05/2011	Oceanside Beach Cleanup	Harbor South Jetty		18	18	300
4/28/2012	SLR River Cleanup	Old 395 and Highway 76	42		42	2,990
4/28/2012	Oceanside Beach Cleanup	South side of Pier		285	285	411
	<b>Totals</b>		<b>124</b>	<b>834</b>	<b>958</b>	<b>6,881</b>

**North County Storm Water Program**

Since the initiation of the Regional Education and Residential Sources (ERS) Workgroup in FY 2007-08 the San Luis Rey Copermittees have been attending meetings of the Regional ERS Workgroup collaborating with all 21 Copermittees on regional stormwater education outreach programs. Therefore the NCSWP group combined efforts with the ERS Workgroup during the FY 08-09 reporting period and has discontinued meeting. Materials developed under this group are still in use by SLR Copermittees including the following:

- Construction brochure highlighting construction site BMPs
- BMP posters specifically for restaurant activities
- BMP posters specifically for automotive repair and auto body repair activities

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### **San Luis Rey Watershed Council**

The SLR Watershed Copermittees continued participating in regular meetings of the San Luis Rey Watershed Council (SLRWC) during this reporting period. The SLRWC is a partnership of local landowners, agricultural growers, Native American Tribal bands, community and environmental organizations, government agencies, and special districts with ties to the watershed. The SLRWC's primary goal is to keep stakeholders apprised of issues and projects concerning the SLR Watershed and to develop and implement a comprehensive resource management plan for the SLR watershed. During FY 2009-10 the SLRWC received nonprofit status by the Federal Internal Revenue Service. The SLRWC can now submit grants on behalf of the watershed stakeholders and move toward implementing priority projects identified by the members. Staff from two SLR Copermittees (City of Oceanside and County of San Diego) fill seats on the Board of Directors of the organization.

### **Project Clean Water**

Project Clean Water (PCW) is a water quality resource for the San Diego County region including Municipal NPDES Copermittees and the public. PCW, initiated in July 2000, established a framework for the broad-based and collaborative development of solutions to local water quality problems. PCW seeks to actively involve a multitude of stakeholders in exploring water quality problems, their causes, and their solutions. It was formed under the guidance of a Technical Advisory Committee made up of local stormwater-related professionals. For more details on the development of PCW refer to the FY 2007-08 SLR WURMP Annual Report.

One component of PCW is the PCW website which is accessible to the public and is promoted for use by the public to gather information about San Diego County watersheds. There are several web pages that provide information on San Diego's Watersheds, programs and laws related to urban runoff, education information and how to report water pollution. This website provides Best Management Practices information for both residential and industrial/commercial audiences (<http://www.projectcleanwater.org/bmp/>).

PCW features a page devoted to the SLR WMA, with details on the watershed, major pollutants, and organizations related to water quality. Additionally the webpage also offers links to relevant documents such as the WURMP and WURMP Annual Reports. During FY 2011-12 the hits for the Project Clean Water Main Webpage totaled 35,299 visitors (an average of 97 per day).

### **Regional Education and Residential Sources Workgroup**

The Regional Education and Residential Sources Workgroup (ERS Workgroup), was formed during FY 2007-08 under the auspices of the MOU between the 21 San Diego County Copermittees. During FY 2010-11, the ERS Workgroup was co-chaired by the City of Oceanside and City of Imperial Beach with support from the San Diego Regional Airport Authority as Secretary. The ERS Workgroup met four times during FY 2011-12. A list of meeting dates, locations, agenda items and accomplishments are provided in the Regional Urban Runoff Management Program (RURMP) Annual Report scheduled to be submitted to the RWQCB in January 2013.

During FY 2007-08, the ERS Workgroup developed a Regional Residential Education Plan (Plan) which was submitted to the Regional Water Quality Control Board as part of the March

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2008 RURMP. During FY 2011-12 the SLR Copermittees, in conjunction with County Copermittees, continued to implement components of this Plan. A brief summary of the accomplishments of the ERS Workgroup are mentioned below. More details on workgroup products will be provided in the (RURMP) Annual Report scheduled to be submitted to the RWQCB in January 2012.

### *Regional Branding*

The ERS workgroup continues to use the approved logo on its work products for unified branding as well as the Think Blue San Diego Region name. Regional Branding helps to unify the region's stormwater outreach messages.



think **BLUE**  
SAN DIEGO  
REGION

### *EnviroFair at the San Diego County Fair*

During this reporting period, Copermittees collectively staffed a table at EnviroFair on June 23, 2012 during the San Diego County Fair. This event is an excellent opportunity for Copermittees to collect event surveys that gather knowledge and awareness from event attendees related to stormwater related activities. Event survey results will be summarized in the RURMP Annual Report (RURMP AR) due to the RWQCB in January 2013.

### *Mass Media*

The ERS Workgroup continues to purchase media buys at various outlets. These include radio and television ads, as well as Public Service Announcements shown at movie theatres throughout the county.

### *Materials Development*

The ERS Workgroup developed and distributed several outreach materials and continued distribution of products produced during previous reporting periods to residents in the San Diego County region:

- 2012 English and Spanish Stormwater Calendars
- Sponsorship and distribution of reusable tote bags in a region-wide Day Without A Disposable Bag event
- Development of a bilingual stormwater coloring book
- Pencils with the regional stormwater hotline phone number
- Pet waste bag dispensers

### *Partnership Development*

Spanish stormwater calendars were distributed via a partnership with Wildcoast and I Love A Clean San Diego to underserved communities.

### *Market Research and Development*

Assessment of the following work products will be provided in the RURMP AR due to the RWQCB in January 2013:

- Draft tourism video aimed towards tourism operators to educate tourists to the San Diego region about stormwater pollution.
- Revision of the English stormwater calendar based on previous assessment.

### **3.4 Collaborative Land-Use Planning Efforts**

This section describes collaborative land use planning efforts within the San Luis Rey Watershed during FY 2011-12. The SLR Copermittees have identified enhanced education and cross-jurisdictional communication as key elements in lessening the potential watershed impacts resulting from jurisdictional land use decisions. Efforts are ongoing to further integrate watershed priorities into jurisdictional land use planning processes and to search for innovative opportunities to enhance collaboration at the watershed scale. JURMP annual reports contain information on individual Copermittee efforts to integrate watershed and water quality principles into local general plans and ordinances.

#### **Land Acquisitions (Activity ID# SLR-012)**

During this reporting period the County of San Diego acquired 86.43 acres of land within the San Luis Rey Watershed. These land acquisitions will provide a significant water quality benefit, preclude development from occurring, and allow land to retain its natural runoff characteristics. All SLR Copermittees support the purchase of these lands with this purpose in mind.

