AGENDA FOR THE REGULAR MEETING OF THE COASTAL ADVISORY COMMITTEE FOR THE CITY OF SAN CLEMENTE, CALIFORNIA

San Clemente Community Center
Ole Hanson Fireside Room
100 North Calle Seville
San Clemente, California

November 8, 2012
7:00 p.m.

RULES FOR ADDRESSING THE COMMITTEE

Members of the audience who wish to address the Committee are requested to complete one of the forms located on the table near the entrance of the Ole Hanson Room and submit it to the Chairperson. Please limit presentations to three minutes.

Please note: Written material distributed to the Coastal Advisory Committee, after the original agenda packet was distributed, is available for public inspection in the Environmental Programs office located at 910 Calle Negocio, San Clemente, during normal business hours.

1. PLEDGE OF ALLEGIANCE

2. ROLL CALL

3. APPROVAL OF MINUTES

A. September 13, 2012

4. PUBLIC INPUT

Members of the audience who wish to address the Committee on matters of public interest pertaining to the City may step to the podium, state their name and the City in which they reside, and make their presentation. Please limit presentations to three minutes. Since the Committee cannot discuss or take action on matters not on the agenda, items of concern which are not urgent in nature can be resolved more expeditiously by completing and submitting a written request to the Engineering Division, Environmental Programs Section.

For matters on the agenda, public comments will be received at the time that the Coastal Advisory Committee considers the agenda item.

Pursuant to the Americans with Disabilities Act, persons with a disability who require a disability-related modification or accommodation in order to participate in a meeting, including auxiliary aids or services, may request such modification or accommodation from the Environmental Programs Assistant at (949) 361-6143. Notification 24 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to the meeting.

5. OLD BUSINESS – None.

6. NEW BUSINESS

A. Comprehensive Load Reduction Plan (CLRP) Submittal

A memo by Mary Vondrak, Senior Management Analyst, discussing the City's Comprehensive Load Reduction Plan and submittal to the Regional Water Quality Control Board.

Staff Recommendation: Information and discussion item.

B. Potential Meeting with Coastal Commission Staff

A memo by Tom Bonigut, Assistant City Engineer, concerning a potential meeting between several Coastal Advisory Committee and Coastal Commission staff.

Staff Recommendation: Information and discussion item.

7. COMMUNICATIONS

A. Bacteriological Monitoring Report – Date of Posted Report 11/01/12

Information item – Receive and File

B. September 2012 Environmental Programs Update

A summary of recent activities conducted by the City related to runoff/surface water quality and solid waste/recycling.

Information item – Receive and File

8. ITEMS FROM STAFF

A. Potential Future Agenda Items

A memo by Mary Vondrak, Senior Management Analyst, on scheduling of potential future Coastal Advisory Committee agenda items.

Staff Recommendation: Information and Discussion Item.

9. ITEMS FROM COMMITTEE MEMBERS

10. ADJOURNMENT

Adjourn the meeting to the next regular meeting of the Coastal Advisory Committee on Thursday, December 13, 2012 at 7:00 P.M., in the Fireside Room, at the Community Center, 100 N. Seville, San Clemente, CA .

MINUTES
CITY OF SAN CLEMENTE
COASTAL ADVISORY COMMITTEE MEETING

Thursday, September 13, 2012 @ 7:00 p.m.
Community Center, Ole Hanson Fireside Room
100 N. Seville, San Clemente, CA 92672

1. CALL TO ORDER/ PLEDGE OF ALLEGIANCE

Chair Hart called the meeting to order at 7:00 p.m. Chair pro tem Salgado led the Pledge of Allegiance.

2. ROLL CALL

Present: Don Brown, Robert Jordan, Michael Smith; Chair pro tem Peter Salgado and Chairman Bill Hart

Absent: Susan Ambrose, Ken Nielsen

Staff Present: Tom Bonigut, Assistant City Engineer
Eileen White, Recording Secretary

3. APPROVAL OF MINUTES

A. Minutes of the Regular CAC Meeting of August 9, 2012

MOVED BY COMMITTEE MEMBER JORDAN, SECONDED BY COMMITTEE MEMBER BROWN, AND UNANIMOUSLY CARRIED to receive and file the minutes of the Regular CAC Meeting of August 9, 2012, with the following revisions:

Revised the bulleted list on Page 5 to include the following points:

- The existence of the pond itself is the problem, and the City's actions to channel storm water drainage into the pond have only exacerbated the problem.
- One sustainable solution to the problem would be to redirect the stormwater to another location, or remove the concrete drains that feed the pond and allow the water to percolate back into the ground.
- If the water was removed, diverted or prevented from going into the pond, the bird problem would go away. A more focused scope of work for eliminating the pond should be prepared.
- Suggested the City pursue legal avenues to apply leverage that might encourage the CCC to change its view that the pond should be protected.

- Suggested CCC involvement in a workshop with the community for a better understanding of the situation. Also noted the need to work/coordinate with the permitting agencies on the Poche issue.
- Commented that millions of dollars spent to date on solutions have not resulted in improved situation.
- With regard to the grant proposal, expressed concern that the City might lose credibility if the City spends $1.4 million on additional actions if those don't definitively solve the problem at Poche. Noted that the watershed action plan is not ready to implement via a grant and that more detail is needed so that the proposed actions should be further considered so that more careful consideration can be given as to the actions that grant funding should be pursued.
- Noted that the options/proposed action items in the watershed action plan should be more specific with added detail.

4. PUBLIC INPUT - None

5. OLD BUSINESS - None

6. NEW BUSINESS

A. Pharmaceutical Disposal

Tom Bonigut, Assistant City Engineer, reviewed the memo from Danna McIntosh, Environmental Services Coordinator, providing information on Pharmaceutical Disposal. Staff is requesting Committee feedback on the potential to implement a "Drug Drop Box" program managed and secured by local police departments. The program costs, which would come out of solid waste funds, include a cost for the drop box of $700, with fees of approximately $5,000 annually for monitoring, maintenance and disposal. Sharp needles are not accepted, and special considerations may be attached to liquid medications or they can be refused altogether. Staff recommended the Committee consider implementation of the drop box program.

In response to questions, Assistant City Engineer Bonigut advised that currently most medications are either flushed or disposed of in trash bins; noted the current proposal calls for one box located at City Hall open during business hours only; discussed problems associated with needle disposal; reported cities currently participating in the program report low demand; noted current recommendation to mix with coffee grounds and dispose in trash may have potential to negatively affect the solid waste stream in the future; agreed to research potential to partner with drug stores for disposal and provide copy of previous presentation concerning negative effects on marine life.

During the ensuing discussion, the Commissioners, either individually or in agreement, provided the following commentary:

- Supported the multiple option approach to disposal, with CC&R providing needle pick-up and working with a contractor to provide non-controlled pharmaceutical disposal in the future, and the drug box program providing a receptacle for controlled substances.
- Suggested staff research potential for drug stores in town to participate in a no cost, City-sponsored pharmaceutical disposal program.
- Requested a copy of past presentation summarizing the extent of drugs in the waste stream and their effect on marine life.
- Requested staff research and determine extent of existing problems associated with pharmaceutical disposal.
- Suggested increased community outreach and further options research if determined pharmaceutical disposal is a substantial problem, including information on drug impacts to deter flushing.
- Requested staff provide feedback from currently participating cities regarding success of drug box program, amounts of drugs collected, real costs, etc.
- Requested staff provide information on alternative programs adopted by other cities, especially coastal cities, including facts about extent of participation and amounts of drugs collected.

Committee Members concurred to request staff research and determine extent of existing problems associated with pharmaceutical disposal as the Committee first wanted to understand how much a problem pharmaceutical disposal actual presents; research and report on actions taken by other communities to solve this problem; gather data concerning alternative pharmaceutical disposal programs, with success rates and user costs, so the Committee can make an informed decision.

B. Comprehensive Load Reduction Plan (CLRP) Submittal

Tom Bonigut, Assistant City Engineer, summarized the staff report, a summary of the City's efforts to comply with a resolution issued by the San Diego Water Board requiring the City develop and submit a Comprehensive Load Reduction Plan (CLRP) by October 4, 2012, to reduce concentrations of bacteria within the San Clemente Hydrologic area along the shoreline at five stretches of beach. The City is waiting for a model plan being developed by the County of Orange, anticipated to be completed by September 13, 2012 before finishing the City plan. Staff requested the Committee appoint three members to take part in an informal review of the CLRP before it is submitted in early October.

During the ensuing discussion, Committee Members discussed difficulties associated with determining baseline levels of naturally occurring bacteria, as well as developing programs to clean water coming from areas inland before it reaches the ocean.

Committee Members Jordan, Smith, and Salgado volunteered to serve on a subcommittee to informally review the CLRP before it is submitted in early October.

IT WAS MOVED BY CHAIR HART, SECONDED BY COMMITTEE MEMBER BROWN, AND UNANIMOUSLY CARRIED TO APPOINT COMMITTEE MEMBERS JORDAN, SMITH, AND SALGADO TO A SUBCOMMITTEE TO INFORMALLY REVIEW THE CITY'S CLRP BEFORE SUBMISSION TO THE SAN DIEGO WATER BOARD.

7. COMMUNICATIONS

A. Bacterial Monitoring Report Dated September 5, 2012

B. August 2012 Environmental Programs Update

Committee Members received and filed items 7A and 7B.

8. ITEMS FROM STAFF

A. Potential Future Agenda Items

Tom Bonigut, Assistant City Engineer, reviewed the Potential Future Agenda Items and requested the Committee Members provide input.

Committee Member Salgado suggested the City get serious about Poche Pond, bring an expert on board to help think about solutions, and put the data provided in the Weston Solutions study to use; requested staff consider cleaning up the stagnant water pond north of T-Street Beach near the temporary bridge.

Chair Hart opined the main roadblock standing in the way of cleaning up Poche Pond is the California Coastal Commission (CCC), specifically a certain biologist opposed to its elimination. He suggested the City consider hiring a political consultant or outside help to help with this political issue.

Committee Members requested staff add for the November meeting a discussion of potential meeting, delegation, or alternative communication with the CCC regarding the condition of Poche Pond, including strategies, member appointment, presentation specifics, etc. In addition, they also requested a speaker on the impacts of Pharmaceutical disposal on the environment, as well as updates on their recommended revisions to the street sweeping program and potential plastic bag ban.

B. Staff Announcements

Tom Bonigut, Assistant City Engineer, updated the Committee on the results of the bird reduction program. The falconer is using 3-5 tethered falcons to reduce the number of birds at Poche Pond, as was recommended in the bird study. Short term results indicate a reduced number of birds; he will continue to keep the Committee updated as the program moves forward.

Mr. Bonigut announced that County staff has submitted a request to the CCC to allow the temporary discharge of water out to the end of the bulkhead to become permanent. Potential obstacle is the water board. He will continue to update the Committee on the status of the request.

Mr. Bonigut announced that Mary Vondrak, Senior Management Analyst, was currently undergoing treatment for breast cancer. She intends to work as much as her health permits both at the office and from home. Committee Members extended support for her well being and best wishes for a complete recovery.

9. ITEMS FROM COMMITTEE MEMBERS

Committee Member Smith reported that at the last Beaches, Parks, and Recreation Commission meeting, the Commissioners adopted the Beach Ecology and Maintenance Policy on a 6-1 vote; were advised that survey results to date indicate very positive comments on the City's Beach Trail; held discussion regarding future uses for meadow field at Vista Hermosa Sports Park.

Committee Member Jordan invited all to attend the Coastal Clean-up scheduled for this Saturday.

Chair Hart encouraged all to volunteer at the Coastal Clean up on Saturday, from 9:00 a.m. to 12:00 noon, with volunteers meeting at the pier for coffee and assignments.

Committee Member Brown reported that at the last Planning Commission meeting, the Commissioners heard testimony and received many emails regarding the 2- versus 3-story height limit debate for Avenida Del Mar; began review of the Bike and Pedestrian Master Plan; discussed ongoing Local Coastal Plan development.

10. ADJOURNMENT

MOVED BY COMMITTEE MEMBER BROWN, SECONDED BY COMMITTEE MEMBER JORDAN, AND UNANIMOUSLY CARRIED to adjourn at 8:52 p.m. to the Joint Committees/Commissioners/Council Meeting to be held on October 23, 2012, at 6:00 p.m. at the Municipal Golf Course restaurant located at 150 E. Magdalena, San Clemente, CA.

Respectfully submitted,

_____
Bill Hart, Chair

Attest:

_____
Tom Bonigut, Assistant City Engineer

Memorandum
Engineering

November 8, 2012

To: Coastal Advisory Committee
From Mary Vondrak, Senior Management Analyst
Subject: Comprehensive Load Reduction Plan Submittal
Copies: Tom Bonigut, Assistant City Engineer

On February 10, 2010 the San Diego Water Board adopted Resolution No. R9-2010-0001, an amendment incorporating Revised Bacteria Total Maximum Daily Loads (TMDLs) Project I into the San Diego Basin Plan. The TMDL Basin Plan Amendment became fully effective on April 4, 2011. The City was required to develop and submit a plan by October 4, 2012 which outlines the implementation of the TMDL. Due to delays in County materials serving as a template for San Clemente CLRP development an extension was requested by the City and granted by the Regional Water Quality Control Board to extend the CLRP submittal date to December 4, 2012.

The TMDL requires the City of San Clemente to reduce the concentrations of bacteria within the San Clemente Hydrologic Area (HA) along the shoreline at five stretches. The areas include: Poche Beach, North Beach, San Clemente Pier, and two areas along beach road in capo beach. The compliance deadline is ten years from the effective date. The City has the choice to extend the compliance deadline to twenty years by implementing a Comprehensive Load Reduction Plan (CLRP) which considers ways to reduce 303(d) listed pollutants for impaired water bodies in San Clemente along with the TMDL. If compliance is not met then Cities could face heavy fines from the Regional Board. However, there is a provision in the TMDL that allows for natural source exclusion if it can be proven that the pollutant concentrations are naturally occurring and not man made. Since there is little water quality data going back to the time before urbanization along the coast, the Cities and Counties in San Diego and Orange have enlisted the help of scientific experts from the Southern California Coastal Water Research Project (SCCWRP) to perform a reference study which will investigate water bodies not impacted by urbanization. One of these areas is the San Mateo watershed draining to Trestles beach. The results of this study will help

understand and justify what concentrations of bacteria could be realistically obtained if urbanization had no impact on the watersheds and the coastline.

The City is required to submit a Comprehensive Load Reduction Plan (CLRP) to the Regional Water Quality Control Board by December 4, 2012. A CLRP will not only include strategies to reduce the bacteria concentrations along the impaired shoreline but will also include strategies to address the Cities 303(d) listed water bodies and their constituents. This is outlined in the CLRP for your review. The plan gives credit for projects already implemented that continue to improve water quality in our watersheds. These include BMPs such as street sweeping, the Clean Ocean public outreach campaign, structural BMPs such as vortex separator units and diversions to the sanitary sewer. It will also discuss potential projects for the future as funding becomes available. These include items such as those follow up implementation actions recommended as a result of the M01 Bacteria Source ID Study. Once approved by the Regional Board, the final CLRP will be a living document which will be modified regularly to reflect current conditions and improvements as they are made.

As the draft CLRP document is lengthy, CAC review should be particularly focused on the main body of the document, Table 2, and Appendices B and E. Some information is still pending with regard to Appendices B and E but was included to give an idea of the information to be submitted. Appendix A and G have been left out of the packet submittal to the CAC but will be added in the final version.

SAN CLEMENTE COASTAL STREAMS COMPREHENSIVE LOAD REDUCTION PLAN

December 4, 2012

Prepared by the City of San Clemente
for the
San Diego Regional Water Board

San Clemente
CLEAN OCEAN PROGRAM

TABLE OF CONTENTS

List of Tables

List of Figures

Appendices

Executive Summary

This Comprehensive Load Reduction Plan (CLRP) describes the approach that will be taken by the San Clemente Coastal Streams Watershed Permittees (City of San Clemente and the Orange County Flood Control District collectively as Phase 1 MS4s) in response to San Diego Regional Water Quality Control Board Resolution No. R9-2010-0001 (*Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Beaches and Creeks in the San Diego Region* (*Including Tecolote Creek*)). As described in the amendments, development of a watershed pollutant load reduction plan is a required step in the bacteria Total Maximum Daily Loads (TMDLs). To fulfill this requirement a watershed CLRP has been developed to address bacteria pollutants and other watershed 303(d) listed constituents. Key CLRP elements include: assessing watershed conditions and setting priorities including development of a Watershed Monitoring and Assessment Program (**Section 2**); assessing BMP candidate strategies and developing a CLRP Implementation Strategy (**Section 3**); developing BMP Action Plans (Section 4, Appendix E and Appendix F); and, preparing a schedule for loading reductions to be achieved (Section 5 and Appendix G).

The 2010 Clean Water Act Section 303(d) list identifies sections of Prima Deshecha Canada, Segunda Deshecha Canada, and along the San Clemente coast with the following pollutants/stressors: indicator bacteria, phosphorus, turbidity, toxicity, cadmium and nickel. With the exception of indicator bacteria where TMDLs have been developed, current monitoring provides limited data on these other constituents. Additional monitoring and data analysis is needed to calculate pollutant loads, identify hotspots, better define human health risks, habitat impacts, and in the case of toxicity determine the specific pollutants causing impairment. As a result initial CLRP efforts focus on bacteria TMDLs and a series of additional studies to collect the data necessary to understand the extent of impairment for other watershed pollutants (**Section 2**).

The CLRP Watershed Permittee BMP Action Plans contained in this document detail current and proposed structural and non-structural BMP efforts (**Section 4**). Projected watershed bacterial load reductions were calculated based upon these plans to determine overall progress within the watershed and an expected schedule (**Appendix G**). Required bacteria TMDL reductions dates for the San Clemente Coastal Streams watershed are as follows:

San Juan Creek Watershed Bacteria TMDLs Schedule

	Total Coliform	Fecal Coliform	*Enterococcus*	Date Reduction To be Achieved
Dry Weather Reductions	94.28%	94.23%	98.83%	April 4, 2021
Wet Weather Reductions	6.71%	4.36%	6.01%	April 4, 2031*

*TMDL wet weather reduction date extended to 20-years through CLRP development.

By using an adaptive management approach, it is anticipated that the continual refinement of watershed BMP Action Plans and data gathered through the CLRP Monitoring and Assessment Program will result in reductions consistent with bacteria TMDL objectives and an improved understanding of watershed water quality impairments and the measures needed to address them. This CLRP will be updated annually in December after review and consideration of study and progress findings reported in the annual MS4 progress report.

1.0 INTRODUCTION

This San Clemente Coastal Streams Watershed Comprehensive Load Reduction Plan (CLRP) defines a schedule of management activities that identifies and addresses priority constituents of concern to be undertaken by the City of San Clemente, the County of Orange, and the Orange County Flood Control District (referred to as the San Clemente Coastal Streams Watershed Permittees or Watershed Permittees).[1] This CLRP responds to the requirements of the Regional Board Order No. R9-2010-0001 detailing bacteria Total Maximum Daily Loads (TMDLs) for Phase I Municipal Separate Storm Sewer System (MS4) while integrating many components of the existing San Clemente Coastal Streams Watershed Workplan developed in compliance with Directive G of San Diego Regional Water Quality Control Board Order (No. R9-2009-0002).[2]

The purpose of this CLRP is to develop a load reduction plan to address bacteria pollutants and other watershed 303(d) listed constituents. The CLRP includes a Watershed Monitoring and Assessment Program (**Section 2**), CLRP Implementation Strategy (**Section 3**), Watershed Permittee Budget and Funding Efforts (**Appendix B**), Watershed Permittee non-structural Best Management Practice (BMP) Plans (**Appendix F**), and Watershed Permittee structural Best BMP Plans (**Appendix E**).

These CLRP elements will be maintained as a guide for watershed activities, and will be updated annually to reflect current circumstances in the watershed including reprioritization of concerns and addition of new areas of concentrations based on the findings in the prior year's San Diego Region Monitoring Annual Report and Watershed Monitoring and Assessment Program.

Future management activities in the San Clemente Coastal Streams watershed will be informed by the new regional TMDLs for indicator bacteria and related reduction activities. The bacteria TMDLs were developed using 2001-02 modeled conditions cover over nine and a half miles of Orange County beaches, the entire length of Aliso Creek and the lower mile of San Juan Creek. Required TMDL bacteria reduction dates for the San Clemente Coastal Streams watershed are as follows:

`

[1] Because the Cities of Dana Point and San Juan Capistrano have only an insignificant area of their jurisdiction within the San Clemente Coastal Streams Watershed boundary, they are not identified as Watershed Permittees in this Plan which is in accordance with Order No. R9-2009-0002. The majority of Dana Point's land area lies within the San Juan Creek and Dana Point Coastal Streams Watersheds, therefore, the City's management actions are detailed in the San Juan Creek Watershed Workplan and the Dana Point Coastal Streams Watershed Workplan. The majority of San Juan Capistrano's land area lies within the San Juan Creek Watershed; therefore, the City's management actions are detailed in the San Juan Creek Watershed Workplan.

[2] Order No. R9-2009-0002 is available online at:
http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/stormwater/oc_stormwater.shtml

San Clemente Coastal Streams Watershed Bacteria TMDLs Schedule

	Total Coliform	Fecal Coliform	*Enterococcus*	Date Reduction To be Achieved*
Dry Weather Reductions	94.28%	94.23%	98.83%	April 4, 2021
Wet Weather Reductions	6.71%	4.36%	6.01%	April 4, 2031

*TMDL wet weather reduction date extended to 20-years through CLRP development.

1.1 Watershed Setting

Prima Deshecha Canada is one of two main streams that flow through the City of San Clemente, ultimately discharging into the Pacific Ocean at Poche Beach. Several small, unnamed drainages, as well as a few larger tributaries, join Prima Deshecha as it makes its way through the watershed. The Segunda Deshecha Canada, the second main stream draining the watershed, flows through the Talega development, along Avenida Pico, under the San Diego Freeway (Interstate 5) and N. El Camino Real, before discharging into the Pacific Ocean at North Beach. The 18-square-mile watershed is almost fully developed and includes parts of the cities of San Clemente and San Juan Capistrano (open space) and the County of Orange (open space and landfill).[3] **Figure 1** shows jurisdictional boundaries and existing land use in the San Clemente Coastal Streams Watershed. **Figure 2** shows the parks in the watershed.

The San Clemente Coastal Streams Watershed is within the jurisdiction of the San Diego Regional Water Quality Control Board (the San Diego Regional Board). The San Diego Regional Board has placed San Clemente Coastal Streams under the San Clemente subunit of the San Juan Hydrologic Basin. The Water Quality Control Plan (Basin Plan)[4] lists Prima Deshecha and Segunda Deshecha as coastal streams draining to the Pacific Ocean. The Basin Plan also designates beneficial uses (the uses of water necessary for the survival and well being of humanity, plants and wildlife) for inland and coastal waters, sets narrative and numerical water quality objectives that must be attained or maintained to protect the designated beneficial uses, and describes implementation programs to protect beneficial uses. The designated beneficial uses in the San Clemente Coastal Streams watershed are shown in **Table 1**.

[3] See Footnote 1.

[4] The San Diego Region Water Quality Control Plan (Basin Plan) is available online at: http://www.swrcb.ca.gov/sandiego/water_issues/programs/basin_plan/

1.2 Watershed and Jurisdictional Management Approaches

Watershed management is the term used for the approach to water quality planning that places an emphasis on the "watershed"[5] as the planning area and solutions to problems that cut across programs and jurisdictions. Watershed management, in the context of this CLRP, seeks to build upon existing Countywide programs by identifying watershed-specific management actions that are focused on priority constituents of concern.

The San Clemente Coastal Streams Watershed Permittees have developed a comprehensive approach for urban stormwater management, described in the Drainage Area Management Plan (DAMP)[6], which is updated as appropriate in conjunction with the Report of Waste Discharge (ROWD)[7] and each new Municipal Permit's findings and requirements. This approach for urban stormwater management comprises:

- Jurisdictional Runoff Management Plans (JRMPs) which primarily addresses non-structural and pollution prevention controls, termed Best Management Practices (BMPs), which are implemented on a Countywide basis, as required by Order No. R9-2009-0002[8] and as further determined appropriate by each jurisdiction, and

- Watershed plans which are focused on solving water quality and beneficial use problems in specific receiving waters, and documenting issues and progress through a watershed planning process.

1.3 CLRP Development

This CLRP focuses on watershed-specific source control initiatives, structural and non-structural BMPs, and receiving-water restoration efforts.

1.3.1 Prior Collaborative Programs

This CLRP builds on the considerable work and studies that have been completed collaboratively over a multi-year period. These include the following initiatives:

[5] Watershed is defined as the geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

[6] The Drainage Area Management Plan (DAMP) is available online at: http://www.ocwatersheds.com/DAMP_MapPlan.aspx

[7] The Report of Waste Discharge (ROWD) is available online at: http://www.ocwatersheds.com/ReportsDocuments.aspx#ROWD

[8] Order No. R9-2009-002 is available online at: http://www.waterboards.ca.gov/rwqcb9/water_issues/programs/stormwater/docs/oc_permit/updates_012710/FINAL_R9_2009_0002.pdf

1. Since 1990 the Watershed Permittees have developed and implemented non-structural and pollution prevention controls within their own jurisdictions in response to the requirements of the municipal National Pollutant Discharge Elimination System (NPDES) stormwater permit. In February 2003 an updated version of the DAMP was provided to the Regional Board, including Local Implementation Plans (LIPs also known as JRMPs). The LIPs are detailed plans that focus on specific areas required by the NPDES permits including the legal authority to detect and eliminate pollutant discharges; public education; enhanced standards for new development/significant re-development; implementation of best management practices (BMPs) at municipal facilities, construction sites, and commercial and industrial facilities; and water quality monitoring. The BMPs are, in most cases, focused on targeted constituents of concern identified through the monitoring program.

2. In 2004 the Orange County Stormwater Program initiated a study for selecting potential BMP retrofit sites. The study identified potential retrofit sites adjacent to or near existing flood control infrastructure under public ownership and which had sufficient space to meet specified siting requirements. In 2005, the study was expanded to include an evaluation of potential retrofit opportunities that considered transportation and excess highway right-of-ways, homeowner associations open space, and publicly-owned lands such as regional parks. To further inform the findings of the 2005 Draft Identification of retrofitting study, a Hydrologic Simulation Program in Fortran (HSPF) water quality modeling study was conducted in 2009 to develop recommendations on the types and locations of potential BMP retrofit sites that would achieve the greatest benefit to receiving water quality. Water quality models were developed using HSPF to simulate the hydrologic and water quality processes within two impaired Orange County watersheds, Aliso Creek and Anaheim Bay/Huntington Harbour. The collective findings of these work-in-progress studies are currently being used by the Orange County Transportation Authority (OCTA) in support of their Structural Treatment Best Management Practice (STBMP) Grant Program (Tier 2 Grant Program). The model being developed through this Tier 2 Grant Program will further provide a systematic planning tool for evaluating the potential strategic effectiveness and cost-effectiveness of STBMPs.

3. In 2005 the San Clemente Coastal Streams Watershed Permittees, in collaboration with other stakeholders in the southern portion of Orange County—including seven water and wastewater agencies—representing half a million people and working across seven major watersheds and two groundwater basins, developed an Integrated Regional Water Management Plan (IRWMP)[9] to balance the needs of the environment and the demands of a growing population. In addition to continuing to reduce water supply vulnerability, the IRWMP focuses on water quality to reduce and prevent pollution, while protecting the beneficial uses of the waters in the region, as well as guarding and restoring the biological diversity and ecosystems of the region's watersheds. The plan is

[9] The South Orange County Integrated Regional Water Management Plan (IRWMP) is available online at: http://www.ocwatersheds.com/Documents/FinalSouthOCIRWMPlan1.pdf

currently being updated with the following new sections: climate change, salt/nutrient management plan, floodplain management plan, and groundwater management plan.

4. In 2007 the Southern California Coastal Water Research Project (SCCWRP) initiated an epidemiology and microbial source tracking study to assess the risk of swimming-related illnesses following exposure to nonpoint source contaminated waters at three beaches: Doheny Beach in Dana Point, Avalon Bay Beach on Santa Catalina Island and Surfrider Beach in Malibu. These studies examined several new techniques for measuring traditional fecal indicator bacteria, new species of bacteria, and viruses to determine whether they yield a better relationship to human health outcomes than the indicators presently used in California. The final report is anticipated to be published in fall 2012.

5. On December 16, 2010, the Watershed Permittees in south Orange County began implementing Interim Hydromodification Controls.[10] A comprehensive Hydromodification Management Plan (HMP) was submitted to the San Diego Regional Board on December 16, 2011. Hydromodification refers to changes in the magnitude and frequency of stream flows due to land use by urbanization and the resulting impacts on receiving channels, such as erosion, sedimentation, and degradation of in-stream habitat. The Interim Hydromodification Controls and the successor HMP seek ways to mitigate erosion impacts by establishing requirements for controlling runoff from new development and significant redevelopment. These plans typically include decentralized storm water management systems and protection of natural drainage features, such as wetlands and stream corridors. Runoff is typically directed toward infiltration-based stormwater BMPs that slow and treat runoff.

1.3.2 Monitoring Programs

The CLRP also considered the findings of the Receiving Waters and MS4 Discharge Monitoring Program (San Diego Region Monitoring Program) and resultant Receiving Waters and MS4 Discharge Monitoring Annual Report (San Diego Region Monitoring Annual Report). The San Diego Region Monitoring Program is intended to meet the following goals:

1. Assess compliance with Order No. R9-2009-002;
2. Measure and improve the effectiveness of the Permittees' runoff management programs;
3. Assess the chemical, physical, and biological impacts to receiving waters resulting from MS4 discharges;
4. Characterize storm water discharges;
5. Identify sources of specific pollutants;
6. Prioritize drainage and sub-drainage areas that need management actions;
7. Detect and eliminate illicit discharges and illicit connections to the MS4;

[10] The Interim Hydromodification Sizing Tool and Technical Guidance document are available online at: http://www.ocwatersheds.com/WQMP.aspx

8. Assess the overall health of receiving waters; and
9. Provide information to implement required BMP improvements.

The San Diego Region Monitoring Program is updated annually and submitted to the Regional Board annually on September 1. The implementation timeframe is October 1 through September 30 of the following year. The 2012-13 San Diego Region Monitoring Program is included in **Appendix A**. The Unified Report, which is an annual comprehensive description of municipal permit compliance activities and assessment of program effectiveness, includes the monitoring program data/results, methods of evaluating the data, graphical summaries of the data, and an explanation/discussion of the data for each monitoring program component in the context of a regional assessment program.

1.4 Budget and Funding

An important element to the success of the CLRP is to secure budget and funding for future BMP efforts. The City of San Clemente's property owners approved a Proposition 218 Clean Ocean Fee in 2003 that dedicates funds toward meeting the City's NPDES MS4 permit requirements. The fee fully funds the efforts needed for to meet the permit requirements. The fee sunsets in 2013 and voters will be asked to renew the fee through an election process. Other funding sources include grants. **Appendix B** details the continuous budget and funding efforts in the watershed. In response to NPDES requirements there has been an increase in BMP efforts in the watershed over the last decade. To highlight the progression 2010-11 budget data is contrasted with baseline efforts when available. A baseline of 2001-02 was used to coincide with the bacteria TMDL baseline for reductions. The City of San Clemente estimates that program expenditures for 2001-02 was $684,728.00 compared with $2,354,552.38 for reporting year 2010-11. Budget and funding for bacteria TMDL/CLRP efforts is ongoing and will be reevaluated annually as the program evolves.

1.5 CLRP Update Schedule

The CLRP will be updated annually in December after review and consideration of the San Diego Monitoring Program Annual Report and Watershed Monitoring and Assessment Program findings. A proposed schedule for Watershed Monitoring and Assessment Program activities is provided in **Section 2** below.

2.0 RECEIVING WATER QUALITY CONCERNS AND PRIORITIES

Monitoring is a key element of this CLRP. Monitoring provides data that can be used to inform management decisions about the environment, its resources and the human activities affecting them. Environmental monitoring data documents existing conditions and, if collected over a period of time, provides evidence of changes in these conditions. Water quality in the San Clemente Coastal Streams watershed has and will be assessed through a review of water quality standards and objectives, NPDES wet weather and non-stormwater monitoring data, indicator bacteria data for coastal waters collected from the Orange County Health Care Agency(HCA) and South Orange County Wastewater Authority (SOCWA), special studies conducted within the watershed and neighboring watersheds, watershed management plans, and through informal data exchange and discussions with watershed residents, local conservation agents, and government officials. The following section discusses existing conditions and the monitoring conducted in more detail.

2.1 Watershed Monitoring and Assessment Program

The CLRP Watershed Monitoring and Assessment Program is designed to gather the data necessary to understand the extent of water quality impairment within the watershed, the effectiveness of implemented BMPs, and assess reductions with adopted watershed TMDLs. To achieve these goals the Watershed Monitoring and Assessment Program includes three components:

- Existing monitoring program integration
- Bacteria TMDL monitoring
- CLRP special studies

A description of the three components is provided below. A planned implementation schedule for the Program is presented in **Table 2**. Implementation will be divided into two phases:

- Phase 1 (Development) – consists of initial Program development including preparation of the Watershed Monitoring and Assessment Program, existing monitoring program integration, and bacteria TMDL numeric target evaluation through a regional reference study being conducted by SCCWRP.

- Phase 2 (Implementation) – involves implementation of bacteria TMDL monitoring program and special studies including the completion of the regional reference study and updates to the CLRP.

2.1.1 Existing Monitoring Program

There are several existing monitoring programs that collect water quality data within the San Clemente Coastal Streams watershed. Data from these programs will be integrated into the Watershed Monitoring and Assessment Program whenever possible as it will provide an initial evaluation of current water quality conditions within the watershed and will form the basis for

an assessment of long-term trends in water quality. A description of these existing programs is provided below.

2.1.1.1 NPDES Monitoring – Water Quality Assessment

San Diego Region Monitoring Program

NPDES monitoring per the requirements of Order R9-2009-0002 includes evaluating recreational impacts from indicator bacteria discharged by the stormdrain system into the coastal zone, and assessing habitat quality in streams using multiple lines of evidence (e.g. chemistry, benthic macro-invertebrate community assemblage, physical habitat characterization, and toxicity). The objectives for each monitoring program initiative are as follows:

Urban stream bioassessment monitoring	Uses a "triad" of indicators (bioassessment, chemistry, toxicity), to describe impacts on stream communities and the relationship of any impacts to runoff, based on comparisons with reference locations on a year-to-year time frame.
Long-term mass loading monitoring	Uses measurements of key urban pollutants, to monitor trends in loads over time.
Coastal storm drains outfall monitoring	Uses a suite of bacterial indicators at high priority drain outfalls, to track compliance with regulatory standards and any improvements due to BMP implementation.
Coastal receiving water monitoring	Using measurements of runoff plume characteristics and extent, as well as measures of a suite of physical, chemical, and biological indicators, improve understanding of the impacts of runoff plumes on nearshore ecosystems.
Non-stormwater Action Level (NAL) monitoring	Assesses the quality of dry weather discharges from the MS4, relative to criteria from the California Toxics Rule, and water quality objectives from the Water Quality Control Plan for the San Diego Region (Basin Plan objectives). The NALs monitoring program replaced the Dry Weather Reconnaissance monitoring program from the Third Term Permit.
Stormwater Action Level (SAL) monitoring	Uses 90th percentile values from the arid southwest portion of the National Stormwater Quality Database (NSWQD) as a basis for identifying major outfalls in the MS4 for focused source identification work.

See **Figure 3** for a map of all of the San Diego Region Monitoring Program locations in the San Clemente Coastal Streams Watershed.

2.1.1.2 Orange County Health Care Agency (OCHCA) Ocean Water Protection Program

OCHCA is responsible for protecting the public from exposure to ocean and bay waters that may cause illness along Orange County's 42 miles of open ocean coastline and 70 miles of harbor and bay frontage. One monitoring program that OCHCA conducts is weekly bacteria testing, as required by AB411, and collects samples from April through October for all beaches serving over 50,000 visitors per year and beaches adjacent to storm drains that flow into the ocean during the summer months. There is one OCHCA monitoring site in the watershed (OSC01) which is located at T Street Beach (**Figure 4**).

2.1.1.3 SOCWA Ocean Outfall Monitoring Program

SOCWA operates four wastewater treatment facilities in Orange County with several other facilities operated by SOCWA member agencies. As part of its Ocean Outfall Monitoring Program, SOCWA conducts bacteria testing at several stations in the surf zone, at the near shore and at offshore locations near its outfalls. Samples are collected twice a week form May 1 – October 31 and once a week from November 1 – April 30. Seven SOCWA monitoring sites (S-11, S-13, S-15, S-17, S-19, S-21 and S-23) are located throughout Capistrano Beach and San Clemente. Two of the sites are areas impaired for bacteria based upon REC-1 objectives, S-15 (up coast of Poche) and S-19 (north of the Pier) (**Figure 4**).

2.1.2 Bacteria TMDL Monitoring

The adopted bacteria TMDLs for beaches and creeks were developed separately for wet and dry weather conditions due to the distinct hydrological patterns that occur in southern California. Bacteria TMDL compliance monitoring is designed to supplement existing regional bacteria monitoring to better track compliance under both conditions. Existing bacteria monitoring within the San Clemente Costal Streams is primarily focused on the dry season at areas along the coastline. Additional monitoring targets conditions under wet weather.

The models used to develop the Bacteria TMDLs considered wet weather as storm events of 0.20 inches of rain or greater and a period of 72 hours (3 days) following such events. To monitor wet weather conditions and capture winter dry conditions two additional monitoring efforts are to be performed:

- Bacteria TMDL dry weather monitoring,
- Bacteria TMDL wet weather monitoring.

The proposed additional monitoring will begin upon incorporation of the bacteria TMDL requirements into the NPDES municipal stormwater permit for Orange County, which is anticipated in 2014.

2.1.2.1 Bacteria TMDL Dry Weather Monitoring

As part of the NPDES, HCA, and SOCWA monitoring programs, dry weather bacteria samples are currently collected at least weekly along the coastline from Capistrano Beach to the south end of San Clemente near the Cypress Shore residential area. For the NPDES program samples are also collected at creek mouths/stormdrains outflows when flowing to the ocean at the time of sampling. No additional dry weather monitoring is proposed.

2.1.2.2 Bacteria TMDL Wet Weather Monitoring

Limited wet weather bacteria data are collected as part of existing regional monitoring programs. To address bacteria TMDL wet weather requirements, targeted wet weather samples will be collected within 24 hours of the end of storm events that meet the 0.20 inches or greater criterion. Because of the many issues related to collecting wet weather samples from multiple sites within a short timeframe, a maximum of six (6) TMDL criteria storms will be monitored per year. Based upon these samples, a bacteria concentration correlation curve will be developed for each monitoring site correlating storm sizes with observed concentrations. These correlation curves will be used to estimate concentrations on unsampled wet weather days throughout the year. To help capture variation both during a given storm and throughout the wet season, an effort will be made to sample multiple days per storm event and to sample storms at the start of the wet season (October-November), in the middle (December-February), and towards the end of the wet season (March-April). Sampling will be subject to if enough storms of 0.20 inches or greater occur in any given year. Planned monitoring locations include the 2010 REC-1 303(d) listed sites along Capistrano Beach and San Clemente's shoreline (CSBMP1d, CSBBR1d, S-15/POCHEd,and PIERd).

A summary of the existing San Juan Creek watershed bacteria monitoring sites and monitoring frequencies and those proposed for the bacteria TMDL monitoring program is provided in **Table 3.** Program monitoring locations are also depicted in **Figure 4**. Some of the different agency monitoring program sites overlap each other. When applicable, overlapping sites are denoted in the TMDL monitoring plan by using each agency's unique site name separated by a slash (e.g. S-15/POCHEd). As noted, proposed additional monitoring will begin upon incorporation of the bacteria TMDL requirements into the NPDES municipal storm water permit for Orange County.

2.1.3 CLRP Special Studies

Special studies will better define and optimize watershed CLRP efforts. The City of San Clemente initiated a special study in 2010 to investigate the sources of bacteria in the Prima Deshecha watershed to determine potential illicit connections and suggest BMPs for bacteria and other 303(d) listed pollutant reductions (**Appendix H**). Nearby watershed areas will be conducting several studies that will benefit the San Clemente Coastal Streams watershed and the City of San Clemente will investigate and initiate some studies to target areas of concern specific to the San Clemente Coastal Streams watershed area. These studies include additional monitoring targeting watershed pollutants of concern, an effectiveness assessment of BMPs being implemented throughout the watershed, a regional reference study of natural sources of bacteria, nutrients, and metals, several studies addressing the source and health risks of high

bacteria concentrations within the San Juan Creek mouth and along Doheny Beach, and pollutant modeling as part of future CLRP BMP planning. A description of planned studies and expected implementation timeframe are provided below. Completion of these efforts will depend upon future available funding and progress achieved toward watershed TMDL reductions.

2.1.3.1 Regional Reference Study

The TMDLs for Indicator Bacteria, Project I – Beaches and Creeks were developed using land use based modeling and limited data. Prior studies on indicator bacteria concentrations in references beaches and streams have suggested that current TMDL numeric targets do not adequately account for the natural and largely uncontrollable sources of bacteria generated in watersheds. In addition studies on stream nutrients and metals concentrations have also shown that exceedances of numeric targets may be wet weather driven (phosphorus in the Newport Bay watershed) or geology driven as with metals concentrations in many south Orange County coastal watersheds. A regional reference study is underway to gather the data necessary to derive reasonable and accurate numeric targets for bacteria, nutrients, and metals. The proposed study funded in partnership by Orange County and San Diego County Permittees includes the collection of dry and wet weather samples at reference streams and beaches throughout the San Diego Region. This data will be used to establish the concentrations or loads derived from these reference systems and provide the scientific basis for selecting or revising numeric targets. The study which began in Spring 2012 is expected to be completed in three years.