#### **3.4.1 Cross-Jurisdictional Communication**

The primary means of collaborative land use planning is the clear and timely communication of pending land use decisions among the SLR Copermittees. One way this is accomplished is through notification of the availability of environmental documents and public hearings pursuant to the California Environmental Quality Act (CEQA). To improve awareness of pending projects beyond CEQA requirements, the Copermittees adopted a Memorandum of Understanding in 1991 that establishes guidelines for the notification of land use and development actions approved by Copermittee agencies. Notification triggers are based on considerations of project size, location, and type as specified in the MOU. Each jurisdiction typically provides neighboring jurisdictions with the opportunity to review and comment on discretionary projects located near jurisdictional borders. Through this process, the SLR Copermittees have the ability to participate in and comment on land use planning efforts outside of their jurisdiction. By working together and creating partnerships, Copermittees provide an opportunity to ‘catch’ potential watershed issues from adjacent jurisdictions. Through enhanced communication and strong relationships, the Copermittees are able to better address watershed needs as a whole.

### **3.5 Updated 5-year Strategic Plan**

As mentioned at the beginning of this section the SLR Copermittees are responsible for identifying and implementing Watershed Water Quality and Education Activities that address the high priority water quality problems in the SLR WMA. Utilizing the Collective Watershed strategy the SLR Copermittees have identified activities that will address priority pollutants in the SLR WMA. See Table 3-5 below for an updated 5-year SLR WURMP Strategic Plan.

#### **3.5.1 New Watershed Activities**

Five new watershed activities not listed in the FY 2010-11 SLR WURMP Annual Report 5-year strategic plan were implemented during this reporting period:

- SLR-024: Water Smart Incentive for Outdoor Water Efficiency
- SLR-025: Live Turf Replacement Incentive Program



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- SLR-026: Comprehensive Load Reduction Plan
- SLR-027: Bacteria Source Investigation Focused on Exfiltration From Sanitary Sewers
- SLR-028: Land Use Based Water Quality Monitoring

These new activities are reflected in the updated 5-year SLR WURMP Strategic Plan. Activity Summary Sheets for the new activities are provided in Appendix A of this annual report.

### **3.5.2 Updated 5-Year Strategic Plan**

Table 3-5 at the end of this section provides an updated 5-year Strategic Plan that reflects the status of watershed activities and includes new activities planned for future reporting periods. The updated 5-year strategic plan supersedes the version presented in the FY 2010-11 SLR WURMP Annual Report.

### **3.6 TMDL BMP Implementation**

On February 10, 2010 the San Diego Water Quality Control Board (San Diego Water Board) adopted Resolution No. R9-2010-0001 amending the Basin Plan to incorporate the revised TMDLs for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region. This TMDL Basin Plan amendment was subsequently approved by the State Water Resources Control Board on December 14, 2010, the Office of Administrative Law (OAL) on April 4, 2011, and the United States Environmental Protection Agency (USEPA) on June 22, 2011. Under state law, this TMDL Basin Plan Amendment became fully effective on April 4, 2011, the date of OAL approval.

The Pacific Ocean Shoreline at the San Luis Rey River mouth is specifically addressed in this TMDL. The SLR agencies involved in the SLR watershed are as follows:

- County of San Diego
- City of Oceanside
- City of Vista
- California Department of Transportation

During FY 2011-12, in compliance with the Bacteria Total Maximum Daily Load (TMDL) for Beaches and Creeks, the San Luis Rey agencies began developing a Comprehensive Load Reduction Plan (CLRP) for the San Luis Rey River Watershed. The CLRP outlines a proposed program of activities that will be capable of achieving TMDL-specified bacteria load reductions. To qualify for an extended 20-year wet weather compliance timeline, the Responsible Parties opted to develop a plan that addresses multiple constituents (specifically, bacteria, nitrogen, and phosphorous). See activity SLR-026 in Appendix A of this report for more information.

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**SAN LUIS REY RIVER WATERSHED  
5-YEAR WURMP STRATEGIC PLAN**

**Update for FY 11-12 Annual Report**

**Table 3-5. Five-Year Strategic Plan**

SAN LUIS REY RIVER WATERSHED	HA			Priority Pollutant		Implementation Schedule												
	903.1	903.2	903.3	Bacteria	Nutrients	FY 2007-08		FY 2008-09		FY 2009-10		FY 2010-11		FY 2011-12		FY 2012-13		
<b>Watershed Activities Implemented in FY 2011-12 and Planned for Implementation in FY 2012-13</b>																		
SLR-001: SLR Watershed Water Quality Monitoring Program	x			x	x	M			M			M			M			
SLR-003: Modular Wetland Installation at Oceanside Harbor Boat Wash Outfall	x			x		P			WQ			M			M			
SLR-004: Pet Waste Removal Pilot Project Along San Luis Rey Recreation Trail	x			x		WE			WE			WQ	WE		WQ	WE		
SLR-005: Pet Waste Bag Dispenser Program in County Parks	x			x		WQ			WQ			WQ			WQ			
SLR-007: Water Quality Runoff Management and Agricultural Waiver Workshop	x	x	x	x	x	WE					WE				P		WE	
SLR-008: Guajome Lake Water Quality Monitoring Program	x			x	x	M			M			M			M			
SLR-009: Nutrient Source Identification and Abatement: Guajome Lake	x				x	M	S		WQ	M	S	WQ	M	S	WQ	M	S	
SLR-010: Lower SLR River Bacteria Source Tracking Study	x			x		M	S		M	S		M	S		A	S		
SLR-012: Land Acquisitions	x			x	x	WQ			WQ			WQ			WQ		**	
SLR-014: Harbor Boat Wash Coin Operated Water Dispenser	x			x					WQ	P		WQ	P		WQ			
SLR-015: Focused Horse Property Outreach in the SLR River Watershed***	x	x		x	x				WQ	WE	P	WQ	WE		WQ	WE		
SLR-016: Focused Grove and Nursery Outreach in the SLR River Watershed	x	x			x							WE			WQ	WE		
SLR-017: Focused Onsite Wastewater System Outreach in the SLR River Watershed	x	x		x	x							WE			WQ	WE		
SLR-018: Sports Park Watershed Education Signs	x			x	x							WE	P		WE	P		
SLR-021: Fallbrook Community Center Artificial Turf					x							WQ			WQ			
SLR-022: Residential Rain Barrel Subsidies and Distribution				x	x							WQ	WE	P	WQ	WE		
SLR-023: Residential Smart Landscape Evaluation Program	x			x	x							WE			WE			
SLR-024: Water Smart Incentive for Outdoor Water Efficiency	x			x	x							P			WQ	WE		
SLR-025: Live Turf Replacement Incentive Program	x			x	x										WQ			
SLR-026: Comprehensive Load Reduction Plan	x	x	x	x	x										P			
SLR-027: Bacteria Source Investigation Focused on Exfiltration From Sanitary Sewers	x			x	x												WQ	
SLR-028: Land Use Based Water Quality Monitoring				x	x							M			S		M	
<b>Potential Future Activities</b>																		
SLR River Bacteria BMP Implementation	x			x								Contingent upon funding for prioritized BMPs						