2.1.3.2 BMP Performance Evaluation

Section 3.0 of the CLRP describes the framework for BMP selection and implementation and components for effectiveness assessment. A list of current and proposed structural BMP projects within the watershed can be found in **Appendix E**. The location of these BMPs is also depicted in **Figure 6**. Non-structural BMPs also control sources of watershed pollutants but are difficult to evaluate and associate with measureable improvements. As part of initial CLRP development, a literature review of structural BMP effectiveness on bacteria was completed (**Appendix C**) and used to estimate expected bacteria load reductions from specific BMP types. To build upon this initial effort a study is planned to monitor the effectiveness of different BMPs types being implemented throughout the watershed. **Table 6** lists the BMP types to be evaluated and the pollutants of interest. Additional storm event samples will be collected for BMPs believed to be effective during wet weather. An assessment of integrated pest management programs will be completed separately as part of a regional stakeholder effort, in cooperation with the University of California Cooperative Extension. The proposed BMP performance evaluation study will be conducted over a three year period during Phase 2 of the monitoring and assessment program. Findings of the study will be used in conjunction with TMDL reduction monitoring data to optimize and adjust Watershed Permittee BMP Action Plans.

2.1.3.3 Watershed Pollutant Source Identification

The 2010 303(d) list indentifies the following pollutants/stressors in one or more water bodies in the San Clemente Coastal Beaches and Streams: indicator bacteria, turbidity, cadmium, nickel, toxicity, and total phosphorus. With the exception of indicator bacteria where TMDLs have been developed, current monitoring provides limited data on these other constituents. Additional monitoring and data analysis is needed to calculate pollutant loads, identify hotspots, better define human health risks, habitat impacts, and in the case of toxicity determine the specific pollutants causing impairment. As a first step, existing NPDES and other monitoring program data will be evaluated in the context of identified subdrainages and 303(d) listed segments in the watershed. Once initial data review is complete, a watershed pollutant source identification monitoring program will be designed to target areas of concern and fill data gaps. A projected start date for implementation of these addition monitoring efforts is 2014 during Phase 2 of the monitoring and assessment program.

2.1.3.4 Watershed Pollutant Modeling

Watershed BMP projects have been selected to reduce watershed bacteria loads to meet TMDL numeric targets. Needed reductions and level of BMP effort were calculated based upon the San Diego Regional Board developed bacteria TMDL model and estimated BMP reductions derived through a literature review and whenever possible from existing BMP monitoring data. To determine if additional BMP projects are needed to specifically target other pollutants of concern within the watershed additional pollutant modeling work is needed. It is expected that the data gathered through the planned BMP performance evaluation, watershed pollution source identification efforts, and ongoing OCTA Tier 2 Grant Program water quality modeling work will be invaluable to future watershed pollutant modeling as limited data is currently available. As such a watershed specific pollutant model will be developed after completion of these studies and be used to optimize and adjust watershed BMP efforts to address all pollutants of concern in the watershed.

2.1.3.5 San Juan Creek Mouth Bird Monitoring and Control Study

Historically, a large population of gulls has congregated at the mouth of Poche Beach and along Capistrano Beach shoreline. Fecal matter from the gulls collects in the pond at Poche and on portions of the beach contributing to high concentrations of bacteria in the pond and coastal waters. The gulls are believed to travel back and forth between the Prima Deshecha landfill and the Creek mouth utilizing the landfill as a food source. In 1996 an Orange County landfill bird monitoring and control study was completed on behalf of the County waste management department to identify the types of birds present at County landfills, what draws them to the landfills, and develop a bird control program to reduce or eliminate birds (County of Orange 1996). The study indicated that, among the three active County landfills (Olinda Alpha, Frank R. Bowerman, and Prima Deschecha), the Prima Deschecha landfill had the largest number of birds (i.e. gulls), but that the majority of gulls seen at the landfills roosted out at sea and not at Orange County beaches. A study is planned to more closely track the gull population at the San Juan Creek mouth, its connection to the nearby Prima Deschecha landfill, and explore the possibility of a plan to reduce the number of gulls either through increased efforts at the landfill

or measures employed at the Creek mouth. Due to close proximity between the landfill, San Juan Creek, Capistrano Beach, and Poche Beach the study is expected to benefit all areas with its findings. This study will be completed during Phase 2 as funding becomes available. Projected dates for the study are 2014-2016.

2.1.3.6 Site-Specific Criteria Development

Current bacteria water quality objectives and associated TMDL numeric targets are based on epidemiology studies that linked swimming illnesses at beach waters with known human sewage point sources. In contrast, the impaired surf zone areas within San Clemente Coastal Streams watershed are believed to be impacted by non-point pollutant sources such as bird fecal matter and urban runoff. Several studies have suggested that beaches impacted by non-point pollutants would present lower health risk than those affected by sewage effluents. A recent epidemiological study at Doheny Beach provided mixed support to this theory.[11] The study found that, of the three tested indicators (total coliform, fecal coliform, and *Enterococcus*) in the bacteria TMDL, only associations between *Enterococcus* and health outcomes were consistent with current concentration based objectives and only under conditions when the Creek flowed to the beach. These findings suggest that site specific objectives for at least total and fecal coliform bacteria indicators are warranted to accurately characterize human health risks at San Juan Creek and Doheny Beach. Quantitative Microbial Risk Assessment (QMRA) provides a mechanism to develop these objectives based upon risk assessment principles. This approach is supported in the EPA's 2011 Draft Recreational Water Quality Criteria and the EPA is developing technical support materials to assist States in developing site-specific criteria (EPA 2011). A study is planned to develop site-specific objectives for San Juan Creek Watershed using QMRA. Findings from this study may be used to pursue a natural source exclusion allowing for exceedances of current TMDL numeric targets. Due to close proximity of this location a similar issues, a concurrent study in the Poche Beach area would benefit this analysis. This study is to be completed during Phase 2 as funding becomes available. Projected dates for the study are 2014-2018.

2.1.3.7 Recreational Use Criteria Study

Prima Deshecha Canada and Segunda Deshecha Canada are currently designated as having potential REC-1 and existing REC-2 beneficial uses. As these Creeks are also a flood control channels there are periods of time during storm events in which it would be unsafe for recreational uses. In a recent basin plan amendment the Santa Ana Regional Board adopted revisions to channel beneficial use designations to allow for a temporary suspension of recreational criteria when high flows preclude safe recreation in or near stream channels. A similar high flow suspension may be appropriate for these areas. In addition, consideration should be given to impacts from the gull population at the mouth of Prima Deshecha Canada and its effect on compliance with designated beneficial use criteria. As noted, it is believed that gulls at the Prima Deshecha Canada mouth are contributing to high concentrations of bacteria

[11] Using rapid indicators for Enterococcus to assess the risk of illness after exposure to urban runoff contaminated marine water. 2012. JM Colford et. al. Water Research 46:2176-2186.

coastal waters. As birds are part of the natural landscape, a modified recreational use category and associated water quality objectives may also be appropriate. A study is planned to investigate possible revisions to basin plan San Clemente Coastal Streams beneficial use designations to account for high flow conditions and wildlife impacts. It is expected that findings of the QMRA study for Poche Beach will assist with this effort. The proposed recreational use criteria study will be completed in Phase 2 as funding becomes available. Projected dates for the study are 2014-2016.

2.2 Water Quality Assessment

As noted previously, the purpose of the CLRP is to focus management efforts on priority constituents of concern. Indicator bacteria exceedances (as determined by fecal indicator bacteria) at our beaches, and the resulting potential for human health impacts, is currently the most significant concern for the watershed based upon NPDES and bacteria TMDL requirements. Consequently, bacteria has been the primary focus of existing watershed water quality monitoring programs. As new data is collected through the NPDES regional monitoring program and future watershed pollution source identification monitoring special studies the water quality will be expanded to include additional priority pollutants.

The major findings for the San Clemente Coastal Streams watershed related to bacterial monitoring programs are summarized below. A more complete discussion of these results, including a comparison of San Clemente Coastal Streams stormdrains to other regional drains, can be found in the **2010-11 Unified Report Section C-11**[12]

2.2.1 Regional Coastal Storm Drain Outfall Program Findings

The monitoring conducted under the Coastal Stormdrain Outfall (CSDO) program is intended to assess the impact, with respect to body contact recreation, of dry weather discharges from stormdrains on the surfzone. The concentration of pathogen indicator bacteria in the surfzone are compared to ocean water sports contact standards from the State Water Resource Control Board's 2005 Water Quality Control Plan for Ocean Waters of California (California Ocean Plan) and Assembly Bill 411 (AB411). AB411 defines the days between April 1 and October 31 as the period when water contact recreation is most likely to occur.

The areas that showed the highest (>30% of samples) exceedances of single sample ocean water sports contact standards during the 2010-11 AB411 season are near the outlets of Prima Deshecha Channel (POCHE), San Juan Creek mouth (SJC1), and at Doheny Beach drain just south of the San Juan Creek mouth (DSB4). Comparison of the exceedance proportions from each year appear to indicate that the quality of the receiving waters has improved near the mouths of Salt Creek (SCM1), and most of the stormdrains in San Clemente including POCHE. On days where the stormdrain discharge reached the surfzone, the surfzone samples showed an exceedance of at least one single sample standard 13.2% of the time for SCM1, 35.1% of the time for POCHE and 92.3% of the time for SJC1. In areas where high exceedance rates were

[13] The 2010-11 Unified Report is available online at:
http://www.ocwatersheds.com/DAMP_PEAreports.aspx

observed despite the absence of flow from storm drains suggests that the quality of the water in the surf zone is a function of factors other than storm drain discharges.

2.2.2 Watershed Special Study Findings

Findings from two watershed NPDES special studies on pollutant source tracking were presented in 2010-11 **Unified Report Section C-11**. A summary of findings from these two studies is provided below:

Prima Deshecha Canada Bacteria Source Identification Study

This study was conducted investigate sources of bacteria in the Prima Deshecha Canada watershed and at Poche Beach. The study included:

1. Sanitary Survey Investigations throughout the channel
2. Studies of the biofilm population and growth throughout the channel
3. A study of the groundwater at spots throughout the channel
4. An evaluation of the effectiveness of a bioswale BMP within the watershed
5. A study of the scour pond and beach environment
6. A microbial study of the sources of bacteria in the ocean

Some specific results of the studies are as follows:

- Urban runoff flows in the upper part of the watershed, especially from excess irrigation, provides consistent source of nutrient rich water that maintains a well-developed biofilm in the channel. Efforts should be made to reduce the irrigation flows which should lead to reduced bacteria in the channel.
- The scour pond at Poche Beach is at least 15 feet deep and was found to provide a good environment for bacteria regrowth. Recommendations were made to consider ways to reconfigure the pond to reduce flows attracting seagulls.
- Fecal matter from seagulls was found as the primary contributor of bacteria in the receiving waters. Management plans were recommended to reduce the gull population at the receiving water.

A copy of the report from the Prima Deshecha Canada Bacteria Source Identification Study can be found in **Appendix H**.

2.3 Prioritization of Water Quality Problems and Potential Sources

Priority water quality concerns in the San Clemente Coastal Streams Watershed are identified through monitoring and regulatory directives including approved TMDLs and 303(d) listed impairments. Under Section 303(d) of the 1972 Clean Water Act (CWA), states, territories, and authorized tribes are required to develop a list of water quality limited segments. These waters do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires the establishment of priority rankings for water quality limited segments on the list and develop action plans, referred to as TMDL, to improve water quality.

The Watershed Permittees have prioritized water quality concerns based on the following criteria:

1. Receiving waters subject to an approved TMDL are classified as "high priority pollutants."
2. 2010 303(d) listed waterbodies with known and suspected anthropogenic sources are classified as "medium priority pollutants."
3. 2010 303(d) listed waterbodies with known and suspected natural sources are classified as "low priority pollutants."

A summary of priority pollutants and potential pollutant sources are discussed below and included in **Table 4**.[13] The portion of the 303(d) list pertaining to the San Clemente Coastal Streams watershed is shown in **Table 5. Figure 5** illustrates which water segments in the San Clemente Coastal Streams Watershed are included in a TMDL and/or 303(d) list.

2.3.1 High Priority Pollutants

Indicator Bacteria

Bacteria continue to be identified as a major water quality problem and are considered a high priority for the Watershed Permittees due to the impact on beneficial uses and the TMDL. Sources of indicator bacteria may be:

- Environmental – soils, decaying vegetation,
- Animal wastes – birds, dogs, cats, horses, bats, rabbits, opossums, raccoons
- Humans – shedding from body (most common source in this category), sewer overflows, homeless encampments, businesses

Stormwater and dry weather urban runoff may contain significant concentrations of indicator bacteria from these sources. In dry weather some and in wet weather all of San Clemente

[13] Discussion on potential sources all come from the Water Quality Control Plan for the San Diego Basin ("Basin Plan") unless otherwise referenced. [Basin Plan Reference: September 8, 1994 (with amendments effective prior to April 25, 2007).San Diego Regional Water Quality Control Board. Available at: http://www.swrcb.ca.gov/sandiego/water_issues/programs/basin_plan/]

Coastal Streams discharge directly to coastal areas where body contact recreation does occur or could potentially occur. The State of California has adopted standards for evaluating the safety of ocean water with respect to indicator bacteria, the California Ocean Water –Contact Sports Standards (California Code of Regulations Title 10 and the California Health and Safety Code).[14]

The 2010 303(d) list for indicator bacteria includes 0.15 miles of shoreline along Capistrano and San Clemente beaches.

2.3.2 Medium Priority Pollutants

Phosphorus

Phosphorus is a nutrient more often associated with the particulate component of stormwater runoff, since it readily adsorbs, or attaches, to sediment. Also necessary for plant growth, excess phosphorous becomes a pollutant typically more problematic in freshwater ecosystems than in estuarine ecosystems. The major source of phosphorus in an urban setting is fertilizer. Phosphorus can also be released into water during the construction phase of development. Some soluble phosphorus can be traced to septic systems; however, the use of low phosphorus detergents has significantly reduced this source and septic tanks are not common in south Orange County.[15] In San Clemente septic tanks do not exist and they are not allowed. Levels of phosphorus in some natural steams can exceed water quality objectives, but typically are much less than levels observed in urban runoff. Natural sources of total phosphorus in the watershed may be attributed to decomposing organic material, sediments, wildlife feces, and groundwater chemistry.

The 2010 303(d) list for phosphorus includes the lower 0.92 miles of Prima Deshecha Canada Channel and 1.2 miles of Segunda Deshecha Canada Channel.

Toxicity

Urban runoff can contain substances that are detrimental to the survival and essential life functions (e.g. growth, reproduction) of aquatic organisms. Interactions among the complex mixture of chemicals and physical constituents can lead to additive or antagonistic effects, potentially causing an individual compound to become either more or less toxic than it would be isolated. Some pesticides in very low concentrations (parts per trillion) can be lethal to freshwater and marine aquatic macroinvertebrates. One example is Bifenthrin (a synthetic pyrethroid pesticide) that is used for red imported fire ant (RIFA) control. Dissolved metals in the low parts per billions range can interfere with the reproduction processes of some marine species in tide pools of coastal receiving waters. Ammonia (from fertilizers and sewage discharges) in its unionized form can be extremely toxic to aquatic life.

[14] California Code of Regulations, Title 17, Group 10 is available online at: http://www.cdph.ca.gov/healthinfo/environhealth/water/Documents/Beaches/Regulations-OceanBeaches.pdf
[15] Ibid.

The 2010 303(d) list for toxicity includes the lower 1.2 miles of Segunda Deshecha Canada Channel.

Turbidity

Turbidity in water ways is caused by the presence of suspended and dissolved materials, such as clay, silt, and organic matter. High turbidity lowers the clarity of the water and can contribute to diminished light penetration. Light is key to photosynthesis which aquatic organisms depend upon for survival. If light levels get to low the reduction in photosynthesis will result in lower oxygen concentrations in the water and resulting fish kills. Large amounts of suspended matter may also clog the gills of fish and shellfish and smother benthic macroinvertebrates killing them directly. Sources of turbidity include soil erosion, urban runoff, eroding stream banks, and excessive algae growth.

The 2010 303(d) list for turbidity includes the lower 0.92 miles of Prima Deshecha Canada Channel and 1.2 miles of Segunda Deshecha Canada Channel.

2.3.3 Low Priority Pollutants

Metals

Metals in the environment can originate from many sources both natural in origin and introduced by human activities. Sources of metals include the transportation system, architectural uses, atmospheric deposition, aging plumbing systems, and native soils. The transportation system is a significant anthropogenic source of metals in storm water runoff to urban streams. Cadmium, copper, cobalt, iron, nickel, lead and zinc are deposited into the environment by vehicle exhaust, brake linings, tire balancing weights, battery terminals, tire wear and engine wear. They accumulate on roads, waiting to be washed into storm drains with the next rainfall. Pollutant concentrations in roadway runoff are positively correlated with traffic volume. All cars, even the cleanest vehicles, shed small amounts of metals, fluids, and other pollutants. Atmospheric deposition, which is the process of particulate bound metals settling out of the air, includes sources from vehicle exhaust, high winds carrying fine sediments, roadway dust, the burning of coal for industrial and energy producing needs is a significant source for several metals including copper, zinc, cadmium, and mercury.[16] Lithogenic geology, as previously discussed in **Section 2.1.2,** has been determined to be a significant natural source of metals and the findings of the trace metal special study strongly indicate that at least two, perhaps more, constituents originate from native soils.

The 2010 303(d) list for cadmium and nickel includes the lower 0.92 miles of Prima Deshecha Canada Channel.

[16] Oregon Environmental Council. December 2007. Stormwater Solutions: Turning Oregon's Rain Back Into a Resource. Available at: http://www.oeconline.org/resources/publications/reportsandstudies/sstreport

3.0 BMP SELECTION AND IMPLEMENTATION

The Watershed Permittees are developing and implementing BMPs. These BMPs can be described as:

- *Pollution Prevention BMPs* – any practice that reduces or eliminates the creation of pollutants;

- *Source Control BMPs* – any practice that prevents pollution by reducing pollutants at their source; and

- *Treatment Control BMPs* – any practice that removes pollutants from runoff.

3.1 BMP Planning and Effectiveness

Section 3 of the DAMP describes the general methodology and challenges for examining new BMP retrofit opportunities, BMP selection and implementation, and assessment of BMP effectiveness to direct iterative program improvements at both the local and watershed programmatic levels to the maximum extent practicable. The BMP selection and effectiveness assessment process may include, but is not limited to, input from the following factors and information sources, as available and applicable:

- International Stormwater BMP database (www.bmpdatabase.org)
- CASQA BMP manuals
- Beneficial Use assessment;
- Water quality and flow data and modeling;
- Cost and cost/benefit;
- Acceptability by the community;
- Ease or difficulty of implementation;
- Technical feasibility;
- Maintenance requirements;
- Pollutant prevention/removal performance;
- Multiple resource benefits or impacts;
- Review of technical literature (such as the ASCE/USEPA databases);
- A review of existing control programs;
- Demonstration or research projects by County, City or other entities;
- Input from vendors, consulting firms, other municipalities, or other agencies;
- User and operational/maintenance staff feedback; and
- Opinion surveys.

3.1.1 BMP Effectiveness Assessment

Effectiveness assessment is the process of evaluating whether programs are resulting in desired outcomes. Outcomes are the measures used to characterize results associated with implementing stormwater management programs. They are essential to effectiveness

assessment because they define specific, measurable endpoints by which stormwater programs can be targeted, evaluated, and periodically modified.

The Watershed Permittees apply the California Stormwater Quality Association's (CASQA) approach to assess effectiveness, which utilizes a series of six categories of outcomes, referred to as outcome levels, to establish a logical and consistent organizational scheme for assessing and relating individual outcomes. An additional layer of structure is provided by grouping them in three general areas of assessment activity: 1) Implementation Assessment; 2) Target Audience and Source Assessment; and, 3) Urban Runoff and Receiving Water Assessment. The relationship of assessment types to the six outcome levels is illustrated in **Figure 7**. It is important to note that these six outcome levels illustrate a natural progression from program implementation to receiving water conditions, and although it may appear that the higher numbered levels have greater relative importance, this is not the case. Each outcome level is individually necessary to support effective management decisions.[17]

Progress toward the achievement of outcomes is evaluated through the use of Assessment Measures. Assessment measures may be qualitative (e.g. a judgment regarding the degree of BMP implementation at a facility) or quantitative (e.g. % reduction in a constituent level). Key attributes of assessment measures include:

- Measurability (statistically measurable on a frequent basis)
- Relevance (significant, demonstrable relation to strategy and objectives)
- Reliability (easily documented and reproducible)
- Availability (based upon data obtainable at reasonable cost)
- Scientific validity (based on sound science)
- Replicability (capable of being regularly updated)
- Appropriately focused (ideally measures outcomes, not inputs or outputs)

Effectiveness assessment involves confirmation of outcomes, an interim process of evaluation (principally through comparison) of assessment measures, and communication of progress.

3.1.1.1 BMP Effectiveness Assessment for Bacteria

For BMPs that have already been implemented in the nearby Aliso Creek Watershed and other coastal Southern California areas, bacteria monitoring results were used to classify structural and non-structural BMPs as highly effective, effective, low/potentially effective, and not effective in the reduction of elevated bacteria concentrations. **Appendix C** summarizes the BMPs assessed and their effectiveness classification.

In addition to the structural and non-structural BMPs, a series of studies have been identified that will contribute to the understanding of sources of bacteria within the watershed. One study proposed is a BMP Performance Evaluation. A list of current structural BMP projects within the watershed and the pollutants addressed can be found in **Table 6.** A further

[17] Van Rhyn, Jon; Ashby, Karen; and Brosseau, Geoff. "Methods and activities to gauge effectiveness and make improvements." Stormwater. September 2010: 32-37.

discussion of BMP Performance Evaluation and other planned CLRP special studies is included in **Section 2**.

For the highly effective BMPs listed in **Appendix C** a benefit-cost feasibility analysis was developed to aid the Watershed Permittees in the selection of BMPs to be implemented. This analysis was based on cost information and bacteria removal efficiency data available for BMPs implemented within the Aliso Creek watershed. The benefit-cost feasibility analysis is included in **Appendix D**.

Using the effectiveness assessment summarized in **Appendix C,** and the benefit-cost feasibility results included in **Appendix D**, each Watershed Permittee has identified a specific BMP action plan that contributes to the overall reduction required to meet the TMDL's numeric objectives. These individual plans are discussed in **Section 4.0**.

3.1.1.2 BMP Effectiveness Assessment for Non-Bacteria Priority Pollutants

Additional investigations are necessary to gain a better understanding of the sources and watershed loadings of non-bacteria priority pollutants in the watershed. The Watershed Monitoring and Assessment Program in **Section 2**, details future plans and studies for the development of non-bacteria pollutant load data and BMP selection. As a starting point, potential BMPs to address watershed 303(d) listed pollutants were identified. As described below, several of the BMPs selected for the treatment of bacteria would have an effect on non-bacteria pollutants.

Total Phosphorous

Effective BMP types for the removal of Total Phosphorous (TP):

- *Constructed wetlands*- Constructed wetlands showed an effectiveness of 75% in the reduction of TP concentrations for highway runoff and 71% for urban stormwater runoff according to two studies looking at the effectiveness of constructed wetlands.

- *Catch basin debris gates* - Catch basin debris gates were estimated to remove 59% of TP loadings in the City of Laguna Niguel's Sulphur Solutions study. The study points out that though the removal of TP was exceptionally high (in comparison to other constituents treated) and other environmental factors may be involved in this reduction.

- *Non-structural outreach activities* - Outreach activities in the watershed that are predicted to have an overall impact on TP concentrations include street sweeping, inspections, and public outreach and education on water conservation and gardening BMPs.

Other potential BMP types listed in the California BMP handbook include infiltration trenches, infiltration basins, and retention/irrigation.

Metals

Effective BMP types for the removal of metals:

- *Advanced Biological Metals Removal Process* – Water in the channel would be diverted and treated in large tanks with non-pathogenic microbes in specially developed mixtures. The microbes reduce and precipitate target compounds, or convert target compounds into their insoluble chemical compounds.

- *Subsurface flow wetlands* – These wetlands run in an underground structure just below the surface through a crushed rock media like gravel limestone, volcanic rock, or sandstone. Plants are rooted on the surface of this treatment device and their root system aids in the uptake/absorption of metals.

- *Diversions* - Water in the creek is diverted and treated off-site at a regional publicly owned treatment works, removing metals from the creek system.

Toxicity

Future monitoring efforts are planned in the hopes of better identification of pollutants resulting in toxic impairments in watershed listed areas. Until target pollutants can be indentified, efforts to reduce surface nuisance flows (i.e. irrigation controllers, public outreach and education, etc.) or implement runoff diversions are assumed to offer the most benefit.

Turbidity

Turbidity in surface water is the function of many factors including geology, urban development, topography, vegetation, and the duration and severity of precipitation events. Effective BMP types for turbidity include:

- *Detention Basins* – Detain stormwater runoff for an extended period of time to allow particles to settle prior to runoff release thereby improving downstream water clarity.

- *Low Impact Development (LID)* - LID is an approach to land development (or re-development) to manage stormwater as close to its source as possible and minimize development imperviousness. LID practices may include bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements, etc. By reducing development runoff downstream channel erosion and resulting turbidity is reduced.

- *Constructed Wetlands* – Like detention basins construction wetland detain stormwater runoff allowing for particles to settle. Wetlands also act as biological filters removing other pollutants that may also be contributing to water turbidity.

3.2 CLRP Implementation Strategy

An assessment of the BMP effectiveness and the cost-feasibility analysis resulted in the selection of four (4) main CLRP implementation strategies that will be pursued by the Watershed Permittees to address elevated bacteria concentrations and other watershed pollutants of concern. These four strategies include:

- Water conservation,
- Structural BMPs,
- Non-structural BMPs, and
- Additional studies.

Using these foundation components, the Watershed Permittees have developed a specific action plan to address pollutants in the San Clemente Coastal Streams watershed and these are detailed in **Section 4.0**. An overview of the four selected strategies is provided below.

3.2.1 Water Conservation

Conservation BMPs implemented in the Aliso Creek watershed were found on average to reduce dry weather bacteria loads by 35-40%. Increased participation watershed-wide would further reduce dry weather flows, nutrient, and bacteria loadings based on previous project performance. Therefore water conservation has been identified as an important BMP strategy for the San Clemente Coastal Streams watershed. A strong partnership with the water providers for the area is essential in order to gain a better understanding of water distribution issues and create a focus on households that have the greatest need of reducing their water usage and the greatest surface run-off reduction potential. Both water districts and the City of San Clemente would benefit from more intensive water conservation programs that would conserve water through irrigation control BMPs and public outreach while reducing the bacteria load (and other pollutants) associated with dry weather urban runoff. While the City of San Clemente has a very successful water conservation program through their water department, efforts could be increased to focus on areas draining to channels with 303(d) listed impairments.

3.2.2 Structural BMPs

Based upon the BMP effectiveness assessment findings, structural BMPs, if implemented and maintained correctly, can result in meaningful decreases in bacteria and other pollutant loads. Types of structural BMPs include:

- *Treatment Systems* - Examples include sand filters, cartridge media filters and disinfection treatment, such as ozone or UV light. Dry weather diversions are also included in this category. Dry weather diversions eliminate all pollutants from the MS4 by eliminating all discharge to receiving water bodies. Flow is diverted to the sanitary sewer treatment plant where it is disinfected to the full extent of sewage.

- *Channel Restoration/Retrofitting* - Restoring biological function may enhance a stream's contaminant assimilative capacity. In addition, channel restoration contributes to the

restoration of a more natural watershed hydrologic regime. These efforts can lead to more stable channel morphology and the elimination of the dry weather runoff that sustains the flux of bacteria through the creek system in dry weather.

- *Landscape Retrofits*- Examples include weather-based irrigation controllers (aka SmarTimers), edgescaping where existing irrigated lawn area along the edge of a public sidewalk, street curb, driveway and/or private walkway is replaced with lower impact landscaping and permeable ground covering, and other irrigation enhancements and adjustments to further improve water efficiency and reduce runoff by eliminating overspray onto pavements and improve distribution uniformity.

- *Catch Basin Retrofits* - Examples include catch basin gates and in line baskets or filters. The debris gates are designed to remain closed during low flow conditions but open during high storm flows in order to prevent flooding. The gates keep debris out of the MS4 and within reach of street sweepers.

3.2.3 Non-Structural BMPs

The effect of non-structural BMPs within the San Clemente Coastal Streams Watershed including street sweeping and inspections is difficult to gauge. Similarly, education and outreach efforts are difficult to gauge for short term results as these efforts could take several years before behavior of residents changes. The recommended implementation strategy is to continue the current suite of non-structural BMPs in the San Clemente Coastal Streams watershed realizing that the long-term potential for positive outcome of these actions, particularly education and outreach, has not been reached and requires a long-term implementation period.

3.2.4 Additional Studies

A significant number of studies have been performed locally and regionally to better understand the sources and the drivers of population dynamics of bacteria and other pollutant levels in receiving waters. The existing studies have identified data gaps that are particularly relevant to the implementation of a load reduction strategy. Studies recommended as part as part of the TMDL reduction monitoring (**Section 2.1.2**) include a regional reference watershed study, BMP performance evaluation, watershed pollutant source identification, watershed pollutant modeling, a bird monitoring and control study, site-specific criteria development study, and a recreational use criteria study. It is believed that information gathered from these studies will lend important insight into the sources and transport of bacteria and other pollutants within the watershed and aid in the management and abatement of these pollutants. A number of these studies will be collaborations through the Stormwater Monitoring Coalition and Bight studies.

4.0 WATERSHED PERMITTEE BMP ACTION PLANS

The following sections provide a summary of the individual structural and non-structural BMP plans proposed by the City of San Clemente. This summary is based on detailed structural BMP plans submitted by the City and found in **Appendix E**, and non-structural BMP plans found in **Appendix F**.

4.1 City of San Clemente BMP Action Plan

The City of San Clemente encompasses all of the developed land area in the watershed. Structural and non-structural BMP pollutant reduction efforts planned and/or implemented in City drainage areas within the San Clemente Costal Streams include:

- Poche Beach UV Treatment System
- Segunda Deshecha (M02) Dry Weather Diversion
- Pier Bowl Vortex Separator
- West Mariposa Vortex Separator
- West Palizada Vortex Separator
- Calafia Vortex Separator
- Linda Lane Vortex Separator
- Water District "Smart Landscape" Rebate programs
- Priority Redevelopment Projects with WQMPs/Local Standard Stormwater Mitigation Plan (SSMP) and treatment control BMPs
- Priority New Development Projects with WQMPs/Local Standard Stormwater Mitigation Plan (SSMP) and treatment control BMPs
- Median Retrofits
- City of San Clemente LIP

Appendix E, Table E-3 details the planning and scheduling aspects of the City of San Clemente's structural BMP Plan. For details on the reporting years and quantities of activities performed for the City's non-structural BMP program see **Appendix F**.

5.0 TMDL REDUCTION PLAN AND SCHEDULE

A watershed special study on the origin of bacteria impairments at Doheny State Beach (**Section 2.2.3**) estimated that birds at the San Juan Creek mouth contributed 82.3% of the *Enterococcus* bacteria load discharged to the Pacific Ocean. In contrast the San Diego Regional Board bacteria TMDL model used land use type to model bacteria load and did not consider bird fecal bacteria inputs to the watershed. To address this discrepancy projected bacteria reductions are currently presented only for the watershed area inland. A reduction plan for the surfzone will be developed upon completion of the San Juan Creek mouth bird monitoring and control (**Section 2.1.3.5**) and site-specific criteria development (**Section 2.1.3.6**) special studies.

Using the Watershed Permittee BMP Action plans, projected watershed bacterial load reductions in the San Clemente Coastal Streams watershed inland areas were calculated to determine overall progress within the watershed and develop an expected reduction schedule.

5.1 Projected Bacteria Load Reductions

Projected reductions are based upon Watershed Permittee BMP Action Plans, calculated existing progress in the watershed, and expected TMDL target adjustments due to special studies. A description of current conditions, recent studies, and future action plans toward compliance is given below**.**

5.1.1 Existing Progress Reductions

Poche Beach

A UV treatment system was constructed at the base of the Prima Deshecha Canada watershed in 2009 to reduce exceedances of fecal indicator bacteria (FIB) water quality standards at the beach. While water quality tests of the treatment system effluent show that the treatment system is effective, surf zone samples show continued exceedances for bacteria. The County of Orange and the City of San Clemente independently completed two extensive bacteria source identification studies in the Prima Deshecha Canada watershed and at Poche Beach. The first study was in 2005-06 and the second in 2010-12. Conditions were assessed through an integrated multi-task investigation that included a Sanitary Survey Investigation, Biofilm Study, Groundwater Study, Bioswale BMP Effectiveness Study, and Scour Pond and Beach Environment Study. The findings identified sources of bacteria in the watershed and beach environment, and are the basis for proposed follow up actions to reduce bacteria concentrations to meet the TMDL requirements. This strategy includes: 1) Reducing flows in the upper watershed through water conservation efforts. 2) Reducing nutrient and bacteria loading from watershed through enhancement of an existing bioswale BMP. 3) Addressing the scour pond configuration to reduce the potential of bacteria regrowth after UV disinfection. 4) Reducing the impact of birds at the beach through management measures.

The measures address the identified sources and causes of exceedances at the beach through a multi-pronged approach. This approach assures that the outcome of these management measures is the significant reduction in FIB concentrations at the beach. The four elements of

the multi-pronged approach address each of the listed identified sources and migration pathways. The four elements include: 1) Expansion of a Watershed Non-Stormwater Flow Reduction Program that focuses on modifying irrigation practices through incentives and education building onto the successes and lessons learned from previous reduction measures; 2) Reduction of Nutrient and Bacteria Loading using LID through enhancement of the existing bioswale located adjacent to the creek within the Shorecliffs golf course; 3) Management of Bacteria Regrowth in the Scour Pond through achieving greater efficiencies of UV treatment system and outfall location, and alternative assessment for reconfiguration of the scour pond; and; 4) Bird Management to Reduce Bacteria Exceedances at the Beach. The proposed plan will be carried out as funding becomes available.

North Beach

The City of San Clemente completed constructed and commissioned the Segunda Deshecha Canada (M02) diversion in April 2009. This diversion captures dry weather urban runoff from the 4800 acre watershed and diverts it to the City's sanitary sewer plant. The objective of the project was to reduce bacteria concentrations at North Beach. Monitoring shows the project is effective and surf zone water quality meets the bacteria objectives during dry weather.

5.1.2 Future Progress Reductions

Progress towards meeting compliance targets for dry weather bacteria concentrations at the Pier and Capistrano Beach locations and meeting compliance targets for wet weather at all locations will be met through recommendations obtained from current and future studies. For the immediate future, further data and analysis will need to be conducted especially during wet weather conditions to understand baseline conditions.

5.2 TMDL Compliance Schedule

It is expected that as additional water quality data and Watershed Permittees continue to evolve their programs through actions implemented through Workplan and NPDES monitoring programs the compliance schedule may need to be adjusted to reflect current conditions. Possible revisions will be evaluated on an annual basis as part of the Workplan update. Using an adaptive management approach, it is anticipated that the continual refinement of watershed BMP Action Plans and CLRP special studies will result in compliance with TMDL objectives.

6.0 ACRONYMS AND GLOSSARY

6.1 Acronyms

AB411 Season	April 1 – October 31
AB411 Standards	State Ocean Water-Contact Sports Standards
ASCE	American Society of Civil Engineers
BMP	Best Management Practice
Basin Plan	Water Quality Control Plan for the San Diego Basin
CASQA	California Stormwater Quality Association
CFU	Colony Forming Units
CLRP	Comprehensive Load Reduction Plan
Copermittees	County of Orange, the 11 incorporated cities within the County of Orange in the San Diego Region, and the Orange County Flood Control District
CFR	Code of Federal Regulations
CSDO	Coastal Stormdrain Outfall
CWA	Clean Water Act
CWC	California Water Code
DAMP	Drainage Area Management Plan
DSB4	Doheny beach drain south of the San Juan Creek mouth
GIS	Geographic Information System
HMP	Hydromodification Management Plan
HSPF	Hydrologic Simulation Program in Fortran
IRWMP	Integrated Regional Water Management Plan
JRMP	Jurisdictional Runoff Management Plan
LIP	Local Implementation Plan
MBAS	Methylene Blue Active Substances
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAL	Non-stormwater Dry Weather Action Levels
NPDES	National Pollutant Discharge Elimination System
NSWQD	National Stormwater Quality Database
OAL	Office of Administrative Law
Ocean Plan	Water Quality Control Plan for Ocean Waters of California

OCTA	Orange County Transportation Authority
p-value	Strength of relationship in statistical significance testing
POCHE	Prima Deshecha Channel
POTW	Publicly Owned Treatment Works
Regional Board	California Regional Water Quality Control Board, San Diego Region
ROWD	Orange County Copermittees' Report of Waste Discharge (application for NPDES reissuance)
SAL	Stormwater Action Level
SCCWRP	Southern California Coastal Water Research Project
SCE	Southern California Edison
SCM1	Mouth of Salt Creek
SEEP	SmarTimer / Edgescape Evaluation Project
SIP	State Implementation Policy; State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California
SJC1	Mouth of San Juan Creek
SMC	Stormwater Monitoring Coalition
STBMP	Structural Treatment Best Management Practice
SWAMP	Surface Water Ambient Monitoring Program
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
Watershed Permittees	The City of San Clemente, the County of Orange, and the Orange County Flood Control District
WRMP	Watershed Runoff Management Plan

6.2 Glossary[18]

Beneficial Uses - The uses of water necessary for the survival or well being of man, plants, and wildlife. These uses of water serve to promote tangible and intangible economic, social, and environmental goals. "Beneficial Uses" of the waters of the State that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the

[18] Definitions are derived from Attachment C of Order 2009-2009-002.

implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Best Management Practices (BMPs) - Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.

Clean Water Act Section 303(d) Water Body - An impaired water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.

Dry Season – May 1 through September 30 of each year.

MS4 - conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.

Non-Storm Water - All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit discharges, non-prohibited discharges, and NPDES permitted discharges.

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act: "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses." Pollution may include contamination.

Pollutants of Concern – Pollutants for which water bodies are listed as impaired under CWA section 303(d), pollutants associated with the land use type of a development, and/or pollutants commonly associated with runoff. Pollutants commonly associated with runoff include total suspended solids; sediment; pathogens (e.g., bacteria, viruses, protozoa); heavy metals (e.g., copper, lead, zinc, and cadmium); petroleum products and polynuclear aromatic hydrocarbons; synthetic organics (e.g., pesticides, herbicides, and PCBs); nutrients (e.g., nitrogen and phosphorus fertilizers); oxygen-demanding substances (decaying vegetation, animal waste, and anthropogenic litter).

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control BMPs, treatment control BMPs, or disposal.

Receiving Waters – Waters of the United States.

Runoff - All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows.

Shared Treatment Control BMP - BMPs used by multiple developments to infiltrate, filter, or treat the required volume or flow prior to discharge to a receiving water. This could include, for example, a treatment BMP at the end of an enclosed storm drain that collects runoff from several commercial developments.

Source Control BMP – Land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and runoff.

Storm Water – Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage. Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.

Total Maximum Daily Load (TMDL) - The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology based controls.

Water Quality Objective - Numerical or narrative limits on constituents or characteristics of water designated to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans. Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in a receiving water and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives. (Water quality objectives are also called water quality criteria in the CWA.)

Water Quality Standards - The beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of water and the water quality objectives necessary to protect those uses.

Waters of the State - Any water, surface or underground, including saline waters within the boundaries of the State [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State regardless of circumstances or condition. Under this definition, a MS4 is always considered to be a Waters of the State.

Waters of the United States - As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: "(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA."

Watershed - That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Watershed Runoff Management Plan (WRMP) – A written description of the specific watershed runoff management measures and programs that each watershed group of Copermittees will implement to comply with this Order and ensure that storm water pollutant discharges in runoff are reduced to the MEP and do not cause or contribute to violation of water quality standards.

Wet Season – October 1 through April 30 of each year.

Table 1: Designated Beneficial Uses – San Clemente Coastal Streams

Inland Surface Water	AGR	REC-1	REC-2	WARM	WILD
Prima Desheca Canada	●	○	●	●	●
Segunda Desheca Canada	●	○	●	●	●
Unnamed Intermittent Coastal Streams	●	○	●	●	●

Existing - ● Potential - ○

Agricultural Supply (**AGR**) – Includes uses of water for farming, horticulture or ranching.

Contact Water Recreation (**REC-1**) – Includes uses of water for recreational activities involving body contact where ingestion of water is reasonably possible.

Non-Contact Water Recreation (**REC-2**) – Includes uses of water for recreational activities involving proximity to water.

Warm Freshwater Habitat (**WARM**) – Includes uses of water that support warm water ecosystems.

Wildlife Habitat (**WILD**) – Includes uses of water that support terrestrial ecosystems.