\* Future activity will be assessed based upon program results

\*\* Unable to project land acquisitions in advance

\*\*\* Activity previously named Community Based Residential Horse Property Pilot Project

- WQ = Watershed Water Quality Activity
- WE = Watershed Education Activity
- WQ = Watershed Water Quality Activity (not in active implementation)
- WE = Watershed Education Activity (not in active implementation)
- M = Watershed Water Quality Monitoring Activity
- S = Source ID/Characterization Activity
- P = Activity in Planning Stages
- A = Activity Assessment

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## **4 EFFECTIVENESS ASSESSMENT**

This section summarizes the effectiveness of all of the WURMP activities conducted during FY 2011-12. In addition, there is an assessment of the effectiveness of the collective WURMP implementation.

Each activity summary sheet in Appendix A of the FY 2011-12 SLR WURMP Annual Report identifies specific targeted outcomes (Levels 1-6) that will be assessed and the measures and methods that will be used to gauge activity effectiveness. Each watershed activity is unique and its impacts on water quality are equally distinctive. As a result, measurable outcomes do not always follow a linear path (assessing effectiveness at each of the six outcome levels). For example, a capital project may result in pollutant load reductions (Level 4), but may not have any bearing on changes in the awareness or behavior of a target population (Levels 2 and 3). It is also unlikely that the implementation of an individual watershed activity would be measureable at levels 5 or 6 which are typically measureable through cumulative assessments. The assessment levels are defined below. Definitions are from the Municipal Permit.

**Effectiveness Assessment Outcome Level 1** - Compliance with Activity-based Permit Requirements – Level 1 outcomes are those directly related to the implementation of specific activities prescribed by Order 2007-0001 or established pursuant to it.

**Effectiveness Assessment Outcome Level 2** - Changes in Attitudes, Knowledge, and Awareness – Level 2 outcomes are measured as increases in knowledge and awareness among target audiences such as residents, businesses, and municipal employees.

**Effectiveness Assessment Outcome Level 3** - Behavioral Change and BMP Implementation – Level 3 outcomes measure the effectiveness of activities in affecting behavioral change and BMP implementation.

**Effectiveness Assessment Outcome Level 4** - Load Reductions – Level 4 outcomes measure load reductions which quantify changes in the amounts of pollutants associated with specific sources before and after a BMP or other control measure is employed.

**Effectiveness Assessment Outcome Level 5** - Changes in Urban Runoff and Discharge Quality– Level 5 outcomes are measured as changes in one or more specific constituents or stressors in discharges into or from MS4s.

**Effectiveness Assessment Outcome Level 6** - Changes in Receiving Water Quality – Level 6 outcomes measure changes to receiving water quality resulting from discharges into and from MS4s, and may be expressed through a variety of means such as compliance with water quality objectives or other regulatory benchmarks, protection of biological integrity, or beneficial use attainment.

The activity summary sheets presented in Appendix A include effectiveness assessment summaries for each water quality and education activity, as required in the Municipal Permit, I.2.a.(1).

## **4.1 Assessment of Overall WURMP Effectiveness**

### **4.1.1 Permit Compliance (Level 1)**

A basic Municipal Permit compliance assessment is presented in Table 4-1. This table describes minimum permit requirements set forth in the Municipal Permit, whether or not compliance was achieved by the SLR Copermittees in FY 2011-12, and where in this report, required compliance points are fulfilled or described. As shown in the table, the Copermittees were in compliance with all WURMP related Municipal Permit requirements during FY 2011-12.

**Table 4-1. SLR WURMP Municipal Permit Compliance Assessment.**

<b>Targeted Outcome</b>	<b>Measure</b>	<b>Report Section</b>
Update any watershed maps.	Completed during FY 2007-08, no updates necessary this FY.	Section 1.2
Update watershed water quality assessment, including identification of the watershed's water quality problems and high priority water quality problem(s) during the reporting period.	Completed.	Section 2.1
Identify the likely sources, pollutant discharges, and/or other factors causing the high priority water quality problems within the watershed.	Completed.	Section 2.2
Update list of potential Watershed Water Quality Activities.	Completed.	Section 3.5
Identify and describe the Watershed Water Quality Activities implemented by each Copermittee during the reporting period.	Completed.	Section 3.1
Update list of potential Watershed Education Activities.	Completed.	Section 3.5
Identify and describe the Watershed Education Activities implemented by each Copermittee during the reporting period.	Completed.	Section 3.2
Describe the public participation mechanisms used during the reporting period and the parties that were involved.	Completed.	Section 3.3
A description of Copermittee collaboration efforts.	Completed.	Section 1.1, Section 3.4
Minimum quarterly meetings of the SLR WURMP Workgroup.	Six (6) meetings.	Section 1.1.1
Describe the efforts implemented to encourage collaborative, watershed-based, land-use planning.	Completed.	Section 3.4
Describe all TMDL activities implemented (including BMP Implementation Plan or equivalent plan activities) for each approved TMDL in the watershed.	Developed Comprehensive Load Reduction Plan.	Section 3.6

### **4.1.2 Cumulative Impacts of Activities (Levels 2, 3, and 4)**

#### **Activity Assessments**

During FY 2011-12, there were 20 activities in various stages of implementation. Eleven activities focused on water quality and seven focused on education. Four of these activities included both a water quality component and an education component. Of these twenty activities, thirteen receive WURMP credit during this reporting period due to their active implementation stage. In addition, three activities focused on monitoring and/or source identification (SLR-003, SLR-008, and SLR-028), two activities were in planning stages (SLR-

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007, SLR-026), and two activities were in assessment phases (SLR-010 and SLR-022). All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

Although more water quality data are available via implementation of the Regional Monitoring Program under the current Municipal Permit, it is not feasible to link changes in discharge or receiving water directly to most of the watershed activities. At this point, several questions may be helpful in assessing the cumulative impacts of the watershed activities. Table 4-2 summarizes the assessments of the water quality and education activities that were in active implementation phase during this reporting period in an effort to provide a collective picture of the overall effectiveness of the watershed activities. The activities will be related to historical and recent water quality data and will be examined by hydrologic area in subsequent sections.

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**Table 4-2. Summary of Watershed Water Quality and Education Activities in the SLR WMA (FY11-12).**

Activity Number	Activity	High Priority Water Quality Problem(s) Addressed	Level 2 – Changes in Knowledge/Awareness	Level 3 - Change in Behavior	Sources Identified?	Level 4 - Load Reduction
SLR-004	Pet Waste Removal Pilot Project Along San Luis Rey Recreational Trail	Bacteria	Yes, based on usage of bags and positive examples	A reduction in the number of pet waste piles observed on the North Trail was noted after installation of new stations; Approximately 4,000 pet waste bags were used during the FY.	Pet waste in recreational areas.	Estimated that 1,040 pounds of pet waste were removed from the watershed.
SLR-005	Pet Waste Bag Dispenser Program in County Parks	Bacteria	Yes, based on usage of bags and positive examples	In general, more people picking up after their pets; 33,915 bags were used during this FY.	Pet waste in parks.	Estimated that 6,783 pounds of pet waste were removed from the watershed.
SLR-009	Nutrient Source Identification and Abatement: Guajome Lake	Nutrients	Of those nurseries with multiple scores, two decreased in Stormwater Knowledge Assessment (SKA) Score. All other nurseries have either improved or remained the same.	Of those nurseries with multiple scores, BMP compliance improved or stayed the same at all nurseries in FY 2011-12.	Study area included inspection of 10 nurseries in the upstream area during this FY; no nurseries were found to have BMP violations, there were no direct sources of nitrates identified.	Ten nurseries inspected; BMPs implemented as a result of inspections will likely reduce and abate sources.
SLR-012	Land Acquisitions	Bacteria, Nutrients	None measured	None measured	Potential development	86.43 acres acquired and preserved by the County of San Diego.
SLR-014	Harbor Boat Wash Coin Operated Water Dispenser	Bacteria	None measured	Encourages users to use the water they are paying for more wisely, reducing the amount of water wasted.	Water runoff from washing activities	Expected, although not confirmed, to see a reduction in the amount of water flowing from the site, thereby reducing bacteria loads.



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SLR-015	Focused Horse Property Outreach in the San Luis Rey River Watershed	Bacteria, Nutrients	Pre- and post-workshop surveys were administered to the participants of the Equestrian BMP Workshop. Results indicate a positive increase in knowledge among participants able to correctly identify appropriate equestrian-related BMPs.	Results also show that more equestrians were able to identify positive behavioral changes (Level 3 Outcomes) following the workshops and all responded that they would change future behaviors.	Residential Equestrian Properties	None measured
SLR-016	Focused Grove and Nursery Outreach	Nutrients	Pre- and post-workshop surveys indicate improvements in knowledge of general watershed concepts.	Pre- and post-workshop surveys indicate an increase in those who were able to identify appropriate BMPs.	Groves and Nurseries	None measured
SLR-017	Focused Onsite Wastewater System Outreach	Bacteria, Nutrients	Pre- and post-workshop surveys indicate an increase in knowledge related to stormwater and septic system BMPs.	Thirty-four pumping vouchers were distributed and utilized by program participants, indicating a behavioral change.	Onsite Wastewater Systems	No estimates available at this time.
SLR-018	Sports Park Watershed Education Signs	Bacteria, Nutrients	Yes, based on visitors to the park and usage of the trail.	None measured	Irrigation runoff, litter, fertilizer, pet waste.	None measured
SLR-021	Fallbrook Community Center Artificial Turf	Nutrients	None	None	Fertilizer and irrigation associated with natural turf management	Reduction in fertilizer usage by 25% and irrigation by 18% annually, thereby reducing the loading of nutrients into the watershed by up to 120 pounds of nutrients per year.

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SLR-023	Residential Smart Landscape Evaluation Program	Bacteria, Nutrients	Thirty-eight property owners/managers were educated on appropriate and efficient use of water, specifically focusing on irrigation, thus raising awareness.	None measured	Over-irrigation is a prominent transport mechanism and potential source of dry weather residential contributions to water quality issues.	None measured
SLR-024	Water Smart Incentive for Outdoor Water Efficiency	Bacteria, Nutrients	Twenty participating property owners were educated on appropriate and efficient use of water, specifically focusing on irrigation, although no formal metric to evaluate change in awareness was implemented.	Behaviors were changed as a result of installing 393 Rotating Sprinkler Nozzles and 9 Weather Based Irrigation Controllers.	Over-irrigation is a prominent transport mechanism and potential source of dry weather residential contributions to water quality issues.	The installation of the devices will reduce water use, thus reducing flow leaving the property as urban runoff, although this reduction in flow has not been quantified at this time.
SLR-025	Live Turf Replacement Incentive Program	Bacteria, Nutrients	The City of Oceanside will be promoting the pilot areas in the future to raise awareness for water conservation and turf replacement.	None measured	Over-irrigation is a prominent transport mechanism and potential source of dry weather residential contributions to water quality issues.	The removal of turf followed by landscaping that is less dependent on irrigation water will ultimately reduce over-irrigation flow leaving properties as urban runoff, in turn reducing pollutant loading.

## **4.2 High Priority Water Quality Problems**

All activities addressed high priority water quality problems as identified in the WURMP. Of the activities in implementation, bacteria were specifically addressed in three activities, nutrients in three activities and both bacteria and nutrients in seven activities. A combination of water quality, education, source identification and monitoring activities appear effective at addressing identified high priority water quality problems in the San Luis Rey HU.

### **Level 2 - Changes in Knowledge and Awareness**

Changes in knowledge and awareness of water quality problems were measured in six of the water quality and education activities implemented during this reporting period. Additionally, increases in knowledge are assumed in two activities with no mechanism in place to measure the changes.

Six of the watershed education activities conducted during the reporting period implemented specific measures to assess changes in knowledge and awareness.