Source: http://www.waterboards.ca.gov/sandiego/programs/basinplan.html

Table 2: San Clemente Coastal Streams Watershed Monitoring and Assessment Program Implementation Schedule

Bacteria TMDL approval by state Office of Administrative Law (OAL) April 4, 2011

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2031
Implementation Phase	**Phase 1**			**Phase 2**								
CLRP Monitoring and Assessment Program Development/Updates												
Existing Monitoring Programs – NPDES, HCA, SOCWA												
Bacteria TMDL Monitoring Program												
CLRP Special Studies												
Regional Reference Study - including evaluation of Bacteria TMDL numeric targets												
BMP Performance Evaluation												
Watershed Pollution Source Identification - 303(d) Constituents												
Watershed Pollutant Modeling - 303(d) Constituents												
Site-Specific Criteria Development – QMRA at Poche Beach												
Recreational Use Criteria Study – investigating REC-1 high flow suspension/wildlife impacts												

Table 3: San Clemente Coastal Streams Watershed Bacteria Monitoring Sites and Frequencies

	Monitoring Sites		Frequency	Samples/ Year
	Surfzone	Stormdrain/Creek		
Existing Monitoring Programs				
NPDES Monitoring Programs				
Coastal Storm Drain Outfall	CSBMP1u, CSBMP1d, CSBBR1u, CSBBR1d, POCHEu, POCHEd, SCCS52u, SCCS52d, SCCS17u, SCCS17d, PICOu, PICOd, MARIPOu, MARIPOd, LINDALu, LINDALd, PIERu, PIERd, TRFCYNu, TRFCYNd, LADERAu, LADERAd, RIVERAu, RIVERAd	CSBMP1, CSBBR1, POCHE, SCCS52, SCCS17, PICO, MARIPO, LINDAL, PIER, TRFCYN, LADERA, RIVERA	1x/week Dry Weather (Upcoast only when flow to ocean)	Up to 1872
Long-Term Mass Loading		PDCM01, SDCM02	2x/year Dry Weather and 2x/year Wet Weather	8
Non-stormwater Action Level		SCM01CGR, SCBS@M02, M01S01, M01S02, M01TBN1	2x/year Dry Weather	10
Other Watershed Bacteria Monitoring Programs				
HCA Ocean Water Protection Program (AB411 Monitoring)	OSC01		1x/Week April 1 – October 31	30
SOCWA Ocean Outfall Monitoring Program	S9, S11, S-13, S-15, S-17, S-19, S-21, S-23		2x/Week May 1 – October 31 1x/Week November 1 – April 30	624
Bacteria TMDL Compliance Monitoring Program				
Targeted Wet Weather Monitoring	CSBMP1d, CSBRR1d, S-15/POCHEd, PIERd		6 storms events/Year (>= 0.2 inch of rain) May include multiple samples/storm event	>= 24

Table 4: Priority Pollutants and Sources

Priority	Pollutant	Anthropogenic Sources	Natural Sources
HIGH	Indicator bacteria (*Enterococcus* and Total Coliform)	Pet feces, sewer spills, food wastes, manure, decomposing landscape litter	Wildlife feces, biofilms, decomposing organic material, sediments
MEDIUM	Turbidity	Construction activity	Suspended colloidal matter
MEDIUM	Dissolved Oxygen	Fertilizer runoff, untreated sewage	Excess organic matter, increased water temperatures
MEDIUM	Total Nitrogen	Fertilizers, cleaning products, recycled water	Decomposing organic material, sediments, wildlife feces, groundwater chemistry
MEDIUM	Total Phosphorus	Fertilizers, cleaning products, recycled water	Decomposing organic material, sediments, wildlife feces, groundwater chemistry
MEDIUM	MBAS	Anionic surfactants	
MEDIUM	Metals	Atmospheric deposition, automotive byproducts, architectural uses, aging plumbing systems	Lithogenic geology of native soils
LOW	Toxicity	Automotive byproducts, pesticides	Groundwater chemistry
LOW	pH	Atmospheric acid deposition	Lithogenic geology of native soils

Table 5: 2010 303(d) List and TMDL Priority Schedule – San Clemente Coastal Streams Watershed

Type	Name	CalWater Watershed	Pollutant/Stressor	Source	Estimated Size Affected	Proposed TMDL Completion
2010 303(d) List						
C	Pacific Ocean Shoreline, San Clemente HA, at Poche Beach	90130000	Enterococcus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2019
			Total Coliform	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2019
C	Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach at Pier	90130000	Enterococcus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2019
C	Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach, North Beach	90130000	Total Coliform	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2019
C	Pacific Ocean Shoreline, San Clemente HA, at South Capistrano Beach at Beach Road	90130000	Enterococcus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2021

Type	Name	CalWater Watershed	Pollutant/Stressor	Source	Estimated Size Affected	Proposed TMDL Completion
2010 303(d) List						
C	Pacific Ocean Shoreline, San Clemente HA, at South Capistrano County Beach	90130000	Enterococcus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2012
			Total Coliform	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.03 mile	2021
R	Prima Deshecha Creek	9013000	Cadmium	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	1.2 miles	2021
			Nickel	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	1.2 miles	2021
			Phosphorus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	1.2 miles	2019
			Turbidity	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	1.2 miles	2019
R	Segunda Deshecha Creek	9013000	Phosphorus	Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.92 mile	2019
			Toxicity	Unknown Nonpoint Source Unknown Point Source	0.92 mile	2021

Type	Name	CalWater Watershed	Pollutant/Stressor	Source	Estimated Size Affected	Proposed TMDL Completion
2010 303(d) List						
				Urban Runoff/Storm Sewers		
			Turbidity	Channelization Construction/Land Development Flow Regulation/Modification Unknown Nonpoint Source Unknown Point Source Urban Runoff/Storm Sewers	0.92 mile	2019

Notes:

1. R – River & Stream; E – Estuary; C – Coastal & Bay Shoreline; B – Bays & Harbors

Figure 1: San Clemente Coastal Streams Watershed Land Use

Figure 2: San Clemente Coastal Streams Parks

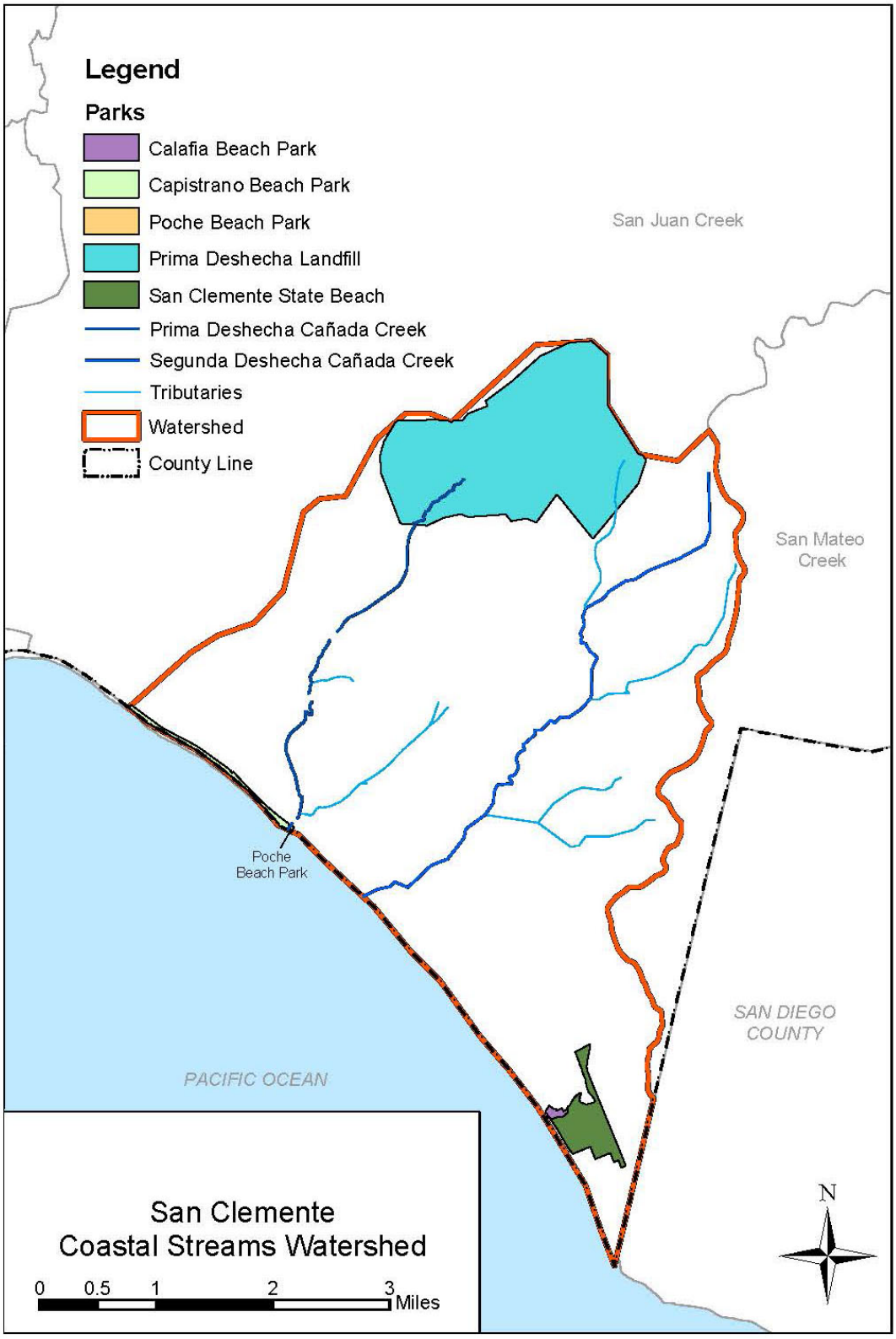


Figure 3: San Clemente Coastal Streams Watershed Monitoring Sites

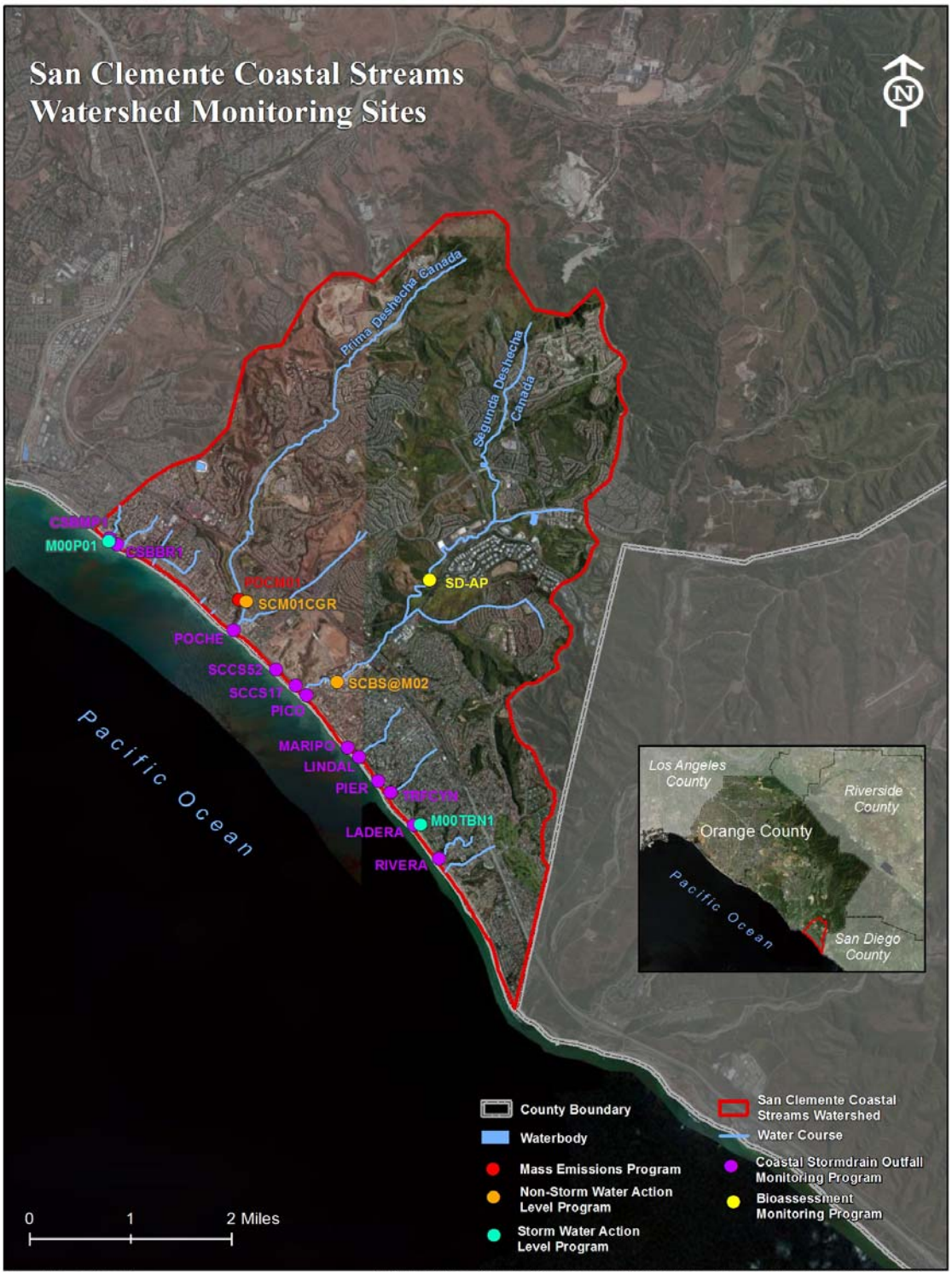


Figure 4: San Clemente Coastal Streams Bacteria Monitoring Sites

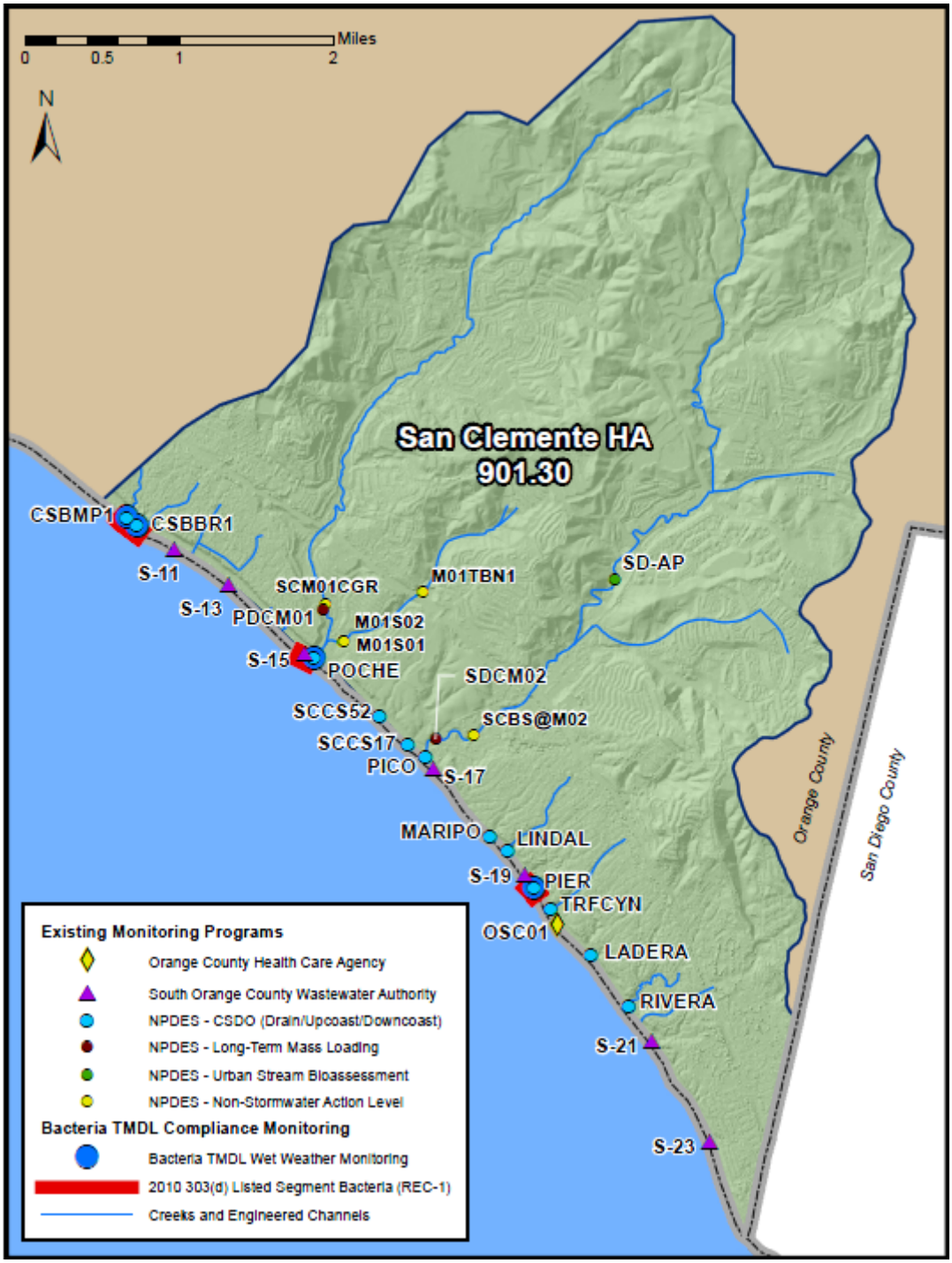


Figure 5: San Clemente Coastal Streams Watershed TMDL and 303(d) Listed Water Bodies