- SLR-004: The Pet Waste Removal Pilot Project along the San Luis Rey Recreational Trail accounts for changes in knowledge based on changes in behavior. In FY 2011-12, there were 4,000 bags used from the four stations along the trail.
- SLR-005: The Pet Waste Bag Dispenser Program in County Parks accounts for changes in knowledge based on changes in behavior. In FY 2011-12, there were 33,915 bags used from the 11 stations in the SLR Watershed.
- SLR-009: The Nutrient Source Identification and Abatement in the Guajome Lake Drainage Area also quantified changes in knowledge during inspections. Standardized assessment ratings were given to each facility during inspections over the five years of implementation. A comparison of these numbers over time indicates that two sites decreased in knowledge over time while all other nurseries have either improved or remained the same.
- SLR-015: The Focused Horse Property Outreach in the San Luis Rey River Watershed illustrated increases in knowledge by administering pre- and post-workshop surveys at the workshops conducted in May and June 2012. These surveys showed increases in knowledge related to BMPs designed to address the effects of horse manure on water quality.
- SLR-016: The Focused Grove and Nursery Outreach assessments included pre- and post-workshop surveys to assess knowledge of general watershed principles and changes in awareness of proper irrigation and fertilization practices. An increase was noted in general watershed concepts.
- SLR-017: The Focused Onsite Wastewater System Outreach Activity developed an online web portal offering information on septic tank awareness and proper maintenance procedures for maintaining a healthy septic system. Participants were asked to complete a pre- and post-program questionnaire to assess the effectiveness of the outreach. Pre- and post-program surveys indicated an increase in knowledge related to stormwater and septic system BMPs.

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Certain activities can be assumed to result in increased awareness, although a formal mechanism to measure the change may not be feasible. For example, knowledge was likely increased through the implementation of SLR-018, with the implementation of educational signage at a popular sports park, but was not quantified. Likewise, through the implementation of SLR-023 and SLR-024, fifty-eight participating property owners were educated on the appropriate and efficient use of water; however, no specific mechanism was implemented to measure the change in knowledge. The activities that did not result in increased awareness were designed as monitoring activities or to implement BMPs targeting load reductions. These activities generally focused on public lands and implemented BMPs to reduce the effects of bacteria, nutrients, and other pollutants on receiving waters.

Collectively, the water quality activities are focused efforts leading to localized changes in knowledge and awareness. However, the education activities are broad based, applicable to all hydrologic areas in the watershed and are expected to provide for a general increase in knowledge in the San Luis Rey River Watershed over time.

### **Level 3 – Changes in Behavior, Implementation of BMPs**

A change in behavior was observed and BMPs were implemented in seven of the activities implemented during the Fiscal Year. One additional activity also assumed a change in behavior with no mechanism to measure. Each change in behavior is described below.

- SLR-004: In this activity targeting pet waste along a recreational trail on the San Luis Rey River, there was evidence that people continued utilizing the pet waste bags from installed dispensers to pick-up and properly dispose of pet waste. Approximately 4,000 bags were used during FY 11-12.
- SLR-005: In this activity targeting pet waste in County Parks, there was evidence that people continued utilizing the pet waste bags from installed dispensers to pick-up and properly dispose of pet waste. Approximately 33,915 bags were used during FY 11-12.
- SLR-009: In the Nutrient Source Identification and Abatement activity focusing on the Guajome Lake drainage area within the County, changes in behavior were assessed by tracking the number of violations observed during inspections of the nursery facilities. In most cases, BMP compliance (i.e. behavior) has been shown to improve over time.
- SLR-015: The activity focused on Horse Property Outreach, the pre- and post-workshop surveys included a question regarding BMPs to prevent pollution. Survey scores showed that participants were able to identify more positive behavioral changes after the workshops and all responded that they would change future behaviors.
- SLR-016: This activity focused on outreach to groves and nurseries. Changes in behaviors were not directly measured, but were addressed through pre- and post-workshop surveys administered at the training. Pre- and post-workshop surveys demonstrated that there was an increase in those who were able to identify appropriate BMPs.
- SLR-017: The activity designed around Focused Onsite Wastewater System Outreach illustrated the intent of the participants to positively change their behavior in that 34 vouchers were distributed and utilized. The vouchers reimburse participants for a portion of the pumping costs for residents' onsite wastewater systems.

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- SLR-024: This activity provided outreach and incentives for property owners to utilize water smart irrigation controllers to improve water efficiency and reduce irrigation related runoff. Behaviors were changed as a result of installing 393 Rotating Sprinkler Nozzles and 9 Weather Based Irrigation Controllers.

Certain activities can be assumed to result in positive behavioral changes, although a formal mechanism to measure the change may not be feasible. For example, behaviors were likely improved through the implementation of SLR-014, with the implementation of a coin operated water dispenser at the Harbor Boat Wash Station. This activity encourages users to use the water they are paying for more wisely, reducing the amount of water wasted. Although data collected did not support this assumption, it may prove valid as further data is collected related to water usage.

Sources addressed through these activities included nurseries, pet waste, horse properties, on-site wastewater systems, residential land uses, and recreational areas. The connection of the BMPs to the specific water quality problems are further discussed below.

### **Level 4 – Load Reductions**

In general, water quality and monitoring activities appear effective at identifying and abating sources of high priority water quality problems in the SLR HU.

- SLR-004: The Pet Waste Project along the San Luis Rey Trail has caused a direct, measurable reduction in pet waste, estimated at approximately 1,040 pounds of pet waste removed during FY 2011-12.
- SLR-005: The Pet Waste Bag Dispenser Activity in County Parks has caused a direct, measurable reduction in pet waste, estimated at nearly 6,783 pounds of pet waste during FY 2010-11.
- SLR-009: The Nutrient Source Identification and Abatement at Guajome Lake consists of inspections which require and enforce BMP implementation at the nursery facilities in the drainage area. Ten nurseries were inspected this FY. BMPs implemented as a result of these inspections are expected to reduce the negative impacts of nursery activities on water quality through load reductions. At this time, through BMP implementation, load reductions are assumed, although not quantified.
- SLR-012: The acquisition of land by public agencies, specifically the County of San Diego, will provide for preservation of the land in the future, reducing the negative effects of development on the watershed. The source has been identified as new development and by acquiring the land for public use, the pollutants associated with this source have been prevented. Although load reductions are not quantifiable, the 86.43 acres acquired by the County this fiscal year will contribute to preservation of existing water quality within the watershed.
- SLR-021: In the activity that installed Artificial Turf at the Fallbrook Community Center, estimations of water and fertilizer savings were calculated. The annual use of irrigation water at the facility was reduced by 18% (approximately 170,000 gallons) and the annual amount of fertilizer used decreased by 25% (approximately 120 pounds). The reductions in the amount of fertilizers used and in the transport mechanism both play important roles in reducing dry weather nutrient loads.