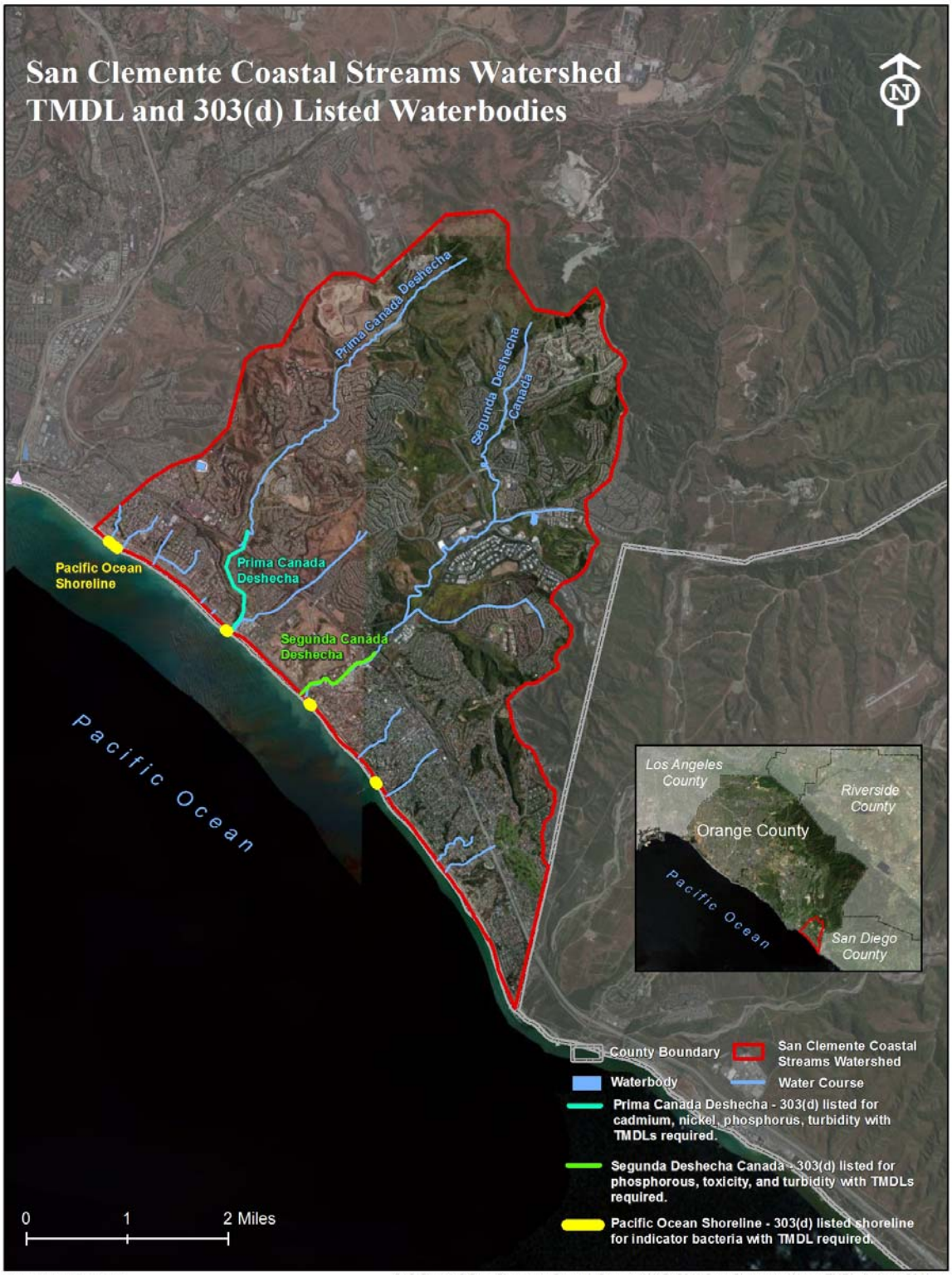


Figure 6: San Clemente Coastal Streams Watershed BMP Sites

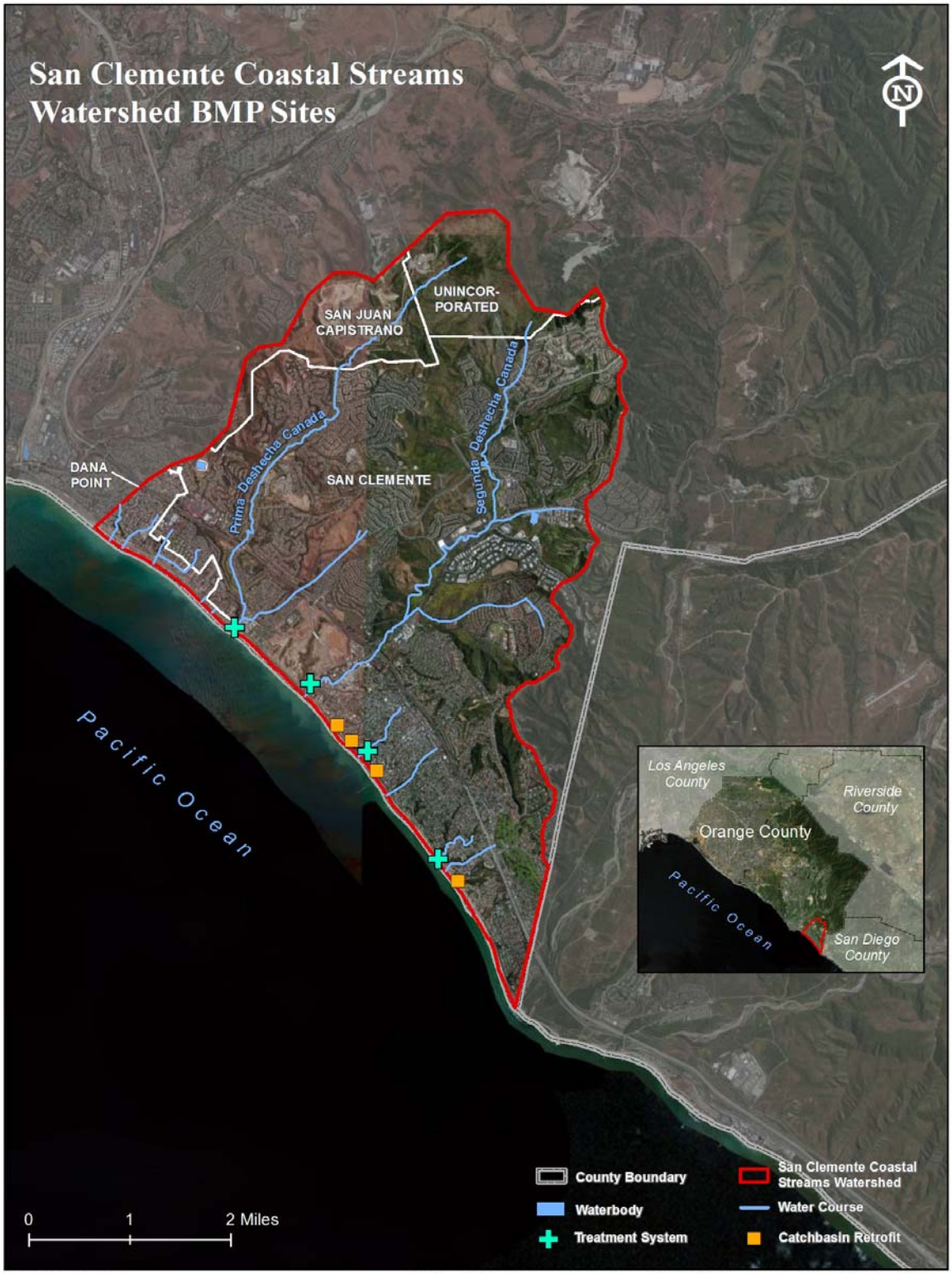
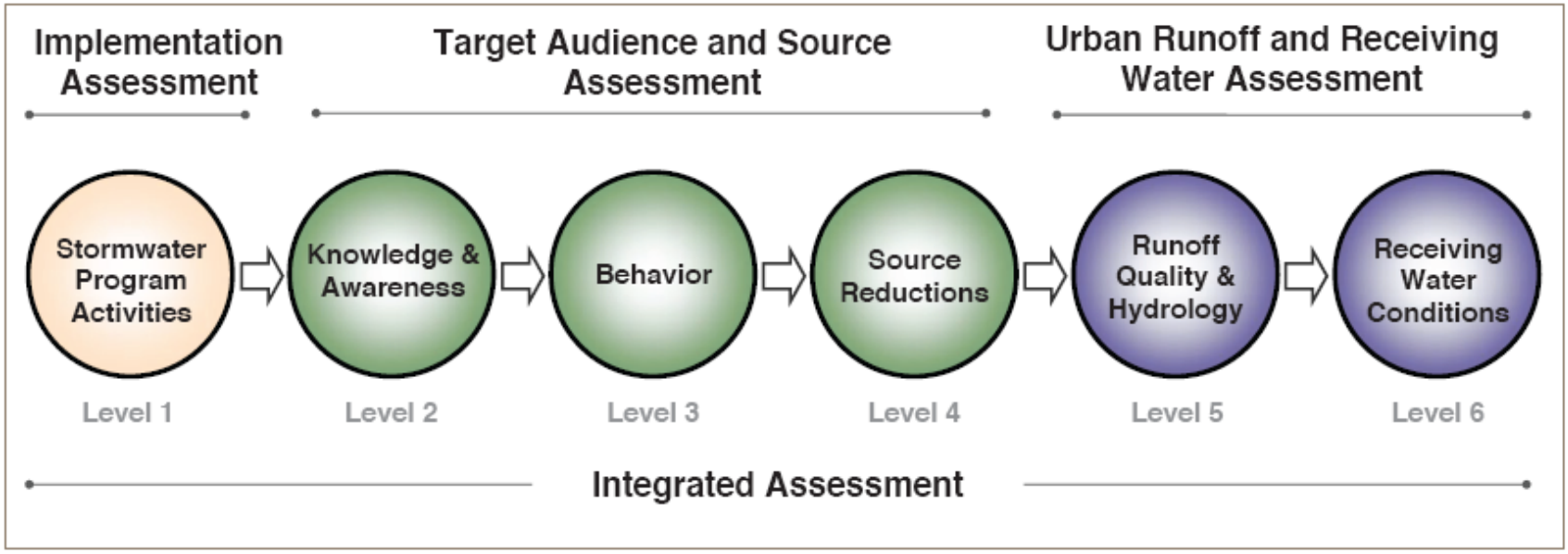


Figure 7: Relationship of Assessment Types to the Six Outcome Levels



APPENDIX A

RECEIVING WATERS AND MS4 DISCHARGE MONITORING PROGRAM

APPENDIX B

BUDGET AND FUNDING EFFORTS

TABLE B-2, CITY OF SAN CLEMENTE – SAN CLEMENTE COASTAL STREAMS WATERSHED BUDGET AND FUNDING EFFORT

LIP Program Element	Prorated Budget		Staffing				Funding	
					Prorated FTEs			
	Baseline 2001-02	*Reporting Year 2010-11*	Positions	Job Descriptions	*Baseline 2001-02 (estimated)*	*Reporting Year 2010-11*	Sources	Time Horizon
Administration (LIP Section 2.0)	nr	$20,559	Personnel responsible for implementing and administering the Stormwater program.	Administrative oversight, planning and direction, budgeting and grants, reporting.	0.07 FTEs	0.08 FTEs	Clean Ocean Fund	Ongoing annually.
Non-Structural BMPs Implementation – Municipal Activities								
Trash and Debris Control (LIP Section 5.0)	$1,370	$2,702	Drainage system, landscape, facilities and streets maintenance supervisors and outside contractors	Supervisory staff oversees contracts, progress and quality control for routine maintenance operations and BMP implementation conducted by third-party outside contractors. NPDES Authorized Inspector responds to illicit discharge incidents on public streets, facilities or MS4, and conducts annual municipal programs reviews.	0.04 FTEs	0.007 FTEs	Solid Waste Fund Clean Ocean Fund	Ongoing annually.
Drainage Facility Maintenance (LIP Section 5.0)	$2,830	$10,510						
Street Sweeping (LIP Section 5.0)	$7,980	$3,641						
Environmental Performance - BMP Implementation (LIP Section 5.0)	nr	nr						
Pesticide & Fertilizer Management (LIP Section 5.0)	nr	nr						
Non-Structural BMPs Implementation – Commercial, Industrial, and Residential Activities								
Nonpoint Source Pollution Awareness (LIP Section 6.0)	$822	$5,497	Code enforcement officers, inspectors, planners, and plan checkers.	Contract inspectors utilized for annual commercial inspection program. Code Enforcement officers respond to illicit discharge incidents on private properties. Development plan review and construction inspection to confirm BMP implementation.	0.04 FTEs	0.17 FTEs	BMP implementation funded by property owners on private properties. General Fund and Plan Check Fee Revenue.	Ongoing annually for Code Enforcement Officers and Contract Inspectors and project-specific one-time costs on per-project basis, based on project schedule.
Household Hazardous Waste Collection (LIP Section 6.0)	nr	$603						
New Development BMP Requirements – Supportive of Planning , etc. (LIP Section 7.0)	nr	$3,083						
Construction BMPs – Plan Check & Inspection (LIP Section 8.0)	nr	$8,670						
Existing Development – Industrial/Commerical/HOA Inspections (LIP Section 9.0)	$467	$6,117						
Illicit Connections/Discharge Identification & Elimination (LIP Section 10.0)	nr	$1,858						

TABLE B-2, CITY OF SAN CLEMENTE – SAN CLEMENTE COASTAL STREAMS WATERSHED BUDGET AND FUNDING EFFORT

LIP Program Element	Prorated Budget		Staffing				Funding	
	Baseline 2001-02	*Reporting Year 2010-11*	Positions	Job Descriptions	Prorated FTEs: *Baseline 2001-02 (estimated)*	Prorated FTEs: *Reporting Year 2010-11*	Sources	Time Horizon
Structural BMPs Programs – Capital Costs								
Public Projects – BMPs	$15,868	$16,070	Engineers and construction inspection staff in Public Works, and outside design and construction contractors.	Planning, design, construction and inspection of structural BMP projects on public property.	0.009 FTEs	0.009 FTEs	Grant funds as available; and General Fund Capital Improvement Program Accounts.	Project-specific one-time costs, based on design and construction schedule on per-project basis.Citywide Accrued public BMP capital costs since baseline year: FY01-02 = $173,800 FY02-03 = $399,512 FY03-04 = $474,048 FY04-05 = $2,348,400 FY05-06 = $2,789,584 FY06-07 = $1,846,023 FY07-08 = $785,864 FY08-09 = $439,960 FY09-10 = $403,074 FY10-11 = $320,114 Total since baseline = **$9,980,379**
Construction BMPs for Public Construction Projects	nr	$24,478						
Other Capital Projects/Major Equipment Purchases	$365	$347						

TABLE B-2, CITY OF SAN CLEMENTE – SAN CLEMENTE COASTAL STREAMS WATERSHED BUDGET AND FUNDING EFFORT

LIP Program Element	Prorated Budget		Staffing				Funding	
					Prorated FTEs			
	Baseline 2001-02	*Reporting Year 2010-11*	Positions	Job Descriptions	*Baseline 2001-02 (estimated)*	*Reporting Year 2010-11*	Sources	Time Horizon
Other LIP Programs								
Contribution to Regional Program	nr	$17,274	County of Orange staff planners, scientists, engineers, and outside environmental contractors.	Implement region wide MS4 programs including: program development and coordination, regulatory agency liaison and reporting, public education and outreach, and environmental quality monitoring.	nr	0.02 FTE	General Fund.	Ongoing annually.
Other – Household Hazardous Waste	NA	NA	NA	NA	NA	NA	NA	NA
Other	NA	NA	NA	NA	NA	NA	NA	NA

- NR = Not reported. Note re FTEs: City personnel only; excludes outside contractors. **O&M Contractor costs are included in the Prorated Budget figures.**

APPENDIX C:

Regional BMP Effectiveness Matrix and Descriptions

1. Bacteria Pollutant BMPs

This appendix details the results of literature review efforts conducted by the Aliso Creek Watershed Permittees to determine the effectiveness of bacteria reduction Best Management Practices (BMPs) applicable to the development of the Aliso Creek, San Juan Creek and San Clemente Coastal Streams Watershed Comprehensive Load Reduction Plans (CLRPs).

1.1 Storm Water Quality Standards Task Force

Staff of the Santa Ana Regional Water Quality Control Board and other members of the Stormwater Quality Standards Task Force (SWQSTF) in 2009 conducted a BMP evaluation and economics analysis. This evaluation and analysis yielded a comprehensive list of BMPs found throughout the Country and the Southern California region. The list was eventually approved as an amendment into the Santa Ana Regional Water Quality Control Boards Basin Plan. Additional information on the Proposed Basin Plan Amendments can be found on the Santa Ana Regional Water Quality Control Board's website at the following link: http://www.waterboards.ca.gov/rwqcb8/water_issues/programs/basin_plan/recreational_standards.shtml. Table C-1 below, summarizes the results of the SWQSTF's literature review. BMP effectiveness results from this analysis were reviewed and compared to results found in the Watershed Permittee Bacteria BMP literature review found in Section 1.2 for consistency.

Table C-1- Initial Literature Review Stormwater Bacteria BMPs – (Prepared for the Stormwater Quality Standards Task Force, April 2009)

Bacteria BMP Type	Storm?	Parameter	Mean Influent #/100 mL	Mean Effluent #/100 mL	n	Percent Removal	Construction Cost (excluding land costs)	Annual O & M Cost	Source	Comments
Water Treatment BMPs										
Wet Basins (Retention ponds, wet ponds, wet extended detention ponds, stormwater ponds, retention basins). Retains permanent pool.	Y	FC	11700	100	NR	99	$1.00-12.25/ft³ Typically <$100,000 per acre	Up to $10,000 per pond	CalTrans (2004) study in SoCal	May attract wildlife which could increase bacteria concentrations.
	N	FC	4400	20	NR	99			CalTrans (2004) study in SoCal	
		FC	1929	515	9	73			BMP dB; Fremont, CA	
		FC	58	5	24	91			BMP dB; Largo, FL	
		FC	4231	2475	16	41.5			BMP dB; Valhalla, NY	
	Y	FC	NR	1779	10	90			Schueler (2000); ON	
	Y	FC	NR	2858	10	64			Schueler (2000); ON	
	Y	*E. coli*	NR	NR	10	86			Schueler (2000); ON	
	Y	*E. coli*	NR	NR	10	51			Schueler (2000); ON	

Bacteria BMP Type	Storm?	Parameter	Mean Influent #/100 mL	Mean Effluent #/100 mL	n	Percent Removal	Construction Cost (excluding land costs)	Annual O & M Cost	Source	Comments
	Y/N	FC	152	63	84	58			Mallin et al. (2002); NC	
Dry Basins (Dry ponds, detention or extended detention basins or ponds). Designed to empty within several days.	Y	FC	900	2000	NR	-122	$0.30-1.00/ft³ Typically < $100,000 per acre	$3,100-10,000 per pond	CalTrans (2004) study in SoCal; storm	Unlined
	Y	FC	6700	7500	NR	-12			CalTrans (2004) study in SoCal; storm	Concrete lined
	Y	FC	27	27	8	0			USGS (2004) study in USVI	
	Y	FC	3412	724	35	79			Harper et al. (1999) study in FL	
	N	*E. coli*	563	515	18	9			MSAR (2009)	
	N	FC	957	738	18	23			MSAR (2009)	
	Y	*E. coli*	149	204	12	-37			MSAR (2009)	
	Y	FC	380	490	12	-29			MSAR (2009)	
Constructed Wetlands (Stormwater wetlands, wetland basins, shallow marshes, extended detention wetlands). "Essentially shallow wet basins."	Y/N	FC	33.8	7.4	5	78	$0.35-1.30/ft³, or $26,325-55,485/acre of wetland	$1,500-2,700/hectare	Hinds et al. (2004); Columbus	
	N	FC	760	80	10	89			LN & COO (2004); Laguna Niguel	
	N	FC	1915	116	9	94			LN & COO (2004); Laguna Niguel	
	N	FC	5178	101	12	98			LN & COO (2004); Laguna Niguel	
	N	*E. coli*	4163	27	10	99			LN & COO (2004); Laguna Niguel	
	N	*E. coli*	1897	107	9	94			LN & COO (2004); Laguna Niguel	
	N	*E. coli*	630	73	9	88			LN & COO (2004); Laguna Niguel	
Media Filters	Y	FC	5800	1400	NR	76	$6,600-18,500 per acre drainage Total $230,000-$485,000 in So CA	5% of construction costs	CalTrans (2004) study in SoCal	Underground filters could promote bacterial growth
		FC	NR	18528		-85			City of Austin (1997)	
	Y	FC	NR	NR		36			Glick et al. (1998); Austin, TX	

Bacteria BMP Type	Storm?	Parameter	Mean Influent #/100 mL	Mean Effluent #/100 mL	n	Percent Removal	Construction Cost (excluding land costs)	Annual O & M Cost	Source	Comments
Disinfection (UV, ozone, chlorine)	N	FC	32800**	16**		99.9% (inversely proportional to turbidity)	For facilities to treat 1,250-5,000 cfs peak flow: $19.2-30.5 million for ozone, $48-87.8 million for UV	$534,000-657,000 for ozone, $248,000-992,000 for UV	**County of Orange (2008)	Caution is required in safe handling of toxic chemicals, and to ensure no toxic residues remain in discharge. **Figures are from a Clear Creek UV treatment system.
Diversion						100% of diverted fraction	$14,400-2,071,000 for diversions of up to 0.5 MGD in Orange County	$2,800-83,000	RBF (2003)	Treatment facilities may not be capable of handling the excess flow due to runoff. Costs assume existing sewer infrastructure has sufficient capacity to treat diversion.
Vegetated Swales or Channels (Grassed channels, dry swales, retention swales). Only includes those features with little to moderate soil infiltration.	Y	FC	386	459	NR	-19	$0.50/ft² (<$35,000 for 3 ft x 21 ft x 1,000 ft swale)	32% of construction costs	BMP dB; Altadena, Caltrans (2004)	Possible groundwater contamination in areas with sandy soils and shallow aquifers
	Y	FC	84853	47	NR	99.9			BMP dB; Carlsbad, Caltrans (2004)	
	Y	FC	490	1122	NR	-129			BMP dB; Cerritos, Caltrans (2004)	
	N	*E. coli*	20651	717	18	97			MSAR (2009); dry	
	N	FC	16293	675	18	96			MSAR (2009); dry	
	Y	*E. coli*	2448	2904	12	-19			MSAR (2009); wet	
	Y	FC	3954	4196	12	-6			MSAR (2009); wet	
	Y	FC	65	105	NR	-62			BMP dB; Downey, Caltrans (2004)	
	Y	FC	9460	9168	NR	3			BMP dB; Lakewood, Caltrans (2004)	
	Y	FC	1366	239	NR	82			BMP dB; Vista, CA, Caltrans (2004)	

Bacteria BMP Type	Storm?	Parameter	Mean Influent #/100 mL	Mean Effluent #/100 mL	n	Percent Removal	Construction Cost (excluding land costs)	Annual O & M Cost	Source	Comments
Volume Reduction BMPs										
Infiltraton Basins & Trenches	Y	FC	80-5000	<23	9	>99	$1.25-20.76/ft³ <$110,000 per 1 ac basin	<$3,000 per basin or trench	LASGRWC (2005)	Possible groundwater contamination in areas with sandy soils and shallow aquifers
	Y	*E. coli*	20-1300	<6.9	9	>99				
	Y	FC	500	ND-800	8					
	Y	FC	ND-13000	11-110	8					
	Y	*E. coli*	ND-120	ND	8	>99				
	Y	FC	230	ND	5	>99				
	Y	*E. coli*	310	ND	5	>99				
						100% for infiltrated fraction			USEPA (1999); Arvind & Pitt (2006)	
Low Impact Development (LID)						No data.	N/A	N/A		
Source Control BMPs										
Agricultural BMPs						No data	Variable	Variable		
Public Education/Outreach						No data	Variable (up to $1,000,000+)	Variable		
Routine Inspection/Maintenance of Sewer and Septic Systems						No data	Variable	Variable		

NR = Not reported; ND = Not detected
Cost estimates from CASQA (2003), Olivieri et al. (2007), RBF (2003), and Narayanan & Pitt (2006)
Shaded percent removal values were not statistically significant
BMP categorization scheme mostly from Minton (2002) and Olivieri et al. (2007

1.2 CLRP Bacteria BMP Literature Review

Considerable literature review efforts conducted as part of the development of the neighboring Aliso Creek CLRP development have been utilized as a basis for BMP analysis in the San Juan Creek and San Clemente Coastal Streams CLRP. Unlike the SWQTSF's literature review and analysis, this approach specifically targets the Aliso Creek and adjacent watershed BMP implementation and management strategies through collaboration with Watershed Permittees. Based on BMP effectiveness data provided by Watershed Permittees and similar regional programs, watershed BMPs were summarized and ranked into three categories of effectiveness. The following details existing, planned, and future structural and non-structural BMPs targeting bacteria pollutants within the Aliso Creek Watershed and throughout the region. BMPs are discussed according to their effectiveness.

- **Highly Effective**-BMP is associated with large reductions of pollutant loadings. High effectiveness was rated to those BMPs that could bring outflow from the BMP into REC-1 compliance.