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- SLR-024: In providing Water Smart Incentives for Outdoor Water Efficiency, 393 Rotating Sprinkler Nozzles and 9 Weather Based Irrigation Controllers were installed on single family residential properties. The installation of the devices will reduce water use, thus reducing flow leaving the property as urban runoff, although this reduction in flow has not been quantified at this time.
- SLR-025: In providing an Incentive Program for Live Turf Replacement, over 53,000 square feet of live turf was removed and replaced with less water dependent landscaping. The removal of turf followed by landscaping that is less dependent on irrigation water will ultimately reduce over-irrigation flow leaving properties as urban runoff, in turn reducing pollutant loading. However, this assumed reduction in urban runoff has not been quantified at this time.

In addition to the eleven watershed water quality activities actively implemented during the reporting period, there were three monitoring/source identification activities occurring in an attempt to characterize and identify sources. One of these activities is designed to address bacteria and two address both high priority water quality problems. Each of the monitoring/source identification activities currently supports or will support future watershed activities.

### **4.2.1 Integrated Assessment: Level 5 (Changes in Discharge Water Quality) and Level 6 (Changes in Receiving Water Quality)**

#### **4.2.1.1 Warner Valley and Monserate Hydrologic Areas**

As discussed in Section 2.2, residential and agricultural land uses make up the highest percentage in the lower watershed whereas open space and vacant land make up most of the upper watershed. The Monserate and Warner Valley HAs consist of over 70% vacant land, open space, and preserve. Urban pollutant sources and anthropogenic influences appear to be very limited in the upper portions of the watershed. With minimal development in these HAs, it is expected that anthropogenic impacts to water quality are limited. Although water quality data for these HAs is minimal, the available data and amount of development in the lower parts of the watershed support the Copermittees decision to focus efforts elsewhere in the watershed to maximize positive impacts of activities.

#### **4.2.1.2 Lower San Luis Hydrologic Area**

Residential and agriculture land uses make up the highest percentage of land use in the lower watershed. Significant industrial and commercial activities are also present. The majority of the monitoring in the watershed has been conducted in the Lower San Luis HA and results indicate that anthropogenic activities are likely having a negative effect on receiving water quality. For these reasons, the watershed activities and monitoring programs focus primarily on the Lower San Luis HA and are discussed below.

##### ***4.2.1.2.1 Water Quality***

The high priority water quality problems in the Lower San Luis HA identified in the SLR WURMP 2008 are bacteria and nutrients. In 2010-11 monitoring efforts provided useful information specific to the HA, as there were Temporary Watershed Assessment Stations (TWAS) installed at various locations in the watershed in addition to the historical MLS. Data

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was collected during ambient (dry) and storm (wet) conditions at the TWAS and MLS. Due to the rotational nature of monitoring required by the Permit, monitoring at these stations was not conducted during FY 2011-12. Monitoring to assess urban runoff contribution in the Lower San Luis HA was completed through the DWM and CSDM programs as well as through several WURMP activities.

**Bacteria**

Bacteria have been identified as a high priority water quality problem in the SLR WURMP 2008. This decision is further supported by recent water quality data collected during ambient and storm conditions. The SLR Copermittees have implemented many water quality and education activities designed to address identified sources of bacteria in the watershed. There are also several monitoring and source identification activities related to bacteria in the planning or implementation phase.

During this reporting period, eight water quality activities focused on the abatement of specific sources of bacteria. These activities are listed in Table 4-3.

**Table 4-3. Watershed Water Quality Activities – Bacteria.**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Source of Bacteria</b>
SLR-004	Pet Waste Removal Pilot Project Along SLR Recreation Trail	Pet Waste
SLR-005	Pet Waste Bag Dispenser Program in County Parks	Pet Waste
SLR-012	Land Acquisitions	Developed Land
SLR-014	Harbor Boat Wash Coin Operated Water Dispenser	Washing/Cleaning Activities associated with Recreational Boating
SLR-015	Focused Horse Property Outreach in the SLR River Watershed	Equestrian
SLR-017	Focused Onsite Wastewater System Outreach in the SLR River Watershed	Onsite Wastewater Systems (i.e. septic)
SLR-024	Water Smart Incentive for Outdoor Water Efficiency	Irrigation Runoff
SLR-025	Live Turf Replacement Incentive Program	Irrigation Runoff

During this reporting period, six education activities focused on the abatement of specific sources of bacteria. These activities are listed in Table 4-4.

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**Table 4-4. Watershed Education Activities – Bacteria.**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Source of Bacteria</b>
SLR-004	Pet Waste Removal Pilot Project Along SLR Recreation Trail	Pet Waste
SLR-015	Focused Horse Property Outreach in the SLR River Watershed	Equestrian
SLR-017	Focused Onsite Wastewater System Outreach in the SLR River Watershed	Onsite Wastewater Systems (i.e. septic)
SLR-018	Sports Park Watershed Educational Signs	Pet Waste, Trash
SLR-023	Residential Smart Landscape Evaluation Program	Residential Landscaping
SLR-024	Water Smart Incentive for Outdoor Water Efficiency	Irrigation Runoff

In addition to the required water quality and education activities, the watershed Copermittees also invested significant resources in monitoring activities. Three of the monitoring activities include sample collection and analyses pertaining to bacteria concentrations and sources in the watershed. These are listed in Table 4-5.

**Table 4-5. Watershed Monitoring Activities – Bacteria.**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Waterbody Focus</b>
SLR-003	Modular Wetland Installation at Oceanside Harbor Boat Wash Outfall	MS4 and Oceanside Harbor
SLR-008	Guajome Lake Water Quality Monitoring Program	Guajome Lake
SLR-028	Land Use Based Water Quality Monitoring	SLR River

Discharge Water Quality

Various amounts of discharge water quality data related to bacteria have been collected as part of several monitoring programs in the watershed. However, the data have not been assessed in relation to trends. Therefore, at this time it is not feasible to link the watershed activities and program to changes in discharge water quality. Because data collected as part of SLR-003 and SLR-008 are indicating improvements in water quality, this data may be further assessed in the future to address changes in discharge water quality (Level 5).

Receiving Water Quality

Long-term trend analysis of receiving water data provides a measurement of changes in water quality. With no new data collected at the MLS and TWAS stations during FY 2011-12, trend analyses have not been updated over the past year. Long-term trend analysis is limited to wet weather data collected at the MLS in previous years.