- **Effective**-BMP has measurable reduction of pollutant loadings, but should be used in a "treatment train" (multiple BMPs strategically clustered) in order to increase efficiency.

- **Low/Potentially Effective-** BMP effectiveness in pollutant load reduction is measurable, but not considered significant. "Potential Effectiveness" BMPs are included in this category to represent some BMPs that have performed at the same level of effectiveness as "Low", but have not been fully evaluated for effectiveness, and will need additional time before definitive results are established. Potential Effectiveness rated BMPs may have also shown promise in the field by reducing other pollutants of concern that normally contribute to the establishment of bacterial contamination.

1.3 Highly Effective Bacteria BMPs

BMPs in this category are structural in nature and highly effective in reducing pollutant loadings. Two "highly effective" BMP types have been implemented in the Aliso Creek Watershed; media filtration with UV (ultra violet), and wetland treatment.

Media Filtration UV

The J01P28 treatment BMP located near Woodfield Park has had high success in the treatment of bacteria and shows a significant decrease in bacteria concentration and loadings in the channel outfall when operational; the treatment system is three-part with sand and clay media filters, and UV light. Data that shows the performance of the J01P28 Clear Creek Treatment in spring and early summer 2004 and late summer 2008 provided by the County of Orange is shown in Table C-2 below.

Table C-2- J01P28 Clear Creek Treatment System Performance Evaluation						
	Pretreatment - Intake			Post treatment – Outflow		
Date	Total Coliform (CFU/100 ml)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)	Total Coliform (CFU/100 ml)	Fecal Coliform (CFU/100 ml)	Enterococcus (CFU/100 ml)
4/9/2004	>200,000	>200,000	96,000	1,550	240	20
4/14/04	167,000	129,000	4,400	2,110	1,040	<10
4/20/04	>200,000	>200,000	38,000	36,000	3,500	1,560
4/22/04	95,000	21,000	45,000	2,000	700	180
4/29/04	>200,000	129,000	15,700	190	30	50
5/5/04	>200,000	>200,000	34,000	110	20	<10
5/14/04	184,000	129,000	16,900	260	20	340
5/19/04	116,000	75,000	18,600	30	10	10
5/26/04	>200,000	168,000	17,400	1,890	760	860
5/28/04	18,300	14,000	11,400	1,460	690	1,480
6/2/04	171,000	102,000	41,000	560	150	210
6/10/04	192,000	33,000	71,000	5800	1,520	1,340
6/18/04	139,000	101,000	11,300	1,370	900	800
6/23/04	31,000	14,400	4,800	1,540	1,270	680
6/29/04	129,000	69,000	49,000	12,700	3,300	4,600
6/26/2008	5000000	9300	1500	<90	<9	<9
9/10/2008	910000	5700	6400	<90	<9	<9
9/11/2008	2000000	56000	5400	7400	80	<9
9/15/2008	1110000	59000	11100	<9	<9	<9
9/18/2008	860000	34000	9900	<90	<9	<9

Data collected from the influent and effluent water of this BMP shows (table C-1 above) substantial reductions in the 2004 and 2008 data. In the 2004 data set, REC-1 standards were not consistently met; in the 2008 data set the REC-1 standards were met at the outfall. However, once the treated effluent meets Aliso Creek, elevated bacteria concentrations within the Creek negate any net benefit of the BMP downstream. This indicates that the location of the BMP is critical and may only be appropriate if localized bacteria reduction efforts are needed (such as at a beach outlet).

Since the implementation of J01P28 in 2004, problems with the maintenance and operation of the site have hindered its performance. This caused unexpected expenses in the operation of the system as well as significant non-operational times. By 2011, many of these operational issues were worked out, and the BMP has seen an improvement in performance including a 96% effectiveness for the removal of bacteria.

Wetland Treatment

Bacteria reduction in wetlands is achieved through filtration and interception in the wetland, predation from nematodes and micro-organisms, die-off, and UV exposure. The wetland BMPs evaluated showed that wetlands through this "natural" filtration process can be highly effective in reducing bacteria loads at point of discharge.

Several treatment BMP projects have been implemented within the Aliso Creek Watershed. Two include the Wood Canyon Emergent Wetland Program and the Wetland Capture and Treatment network, or WetCAT.

The Wood Canyon Emergent Wetland Program

The Wood Canyon Emergent Wetland Program is located at the headwaters of Wood Canyon Creek and treats 298 acres of residential runoff from the J02P08 storm drain, by using a train of meandering structural wetland retaining basins and native wetland plants. The BMP has proven to work well for the treatment of fecal bacteria groups as shown in sample collection and analysis at the influent and effluent of the project (Table C-3). Effluent samples from the emergent wetland show a decrease in bacteria with fecal coliform concentrations in all but one sample below REC-1 400 CFU/100 ml criteria. *Enterococcus* concentrations were also reduced but only met REC-1 standard at one sample. Based on this data average reductions are as follows: total coliform 93%, fecal coliform 98%, and *Enterococcus* 98%.

Table C-3- Performance of Wood Canyon Emergent Wetland Project

Sample Location	Parameter	5/31/06	6/14/06	7/12/06	8/23/06	3/19/07	5/21/07	6/13/07	7/11/07	8/13/07	Dry Weather Tolerance Intervals
Wetland Inlet	Total Coliform CFU/100 mL	120,000	27,000	53,000	19,000	75,000	17,000	11,000	78,000	58,000	330,000
	Fecal Coliform CFU/100 mL	14,000	4,800	5,100	9,200	18,000	1,700	8,000	3,000	2,300	95,000
	Enterococcus CFU/100 mL	72,000	8,600	19,000	24,000	64,000	12,000	20,000	12,000	14,000	53,000
Wetland Outlet	Total Coliform CFU/100 mL	1600	1300	9000	9000	4000	700	200	6000	450	330,000
	Fecal Coliform CFU/100 mL	120	120	10	10	1000	10	10	100	<10	95,000
	Enterococcus CFU/100 mL	650	920	300	300	140	450	800	200	<10	53,000

J03P02 Wetland Capture and Treatment Network (WetCAT)

The WetCAT Program was implemented to treat dry flow residential and urban runoff from the J03P02 storm drain. WetCAT has three separate wetland treatment areas along the J03P02 storm drainage area, north, west, and east. Much like the Wood Canyon Emergent Wetland program, the WetCAT utilizes retaining pond residence time (low gradient meandering and retention) and re-established native wetland plants to conduct biofiltration. Effectiveness monitoring of the WetCAT has shown decreases in bacteria effluent concentrations, particularly in fecal coliform.

As seen in the Tables C- 4 and C-5 below, greater than a 95% reduction of bacteria concentrations were observed from 2002 to 2003 as a result of the North and East wetland treatment networks. The West wetland was originally built in 1991 as mitigation for the development of a residential area in the J03P02 watershed. Table C-6 shows pre- and post- enhancement of the West wetland with four shallow berms to spread and store water within the natural marsh habitat. Though the reductions from pre- and post-enhancement implementation are similar, it should be noted that additional drainage areas to expand the treatment area were routed towards the site during the implementation of the West WetCAT.

Table C-4- Performance of North WetCAT

North WetCAT Apr-Dec 2003	Total Coliform			Fecal Coliform			E.coli			*Enterococcus*		
	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction
Mean	98,341	891	99.1	11,116	101	99.1	8,234	98	98.8	19,600	370	98.1
Median	53,000	300	99.4	5,900	10	99.8	5,500	10	99.8	18,000	50	99.7
Geometric Mean	42,531	220	99.5	5,177	25	99.5	3,817	23	99.4	15,198	68	99.6

Table C-5- Performance of East WetCAT

East WetCAT Apr-Dec 2003	Total Coliform			Fecal Coliform			E.coli			*Enterococcus*		
	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction	Inflow	Outflow	%Reduction
Mean	294,590	9,763	96.7	13,066	130	99.0	8,765	99	98.9	14,817	368	97.5
Median	42,000	3,000	92.9	4,000	30	99.3	3,000	30	99.0	7,000	90	98.7
Geometric Mean	38,471	2,839	92.6	2,257	34	98.5	1,719	27	98.4	4,951	82	98.3

Table C-6- Performance of West WetCAT Pre And Post Implementation												
Pre WetCAT 1/01-1/02	**Total Coliform**			**Fecal Coliform**			**E.coli**			***Enterococcus***		
	Inflow	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**
Mean	49,192	5,825	88.2	5,396	242	95.5	3,725	184	95.1	6,625	929	86.0
Median	13,000	2,100	83.8	2,000	110	94.5	1,100	110	90.0	4,000	900	77.5
Geometric Mean	17,909	2,678	85	1,745	109	93.8	1,112	89	92	2,645	636	76.0
Post WetCAT 1/01-1/02	**Total Coliform**			**Fecal Coliform**			**E.coli**			***Enterococcus***		
	Inflow	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**	**Inflow**	**Outflow**	**%Reduction**
Mean	72,846	4,854	93.3	5,462	245	95.5	4,592	229	95.0	8,382	1,283	84.7
Median	20,000	1,800	91.0	2,150	70	96.7	1,800	60	96.7	2,350	930	60.4
Geometric Mean	24,632	2,141	91.3	1,741	67	95.1	1,550	63	95.9	3,216	635	80.3

Diversion Structures

Several channels in Orange County and Los Angeles County use diversion to treat urban run-off. Twenty planned and implemented diversion structures have been utilized in the Santa Monica Bay, Los Angeles County. Several diversion channels/structures have been implemented in Orange County including: Salt Creek in Dana Point, Talbert Channel, the Santa Ana River, Greenville channel, and six throughout Laguna Beach.

The City of Laguna Beach has implemented several dry weather diversions to treat urban runoff in the Laguna Coastal watershed. These BMPs have proven to be 100% effective at the treatment of 75% of their annual flows in dry weather, thus reducing their bacteria loadings by 75%.

The South Coast Water District Water Harvest Project will seek to divert 300,000 to 800,000 gallons per day of Aliso Creek water based on customer demand for recycled water and creek flow. Based upon current conditions within the Creek and restrictions under permitting for project it is estimated that 14% of Creek flow may be diverted over 58% of the year resulting in a possible 8% reduction in bacteria loads.

Ozone Treatment

The Ozone treatment plant in Dana Point treats virtually 100% of dry weather runoff from Salt Creek above the creek's terminus at Monarch Beach (there may be short hour periods when maintenance occurs when the plant is treating the flows, but when operational the plant treats 100% of the dry weather flows. A recent presentation provided at the 2011 CASQA Conference, provided recent monitoring data collected by the City of Dana Point that shows substantial bacteria reductions based on influent (untreated) and effluent (treated) data (Table C-7). On average the Ozone and Trash separation BMP are 99% effective in dry weathers. The treatment plant has succeeded in significantly reducing the amount of beach postings at Monarch Beach & Salt Creek Beaches, so much so that they have been deleted from the 303(d) List for Bacterial Impairments for Recreational Use.

Table C-7. Influent and Effluent Data- Dana Point Ozone Treatment Plant

Bacteria Indicator		Untreated	Treated	Ocean Plan Standard	Design Parameters	% Removal
Total Coliform (MPN/100mL)	Min	2,400	4	10,000	9,000	
	Max	160,000	2,400			
	Ave	54,253	466			99
Fecal Coliform (MPN/100mL)	Min	240	2	400	360	
	Max	90,000	300			
	Ave	7,459	49			99
Enterococcus (MPN/100mL)	Min	111	1	104	93	
	Max	16,930	129			
	Ave	3,502	31			99

Bioretention

The California Stormwater Quality Association's "California Storm water BMP Handbook-New Development/Redevelopment," 2003, states that bioretention BMPs are highly effective at the removal of bacteria (90% removal rate). However, the handbook claims that as of 2003, there had been no bioretention BMPs put in place in California. The rating of this BMP was based on high success rates on the east coast. Bioretention BMPs rely on the infiltration of retained waters into the underlying soil. Any implementation of this BMP would need to consider constraints due to the type of soil and the need for a subdrain system.

1.4 Effective Bacteria BMPs

Irrigation Controllers

Irrigation control appears to be a potentially effective BMP in the reduction of fecal bacteria groups in receiving water, but need further monitoring and data analysis for verification. Two projects showing promising findings were the Prop 13 SmarTimer Evapotranspiration Irrigation Control Study and the SmarTimer Edgescape Evaluation Project (SEEP).

The Prop 13 SmarTimer study was a pilot project conducted in the J01P08 subwatershed in Aliso Creek to evaluate the reductions in runoff through irrigation controllers and the replacement of turf grass with low water use native vegetation landscapes. Project objectives were met with participation of ten percent of residential areas within the subwatershed. As part of a watershed wide BMP effectiveness statistical study *(Statistical Analysis of BMP Effect in the Aliso Creek Stream System, 2008)* a significant correlation was found between project BMP implementation and a reduction of bacteria at the J01P08 pipe.

The objective of the SEEP study was also to assess the effectiveness of implementing select irrigation control BMP strategies to decrease surface runoff/flow from overwatering. BMPs included: irrigation controllers, improved irrigation systems, pervious edgescaping, and drought tolerant plants. Further data is needed to verify BMP effectiveness but since an average of a 40% flow reduction was observed, a 40% reduction in bacteria loadings could be used as an estimate for predicting the performance of future water conservation projects.

Poche Creek UV sterilization

Poche Creek UV (ultraviolet) sterilization treatment site appears to be a promising BMP for reducing influent fecal bacteria groups as measured in effluent water. Unlike the J01P28 site, the Poche Creek site does not utilize clay and sand filters prior to UV treatment, which reduces necessary maintenance but diminishes the UV device's treatment potential. Initial data indicates that the Poche Creek UV treatment site is achieving 1 log removal of bacteria constituents, likely due to influent water's high Total Suspended Solids concentration.

Initially the effluent from the Poche Creek Treatment system like the Salt Creek Treatment system discharged into a scour pond prior to flowing to the ocean. Conclusions in *Improving*

Water Quality Through California's Clean Beach Initiative: An assessment of 17 projects, 2009 stated that UV sterilization effectiveness is also diminished if the structure is not placed at the terminus of the creek, or water is allowed to "pond" prior to discharge into the marine environment. Modifications to the Poche system have been made to discharge effluent directly to the ocean. An evaluation of the effectiveness of this system modification is ongoing.

Narco Channel Restoration Project (Sub-project to the Sulphur Solution project)

The Narco Channel Restoration project restored 1,000 feet of channel next to the Laguna Niguel Regional Park. The project dredged, widened, and terraced existing rock and earthen trapezoidal channel to provide habitat for flora and fauna. Native wetland vegetation was planted within the stream channel and native riparian vegetation was planted on the banks. Monitoring data conducted by the County of Orange in the summer of 2008 and 2009 showed reductions in bacteria concentrations when comparing samples taken upstream of the channel improvements to samples taken downstream. Bacteria reductions are as follows:

- total coliform 35%,
- fecal coliform 30%, and
- Enterococcus 40%

An analysis of 2009 project data by the City of Laguna Niguel shows that the project may have a higher effectiveness of bacteria removal than County monitoring originally indicated; this could be attributed to the establishment of vegetation and natural riverine processes at the site. The new data indicates that bacteria concentrations downstream of the restoration site has averaged 59% less than upstream since monitoring began in 2009. Due to the widened channel cross section and increased vegetative biofiltration area, the site has reduced wet weather flows by 10%. The 10% flow reduction in could help reduce bacteria loadings in wet weather by 10%.

Sand Filters

Sand filters were rated as an effective BMP in a recent article in Stormwater Magazine (*Can Stormwater BMPs Remove Bacteria? New Findings from the International Stormwater BMP Database*, May 2008), based on the performance of several sand filters throughout the region, and the nation. Three sand filters were included in the analysis. On average those filters showed an 81% reduction in the fecal coliform concentrations.

A sand filter treatment system was installed in the Aliso Creek watershed to treat run-off from the Munger Storm Drain. During the short time it was operational the Munger Sand Filter was able to effectively treat bacteria loadings from the drain (Table C-8), but only at well below its planned capacity. The Munger Drain Sand Filter is being redesigned to increase the treatments systems capacity.

Table C-8- Munger Sand Filter Performance					
Fecal Indicator Bacteria	Munger Drain Influent (Drain Outlet)	Influent Wet Well	Sand Filter Effluent	Sand Filter Efficiency % Removal	
				Relative to Munger Drain	Relative Filter Efficiency %Removal
	Geomean, CFU/100mL				
Total Coliform	17,652	30,427	1778	90	94
Fecal Coliform	1965	4214	300	85	93
Enterococcus	2645	4145	377	86	91

Upper Sulphur Creek Restoration Project

The City of Laguna Niguel restored a 1.5 mile segment of Upper Sulphur Creek located within the City of Laguna Niguel. The restoration project consisted of three areas: upper, central, and lower reaches. Key to the project was the central reach where the existing v-ditch channel was removed, the channel was widened, and native vegetation enhancements were implemented. Cumulatively enhancement and restoration efforts in the 1.5 mile project area segment decreased bacteria loadings by an estimated 56%.

J03P01 Restoration Project

Similar to the Upper Sulphur Restoration Project, the J03P01 drainage restoration project restored a 900 foot segment of creek by removing the existing v-ditch concrete channel, widening and re-grading the banks of the channel and implementing native vegetation enhancements. Effectiveness of the projects restoration efforts saw a decrease in fecal coliform concentrations by 30%.

Future Channel Restoration Projects

Two projects involving restoration along large segments of creeks within the Aliso Creek watershed are currently planned: the English Creek Aquatic Habitat Restoration Project, the Aliso Creek Ecosystem Restoration Project, and the Dairy Fork Restoration Project. When compared with the reductions observed as a result of the Narco Channel Restoration Project the planned activities are promising in their potential reduction of bacteria loadings.

The focus of the English Creek Aquatic Habitat Restoration Project is to promote aquatic and habitat restoration by increasing slope stabilization and structural modifications to prevent scour at bridge crossings and at storm drain outfalls along English Creek a tributary to Aliso Creek. The U.S. Army Corps of Engineers (USACE) is currently writing the Detailed Project Report (DPR) that will outline the chosen management measure for future design and construction.

The Aliso Creek Ecosystem Restoration Project area includes the mouth of Aliso Creek, and the Creek area from the South Coast Wastewater Authority Treatment Plant to Pacific Park Drive. The final baseline conditions report the project was completed in December 2009. The next phase of the study will look at a number of project alternatives. Project restoration efforts will

likely focus on grade stabilization, and enhancements to the riparian habitat to the lower 5 miles of the creek.

1.5 Low/Potentially Effective BMPs

BMPs identified as having low/potential effectiveness in the Aliso Creek watershed for bacteria are catch basin inserts and non-structural BMPs.

Catch Basin Inserts/Screens

Catch basin inserts and screens collect organic debris, sediment, and trash that would otherwise migrate to the creek/ocean and serve in providing bacteria a growth medium. A study by Laguna Niguel showed the catch basin screens were effective at reducing trash and particulate loads by about 85% for dry weather. Based on the catch basin's performance in filtering particulates bound by bacteria, it is being assumed that these BMPs can have a bacteria load reduction of up to 85%. However, a watershed wide BMP effectiveness statistical study did not identify any significant reductions in bacteria concentrations associated with catch basin insert installations in subwatersheds to Aliso Creek. Further study is needed to more clearly define catch basin insert effectiveness.

Non-structural BMPs

Based on a statistical analysis of BMPs effectiveness in the Aliso Creek watershed (*Statistical Analysis of BMP Effect in the Aliso Creek Stream System, 2008) using data from 2001-2007*, non-structural BMPs in the watershed were categorized as "not effective." Non-structural BMPs include activities such as street sweeping, inspections, and education and outreach. These activities attempt to reduce migration of materials and promote changes in behavior of residents that lead to the introduction of pollutants into local waterways. Evaluation for effectiveness of non-structural BMPs are more difficult to isolate and thereby quantify. Their implementation represents intuitive actions that would likely contribute to pollutant load reduction and should not be dismissed at this point. Changing behavior is a long-term commitment and the positive impacts from behavioral changes may not yet be seen in the receiving waters.

An analysis of Aliso Creek watershed progress form 2003-2009 has shown that substantial bacteria load reduction have occurred since watershed baseline conditions were established from 2001 to 2002 modeled conditions. Part of this watershed progress is assumed to be from non-structural activities.

1. Bacteria Pollutant Special Studies

In addition to BMP efforts special studies are important to understanding and controlling pollutant loading within a watershed. Through a literature review the following bacterial special studies were identified for the region. Additional efforts are expected to be important part of understanding effective strategies and development of pollutant load reduction plans.

Statistical Analysis of BMP effect in the Aliso Creek Watershed, Orange County and Neptune Inc., June 2008

The intent of this study was to conduct a statistical analysis on the effectiveness of dry weather BMP efforts within the Aliso Creek watershed using data collected in June– September in 2005 - 2007. This report concluded that the longer term non-structural BMPs (education and inspections) were not creating an observable impact while improvement was observed in relation to structural BMPs implementation (treatment facilities, wetland treatment, and irrigation controllers).