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The long-term trend analysis related to bacteria for the SLR-MLS wet weather data indicates statistically significant trends as follows in Table 4-6:

**Table 4-6. Water Quality Trends at MLS – Bacteria.**

<b>Constituent</b>	<b>Trend</b>	<b>Sen's Slope<sup>1</sup></b>
Fecal coliform	Increasing	90
Total coliform	Increasing	692
<i>Enterococcus</i>	Increasing	133

<sup>1</sup>Sen's slope estimator is a non-parametric method that is insensitive to outliers and can be used to infer the magnitude of a trend in the data over time.

Of the constituents significantly increasing, fecal coliform has been consistently above water quality benchmarks. Total coliform and enterococcus do not have wet weather water quality benchmarks. (Weston 2012)

At this time, it is not feasible to link the watershed activities to receiving water data. Changes in water quality trends will take place slowly and will continue to be assessed in future years.

### **Summary**

Through the implementation of a combination of water quality and education activities, complemented by specific monitoring projects, the SLR Copermittees are moving forward in addressing the bacteria problems in the watershed. By implementing practical activities that are targeting identified sources of bacteria, the Copermittees are effectively addressing bacteria problems in the watershed. The combination of activities is having positive impacts on the watershed. However, this does not always translate to changes in discharge and/or receiving water quality, especially related to bacteria. With many diverse sources of bacteria suspected in the watershed, some identified and others not, the Copermittees are implementing activities to address known sources and conducting monitoring activities to identify or confirm other sources.

### **Nutrients**

Nutrients have also been identified as a high priority water quality problem in the SLR Watershed. The decision to identify nutrients as a high priority problem was initially based on the listing of Guajome Lake as impaired for nutrients on the 2006 303(d) listing. Recent revisions to the 303(d) listings include nutrient impairment on the SLR River as well. Based on these impairment listings, and recently collected water quality data, nutrients remain a high priority water quality problem in the SLR Watershed.

During this reporting period, eight water quality activities focused on the abatement of specific sources of nutrients. These activities are listed in Table 4-7.

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**Table 4-7. Water Quality Activities – Nutrients.**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Source of Nutrients</b>
SLR-009	Nutrient Source Identification and Abatement: Guajome Lake	Nurseries
SLR-012	Land Acquisitions	Developed Land
SLR-015	Focused Horse Property Outreach in the SLR River Watershed	Equestrian
SLR-016	Focused Grove and Nursery Outreach in the SLR River Watershed	Groves and Nurseries
SLR-017	Focused Onsite Wastewater System Outreach in the SLR River Watershed	Onsite Wastewater Systems (i.e. septic)
SLR-021	Fallbrook Community Center Artificial Turf	Turf and Irrigation Runoff
SLR-024	Water Smart Incentive for Outdoor Water Efficiency	Irrigation Runoff
SLR-025	Live Turf Replacement Incentive Program	Irrigation Runoff

During this reporting period, six education activities focused on the abatement of specific sources of nutrients. These activities are listed in Table 4-8.

**Table 4-8. Water Education Activities – Nutrients.**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Source of Nutrients</b>
SLR-015	Focused Horse Property Outreach in the SLR River Watershed	Equestrian
SLR-016	Focused Grove and Nursery Outreach in the SLR River Watershed	Groves and Nurseries
SLR-017	Focused Onsite Wastewater System Outreach in the SLR River Watershed	Onsite Wastewater Systems (i.e. septic)
SLR-018	Sports Park Watershed Educational Signs	Irrigation Runoff, Fertilizer, Pet Waste
SLR-023	Residential Smart Landscape Evaluation Program	Residential Landscaping
SLR-024	Water Smart Incentive for Outdoor Water Efficiency	Irrigation Runoff

Each of these water quality and education activities is designed to address sources of nutrients causing or contributing to water quality problems in the watershed. Results of each activity are presented in Appendix A.

In addition to the required water quality and education activities, the watershed Copermittees also invested significant resources in monitoring activities. Three of the monitoring activities

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include sample collection and analyses pertaining to nutrient concentrations and sources in the watershed. These are listed in Table 4-9.

**Table 4-9. Watershed Monitoring Activities – Nutrients.**

Activity Number	Activity Name	Waterbody Focus
SLR-008	Guajome Lake Water Quality Monitoring Program	Guajome Lake
SLR-009	Nutrient Source Identification and Abatement: Guajome Lake	MS4
SLR-028	Land Use Based Water Quality Monitoring	SLR River

MS4 Water Quality

Various amounts of discharge water quality data have been collected as part of several monitoring programs in the watershed. Often, the data related to nutrients has been collected using field test kits. The data have been partially assessed in relation to spatial distribution in the watershed but have not been assessed in relation to trends. Section 2 of this report contains more detailed information on nutrient data collected in the watershed. At this time it is not feasible to link the watershed activities and program to changes in discharge water quality.

Receiving Water Quality

Long-term trend analysis of receiving water data provides a measurement of changes in water quality. With no new data collected at the MLS and TWAS stations during FY 2011-12, trend analyses have not been updated. Long-term trend analysis is limited to wet weather data collected at the MLS in previous years.

The long-term trend analysis for the SLR-MLS wet weather related to nutrient data indicates statistically significant trends as follows in Table 4-10:

**Table 4-10. Water Quality Trends at MLS - Nutrients.**

Constituent	Trend	Sen's Slope <sup>1</sup>
Ammonia	Increasing	0
Turbidity	Increasing	0.21
Dissolved phosphorus	Decreasing	-0.0075

<sup>1</sup>Sen's slope estimator is a non-parametric method that is insensitive to outliers and can be used to infer the magnitude of a trend in the data over time.

Ammonia levels are below water quality benchmarks and turbidity results have been below water quality benchmarks for the last 2 years of monitoring. Dissolved phosphorus is showing a decreasing trend and is also currently below water quality benchmarks (Weston 2012).

At this time, it is not feasible to link the watershed activities to receiving water data. Changes in water quality trends will take place slowly and will continue to be assessed in future years.

**Summary**

Through the implementation of monitoring, source identification projects, water quality, and education activities, the SLR WURMP group is moving forward in addressing the nutrient

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problems in the watershed. In the future, it is expected that the combination of activities will have positive impacts on the watershed. However, this does not always translate to changes in discharge and/or receiving water quality. With many diverse sources of nutrients suspected in the watershed, the Copermittees are conducting monitoring activities to identify or confirm sources as a precursor to designing water quality and education activities in the future.

### **Other Activities**

The Land Acquisitions activity (SLR-012) does not reduce existing loads, but is intended to prevent future loading of pollutants related to new development. Loading estimations are difficult to predict based on land use; however acquisition of the land for public use will prevent the development of commercial and residential areas on the land, both of which have been shown to contribute to bacteria loading. Land acquisition also helps maintain the natural conditions of the site, allowing for natural processes such as infiltration and pollutant uptake to continue. When land is developed, these natural processes are often reduced or eliminated by increasing impervious areas and channelizing or undergrounding stream systems. Preservation of the land will provide for less pollutant generation and may provide for continued pollutant removal, depending on the land acquired. This would directly apply to the bacteria and nutrient water quality problems identified in the WURMP.

### **Conclusions for the Lower San Luis HA**

During FY 2011-12, eleven water quality activities in the HA were in the implementation phase. These activities appear well designed to address high priority water quality problems in the watershed with ten addressing bacteria and ten addressing nutrients (five address both constituents). During FY 2011-12, the seven education activities in the HA addressed both high priority water quality problems in the HA, with six addressing bacteria and six addressing nutrients (five address both constituents).

Monitoring programs throughout the watershed will continue to complement Copermittee data collected as part of the Regional and Jurisdictional Monitoring Programs. These additional programs will likely lead to the implementation of appropriate water quality and education activities targeting identified sources of bacteria and nutrients in the watershed.

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions for Warner Valley and Monserate HA**

With minimal development in this HA, it is expected that anthropogenic impacts to water quality are limited. Although water quality data for this HA is minimal, the available data and amount of development in the lower parts of the watershed support the Copermittees decision to focus efforts elsewhere in the watershed to maximize positive impacts of activities.

### **5.2 Conclusions for the Lower San Luis HA**

The high priority water quality problems in the Lower San Luis HA identified in the SLR WURMP 2008 are bacteria and nutrients. Water quality data collected during previous reporting periods in FY 2007-08, FY 2008-09, FY 2009-10, and 2010-11 provided information specific to the HA. The historical MLS and TWAS installed towards the bottom of the Bonsall HSA collected data during fiscal years 2007-08 and 2010-11. Data collected from water quality monitoring activities during FY 2011-12, in addition to the data mentioned above continues to support listing bacteria and nutrients as high priority water quality problems in the Lower San Luis Rey HA.

#### *Watershed Activities*

During FY 2011-12, there were 20 activities in various stages of implementation. Eleven activities focused on water quality and seven focused on education. Four of these activities included both a water quality component and an education component. Of these twenty activities, thirteen receive WURMP credit during this reporting period due to their active implementation stage. In addition, three activities focused on monitoring and/or source identification (SLR-003, SLR-008, and SLR-028), two activities were in planning stages (SLR-007, SLR-026), and two activities were in assessment phases (SLR-010 and SLR-022). All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

#### **5.2.1 Watershed Water Quality Activities**

During FY 2011-12, there were eleven watershed water quality activities in the implementation stage. All activities focused on one or more of the high priority water quality problems in the SLR Watershed (bacteria and nutrients).

Monitoring programs throughout the watershed will continue to complement Copermittee data collected as part of the Regional and Jurisdictional Monitoring Programs. These additional programs will likely lead to the implementation of appropriate water quality and education activities targeting identified sources of bacteria and nutrients in the watershed.

During the next reporting period FY 2012-13, eight watershed water quality activities are planned to be implemented, with two designed to address water quality problems related to bacteria, two designed to address nutrients, and four that address both bacteria and nutrients.

### *Bacteria*

The SLR Copermittees have implemented several activities designed to address identified sources of bacteria in the watershed. During this reporting period, eight water quality activities focused on the abatement of specific sources of bacteria. There were also several monitoring and source identification activities related to bacteria in the planning or implementation phase.

### *Nutrients*

During this reporting period, eight water quality activities focused on the abatement of specific sources of nutrients. There were also several monitoring and source identification activities related to nutrients in the planning or implementation phase. These were chosen because the sources of the nutrients remain largely uncharacterized in the watershed. Each of these activities appears to be well designed to assess sources of nutrients causing or contributing to water quality problems in the watershed.

## **5.2.2 Watershed Education Activities**

During FY 2011-12, the Copermittees implemented seven watershed education activities: one focused on bacteria, one focused on nutrients, and five focused on both bacteria and nutrients. Through these education activities, outreach was conducted to a variety of populations including pet owners, nurseries, and residential and horse property owner/operators.

During the next reporting period, FY 2012-13, eight education activities are planned with one focused on bacteria, one focused on nutrients, and six focused on both bacteria and nutrients.

## **5.3 Recommendations**

Current water quality activities appear to address identified high priority water quality problems. However, sources need to be linked to the high priority pollutants in order to more completely assess the effectiveness of these activities. This may be accomplished via research, current data assessments, and supplemental monitoring specific to these activities. The current monitoring programs under implementation in the watershed are a positive step in establishing this linkage.

Future data collection should focus on MS4 discharges and source characterization. The current Regional Monitoring program focus is largely on receiving water quality characterization and does not provide the watershed groups data to support MS4 investigations and source identification efforts. The development and implementation of the MS4 outfall and Source Identification programs may provide useful information to the WURMPs but will be limited in scope.

Some of the hydrologic areas in the SLR HU have no receiving water data. Collection of receiving water data where limited sets exist may assist WURMP Copermittees in developing water quality assessments and prioritizing HAs.

Water quality activities that have proven effective may be expanded to other HAs when funding is available. Education activities are often broad in nature and reach targeted groups throughout the watershed; however, where this is not occurring, other Copermittees may wish to build on the experience gained in some of the specific education activities.

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Activities in the watershed appear to be properly focused on identified water quality problems in the SLR HU. These types of activities should continue as bacteria and nutrients show increasing trends at receiving water monitoring stations. Future monitoring should continue to focus on source identification activities in the watershed, especially related to suspected bacteria and nutrient pollution. Future TWAS data will be examined carefully to discern between water quality in the upper and lower watershed. At this time, it appears that the focusing of activities in the lower watershed is appropriate.

Monitoring programs throughout the watershed will continue to complement Copermittee data collected as part of the Regional and Jurisdictional Monitoring Programs. These additional programs will likely lead to the implementation of appropriate water quality and education activities targeting identified sources of bacteria and nutrients in the watershed.

Elevated TDS concentrations are persistent throughout the SLR HU and most of San Diego County. Sources of the elevated TDS are suspected to be related to the region's reliance on imported water and its relation to groundwater recharge in San Diego aquifers, as shown in the results of WURMP Activity SLR-001, the SLR Watershed Water Quality Monitoring Program. Because this is a region-wide problem, efforts for source reduction and abatement will likely be addressed on a regional scale rather than by watershed.

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