Identification of Retrofitting Opportunities Watershed HSPF Model Development Draft Report , Orange County Stormwater Program, December 2008

The intent of this modeling study was to propose BMP types and locations throughout the watershed that could be utilized in the reduction of bacteria/pollutants. Expected average reductions (based on industry standards) from BMPs were modeled with the Best Management Practice Evaluation module (BMPRAC) in HSPF for wet weather conditions. Additional information is needed to calibrate the model to improve its accuracy including: water quality storm monitoring data, land use specific monitoring, fecal pathogen data, and dry weather flow and concentration data. The results of the preliminary modeling indicate that implementation of all structural BMPs evaluated by the model for the Aliso Creek watershed would result in an average total load reduction of fecal coliforms of 10% during wet weather.

Microbial Source tracking in Small Urban Watershed Indicates Wild Animals and Growth as the Source of Fecal Bacteria, May 2007

Three independent microbial source tracking methods were applied in a subwatershed of the Aliso Creek during the summer of 2002. Fifty seven (57) samples were analyzed for human adenovirus and enterovirus, Enterococci and E.coli were tested for Antibiotic resistance analysis, and PCR for animal (human, domestic, and wild animal) specific toxin genes. E.coli toxin markers indicated the presence of toxin genes specific to bird, rabbit, and cow. The study concluded that bird, wild animal feces, soil amendments and fecal coliform regrowth in the storm drain are the primary sources of bacteria within the subwatershed.

Multi-tiered Approach Using Quantitative PCR to Track Sources of Fecal Pollution Affecting Santa Monica Bay, Feb. 2006

This study completed by SCCWRP and several other participants involved identifying the extent of types of microbial contamination in the Ballona Watershed. By using a series of approaches researchers were able to isolate the spatial area in the watershed that had high anthropogenic sources. This provided invaluable information for managers trying to balance regulatory burdens and public safety.

The study found consistently high levels of fecal bacteria throughout the Ballona Creek Watershed; no single tributary dominated fecal inputs. Human fecal inputs were detected 86% and enteroviruses 39% of the time. The results indicated the value and power in using a multi-tiered approach in the assessment and quantification of fecal contamination of freshwater in areas of high value beneficial uses.

Assessment of microbial contaminants pertinent to swimming related illnesses at Doheny Beach, Orange County, CA, SCCWRP 2007

Preliminary findings are that although elevated bacteria levels at the beach are believed to be non-anthropogenic in source, most likely due to the large population of seagulls at the mouth of the creek, a statistically significant correlation was found between elevated levels of indicators and reported swimmer illnesses.

Recreational Water Contact and Illness in Mission Bay CA, SCCWRP March 2005

This study could not find a correlation between high bacteria concentrations and human illnesses due to water contact (swimming) in Mission Bay. The study did find that sources of bacteria in Mission Bay were not of human origin, and were primarily from avian sources.

Enumeration and Speciation of Enterococci Found in Marine and Intertidal Sediments and Coastal Water in Southern California, Orange County Public Health Laboratory

This study found that there were high concentrations of bacteria within intertidal sediments at storm drain outfalls and that certain indicators, primarily Enterococci can subsist and regrow in the sediment and be re-suspended by wave action and tidal cycles. In addition Enterococci speciation testing found that 13.8% of all isolates tested were "environmental species" associated with plants and soils and rarely associated with human infection. This intertidal deposition could be partly responsible for bacteria exceedances and beach postings which may not correspond with recent fecal contamination.

San Juan Creek Study, Orange County Stormwater Program, March 2007 to October 2008

The purpose of this study was to investigate the lower portion and near-shore area of the San Juan Creek watershed in order to better characterize bacteria loads from natural sources and seasonal variances. The study had three main goals 1) to characterize and quantify the sources of baseline data (anthropogenic and natural sources), 2) to identify the locations of impairment(s) in the lower one mile stretch of creek, 3) aid stakeholders in the development of source reduction plans to meet future San Juan Creek bacteria TMDLs. Preliminary findings indicate three sources account for 57.6% of the variability and 98.4% of the overall sampled bacteria loading from the watershed. The native bird population in San Juan Creek accounts for the single largest percentage of bacteria variability and mass contribution in dry weather flows to the Pacific Ocean Shoreline at Doheny State Beach. The birds in San Juan Creek contributed 82.3% of the total Enterococci mass discharged to the Pacific Ocean, followed by influences from sediment bound bacteria re-suspension contributing 13.4% of the total mass, and the impaired section of San Juan Creek, the lowest one mile reach, contributing 2.70% of the Enterococci mass.

APPENDIX D:

Benefit Cost Analysis

Benefit Cost Analysis

As part of the San Clemente Coastal Streams Comprehensive Load Reduction Plan (CLRP) implementation strategy, a Benefit Cost Analysis was considered for planning bacteria Best Management Practice (BMP) implementation activities within the San Clemente Coastal Streams Watershed. BMPs included in this Benefit Cost Analysis were chosen due to their high level, or potentially high level of pollutant removal effectiveness based upon a 2009 literature review conducted in the nearby Aliso Creek Watershed (see Appendix C). These BMP types are to be used as a recommendation and may not be feasible watershed wide (i.e. land constraints, budget, City strategy).

The San Clemente Coastal Streams Benefit-Cost Analysis has 2 main objectives:

1. Compute the average cost of proposed Fecal Indicator Bacteria (FIB) BMPs based on existing information and the benefit of each proposed FIB BMP based on expected performance.
2. Calculate the Benefit-Cost Ratio of each BMP.

BMPs chosen for the benefit cost analysis include:

- Conservation- Irrigation Controller Retrofits and Improvements
- Structural – Constructed Wetland and Diversion Units
- Non-structural- Education and Outreach, Pet Waste Bags, Catch Basin Cleaning, and Street Sweeping
- Additional Studies- Watershed Microbial Source Tracking, Bacteria Attenuation Studies, Reference Watershed Studies, and Watershed Modeling.

All cost and effectiveness information for the BMP types listed above were collected from the Regional stakeholders and were intended to give average costs and effectiveness based on existing, or planned projects. A summary of cost information and effectiveness collected for each BMP type is as follows:

Conservation BMP Costs and Effectiveness

Irrigation Controllers – Planning, Operations and Maintenance (O&M), and capital costs for the implementation of irrigation controllers covering a 274 acre treatment area was used to determine the total cost of the water irrigation controller project for 1 and 25 years. Planning for the life of the project was estimated to be $300,000 (25 years), O&M for the replacement of irrigation controllers is $766,000 (25 years), and capital cost is $516,993 (25 years). The total 1 year cost is $816,993. Over 25 years the project cost is $1,583,043, or $63,322 annually per every 274 acres of treatment area. Irrigation controllers are assumed to have a dry weather effectiveness of a 40% reduction in bacteria load based on their ability to reduce dry weather flows by 40%.

Structural BMP Costs and Effectiveness

Constructed Wetlands – Planning and design¸ capital, and O&M costs, along with project treatment area were used to determine the total cost of a typical constructed wetland over 1 and 25 years. Costs were averaged based on the City of Laguna Niguel's WetCAT (Wetland Capture and Treatment Project) and the City of Aliso Viejo's Wood Canyon Emergent Wetland Project. The project sites have an average area of 418 acres. The average planning and design cost was $55,000 , the average O&M cost per year was $17,500, and the average capital cost was $301,500, which gives a total 1 year cost of $374,000. Over 25 years the project cost would be $794,000, or $31,760 annually per every 418 acres of treatment area. Based on influent and effluent monitoring of these wetland treatment BMPs, an average dry weather effectiveness of 95% was determined.

Diversions – Planning and design¸ capital, and O&M costs, along with the project treatment area and treatment capacity for each diversion unit was used to determine the total cost of a typical diversion over 1 and 25 years. Costs were averaged based on the City of Laguna Beach's Clean Beach Initiative Diversion unit project. Average treatment area for the 6 diversion units was 62 acres. The average planning and design cost was $36,250 , the average O&M cost per year was $7,624, and the average capital cost was $198,159, which gives a total 1 year cost of $242,033. Over 25 years, the project cost would be $425,009, or $17,000 annually per every 62 acre treatment area, for 75% of all flows (wet weather flows not diverted for treatment). Since 75% of all water is diverted and treated, the effectiveness of diversion units is assumed to be 75%reduction in dry weather bacteria loads. Note that unlike most cities within the Aliso Creek Watershed the City of Laguna Beach has its own sewer department and available capacity to send diverted drain runoff to the South Orange County Waste Water Authority at no added cost.

Non- Structural BMP Costs and Effectiveness

Non-Structural Program – Total annual non-structural program costs for the County of Orange, City of Aliso Viejo, City of Laguna Hills, and the City of Laguna Niguel were collected to develop a cost for a typical non-structural program in the Aliso Creek Watershed. The City of Aliso Viejo's non-structural program was used as a conservative estimate for anticipated costs for 1 and 25 years for their City area (3,611 acres). Total 1 year costs are $125,250 and 25 year costs would be $3,131,250, or $125,250 per year. In 2009, Neptune and Associates conducted a BMP effectiveness statistical analysis, which determined that a correlation between non-structural BMP activities and improved watershed water quality conditions was difficult to establish. The study concluded that additional monitoring would be needed to better characterize the effectiveness of watershed non-structural BMPs. As a conservative placeholder in the benefit cost analysis, 1% effectiveness has been assigned.

Additional Studies Costs and Effectiveness

Reference Watershed Study- A study is currently underway to provide data on bacteria, nutrients, and metals concentrations in natural reference watersheds (2011-2013 monitoring by SCCWRP). The total project cost for the region is estimated to be $1,751,268. The estimated total Aliso Creek cost share for 1 and 25 years is $300,000. The estimated 25 year annual Aliso Creek cost share for the study is $12,000. A 20% dry weather and 10% wet weather reduction of the bacteria TMDL compliance target for the entire TMDL watershed area (22,315 acres) is anticipated as a result of the study.

Watershed Modeling- Watershed wide modeling for the entire watershed (22,315 acres) is estimated to cost $300,000 for 1 and 25 years, and $12,000 annually for 25 years. It is assumed that modeling would give watershed stakeholders a better understanding of pollutant loadings, source, and transport, and could help reduce watershed pollutants by up to 10%. Watershed wide modeling would provide stakeholders with the needed tools to better assess the sources, transport, and fate of pollutant loads and the refinement of BMP implementation locations.

Benefit-Cost Ratio (B-C Ratio)

The Benefit Cost Ratio Table D-1, calculates the average cost per acre per percent removal. As an example, the average treatment wetland in the watershed has a one year cost of $391,500, treats 418 acres, and has a removal effectiveness of 95%. To find the Cost per Acre per % Removal uses the following calculation:

(1 year cost of $391,500 / by 418 acres) / 95% removal= $986 per Acre per % Removal

Results in this analysis can be found in Table D-1 under the 25-year and 1-year B-C Ratio columns.

Table D-1 Benefit-Cost Analysis for Dry Weather

Action	Annual Cost over 25 Years	1st Year Cost	Area Treated (acres)	Load Reduction %	25 Year Cost per Acre per % Removal	1st Year Cost per Acre per % Removal
Conservation						
SEEP Type BMPs	$ 63,322	$ 816,993	274	40%	$ 578	$ 7,454
Structural Measures						
Treatment Wetlands	$ 31,760	$ 391,500	418	95%	$ 80	$ 986
Diversion Units	$ 17,000	$ 242,033	62	75%	$ 366	$ 5,205
Non-Structural Measures						
Model Program	$ 3,131,250	$ 125,250	3611	1%	$ 86,714	$ 3,469
Additional Studies						
Reference Watershed Study	$ 12,000	$ 300,000	22,315	20%	$ 3	$ 67
Watershed Modeling	$ 12,000	$ 300,000	22,315	10%	$ 5	$ 134

NOTES

Cost: the total cost of the activity over a 25-year life cycle

Area Treated: in acres, the area to which the % load reduction is applied

% Load Reduction: how much the bacteria load is reduced

Cost per Acre per % Removal: Calculated by dividing cost by area and this result by load reduction

APPENDIX E:

Watershed Permittee Structural BMP Planning and Scheduling

TABLE E-1. COUNTY OF ORANGE STRUCTURAL BMP PLANNING AND SCHEDULING					
Project Name, Control Strategy, Location, and Targeted Pollutant(s)	**Structural BMP Objectives and Analysis**	**BMP Description, Construction Schedule, and Costs**	**BMP Effectiveness Assessment and Optimization Adjustments Dry Weather**	**BMP Effectiveness Assessment and Optimization Adjustments Wet Weather**	**BMP Maintenance Program Description and Costs**
Project Name: Poche UV Treatment System **Control Strategy:** On-site treatment and source control **Location**: **Targeted Pollutant:** Bacteria	**Objectives:** **Analysis:**	**Description:** **Drainage Area:** **Construction Schedule:** **Construction Costs:**	**Effectiveness:** **Optimization:**	**Effectiveness:** **Optimization:**	**Maintenance:** **Maintenance Costs:**

TABLE E-1. CITY OF SAN CLEMENTE STRUCTURAL BMP PLANNING AND SCHEDULING

Project Name, Control Strategy, Location, and Targeted Pollutant(s)	Structural BMP Objectives and Analysis	BMP Description, Construction Schedule, and Costs	BMP Effectiveness Assessment and Optimization Adjustments Dry Weather	BMP Effectiveness Assessment and Optimization Adjustments Wet Weather	BMP Maintenance Program Description and Costs
Project Name: Priority New Development Projects with WQMPs/Local Standard Stormwater Mitigation Plan (SSMP) and treatment control BMPs **Control Strategy:** On-site treatment and source control **Location**: Various **Targeted Pollutant:** All Stormwater Pollutants	**Objectives:** Reduce dry and wet weather stormwater pollutant loads from project sites. **Analysis:** WQMPs/SSMPs and treatment control BMPs ensure that adequate stormwater pollution prevention measures have been incorporated into priority development projects.	**Description:** Several projects with approved WQMPs containing structural treatment control BMPs and/or Low Impact Development (LID) principles have been approved or are being proposed. . **Drainage Area:** **Construction Schedule:** Ongoing **Construction Costs:** Varies project to project	**Effectiveness:** Since pre-developed conditions are natural and are assumed to meet dry weather load reductions, they are 100% effective at treating bacteria loads. LID practices are assumed conservatively to remove 85% of all flows and associated loads. When a natural area becomes developed, the existing 100% effectiveness becomes a -100% effectiveness, since pollutant sources are introduced and natural loadings are no longer baseline conditions. To calculate the new development LID effectiveness: (85% LID) + (-100% new development)= -15% effectiveness. **Optimization:** Varies project to project.	**Effectiveness:** Since pre-developed conditions are natural and are assumed to meet wet weather load reductions, they are 100% effective at treating bacteria loads. LID practices are assumed conservatively to remove 85% of all flows and associated loads. When a natural area becomes developed, the existing 100% effectiveness becomes a -100% effectiveness, since pollutant sources are introduced and natural loadings are no longer baseline conditions. To calculate the new development LID effectiveness: (85% LID) + (-100% new development)= -15% effectiveness. **Optimization:** Varies project to project.	**Maintenance:** Varies project to project, but for structural control BMPs includes removal of debris from systems and vaults on an annual basis, and for irrigation controls adjustment of sprinkler systems to prevent runoff. **Maintenance Costs:** Varies project to project.
Project Name: Priority Redevelopment Projects with WQMPs/Local Standard Stormwater Mitigation Plan (SSMP) and treatment control BMPs **Control Strategy:** On-site treatment and source control **Location:** Various **Target Pollutants:** All Stormwater Pollutants	**Objectives:** Reduce dry and wet weather stormwater pollutant loads from project sites. **Analysis:** WQMPs/SSMPs and treatment control BMPs ensure that adequate stormwater pollution prevention measures have been incorporated into priority development projects.	**Description:** Since 2001 a total of 35.2 acres have been implemented in Dana Point in San Juan Creek watershed) with WQMPs and BMPs and Low Impact Development (LID) principles, as applicable. **Drainage Area:** Approximately 35.2 acres were redevelopment. **Construction Schedule:** Complete. **Construction Costs:** Info not available.	**Effectiveness:** Treatment controls for stormwater are designed to meet the 85th percentile storm. It is assumed that LID BMPs could capture at least 85% for dry weather. An 85% dry weather load reduction of FIB is assumed. Procedures for verifying that applicable site design, source control and treatment control BMPs are required and implemented for Priority Development Projects were described and incorporated into the Local Implementation Plan (LIP). **Optimization:** New Development program in 2003 and updated to meet new Permit requirements in 2010. The City is largely built out, so the pace of New and Re-development is not rapid. Project by project assessment needed.	**Effectiveness:** Treatment controls for stormwater are designed to meet the 85th percentile storm. It is assumed that LID can potentially contain 85% of all site pollutants. An 85% wet weather load reduction of FIB is assumed. **Optimization:** Possible optimization through maintenance frequency and scheduling prior to rain events.	**Maintenance:** Varies project to project. **Maintenance Costs:** Varies project to project.

TABLE E-1. CITY OF SAN CLEMENTE STRUCTURAL BMP PLANNING AND SCHEDULING

Project Name, Control Strategy, Location, and Targeted Pollutant(s)	Structural BMP Objectives and Analysis	BMP Description, Construction Schedule, and Costs	BMP Effectiveness Assessment and Optimization Adjustments Dry Weather	BMP Effectiveness Assessment and Optimization Adjustments Wet Weather	BMP Maintenance Program Description and Costs
Project Name: Linda Lane Diversion **Control Strategy:** Off-site treatment control (diversion to sewer) **Location**: End of Linda Lane at the beach access point. **Targeted Pollutant:** All surface runoff and pollutants	**Objectives:** Installation of a nuisance water diversion in retrofit application as State grant funding was awarded. **Analysis:** All dry weather flows, including any constituents are diverted to the sanitary sewer instead of discharging to the receiving water in this 27 acre subwatershed.	**Description:** An underground structure with a valve that can divert flows to the sanitary sewer when valve is open. When valve is closed the flows drain to the storm drain as originally intended. Wastewater permit required through SOCWA, agreement with SCWD required and monthly monitoring and reporting is required. **Drainage Area:** Approximately 27 acres **Construction Schedule:** Completed December 2003 **Construction Costs:** Total $650,000 for diversion & trash separation unit.	**Effectiveness:** Dry weather flows and pollutant loads reduced 100%. **Optimization:** Extended operation season through rainy season during dry weather, as practical and feasible in regards to staff and budget constraints.	**Effectiveness:** Does not and cannot address wet weather flows (due to sanitary sewer capacity). **Optimization:** N/A	**Maintenance:** Monthly Monitoring & Reporting Annual Flow Meter Calibration/Equipment Maintenance **Maintenance Costs:** Treatment of Runoff: $0/month (less than 10,000 gal/day per agreement) Monthly Monitoring & Reporting: $200 + $100/month Calibration/Equipment Maintenance: $3500/year
Project Name: Riviera Diversion **Control Strategy:** Off-site source/treatment control **Location:** N 2118144.409 E 6125231.816 **Targeted pollutants:** Trash, organic debris & associated constituents, including bacteria & nutrients	**Objectives:** Installation of a trash separation unit in retrofit application as State grant funding was awarded. **Analysis:** Debris, sediment and associated constituents are removed from both wet and dry weather flows from the 372 acre subwatershed.	**Description:** Hydrodynamic separation unit which separates trash & debris and oil/grease from runoff via centrifugal force in an underground vault. **Drainage Area:** Approximately 372 acres. **Construction Schedule:** Completed April 2003. **Construction Costs:** Total $650,000 for diversion & trash separation unit	**Effectiveness:** No bacteria data. Effectiveness assumed to be 9% conservatively, for the reduction of FIB loads based on the City of Lake Forest's catch basin debris gate assumption. 65,000 lbs (32.5 tons) of debris is removed. **Optimization:** Cleaning schedule has been optimized through routine inspections which have provided basis for the amount of cleanings needed.	**Effectiveness:** No bacteria data. Effectiveness assumed to be 14% conservatively, for the reduction of FIB loads based on the City of Lake Forest's catch basin debris gate assumption. 65,000 lbs (32.5 tons) of debris is removed. **Optimization:** Cleaning schedule has been optimized through routine inspections which have provided basis for the amount of cleanings needed during wet weather. In general more cleaning are need during the wet season and the wetter the season.	**Maintenance:** In general, monthly cleanout and disposal of collected debris is conducted. **Maintenance Costs:** $2,945/ /cleaning annually = $35,000
Project Name: San Gabriel Diversion **Control Strategy:** Off-site source/treatment control **Location:** N 2116499.529 E 6124702.856 **Targeted pollutants:** Trash, organic debris & associated constituents, including bacteria & nutrients,	**Objectives:** Installation of a trash separation unit in retrofit application as State grant funding was awarded. **Analysis:** Debris, sediment and associated constituents are removed from both wet and dry weather flows from the 27 acre subwatershed.	**Description:** Hydrodynamic separation unit which separates trash & debris and oil/grease from runoff via centrifugal force in an underground vault. **Drainage Area:** Approximately 27 acres. **Construction Schedule:** Completed December 2003. **Construction Costs:** Total $650,000 for diversion & trash separation unit.	**Effectiveness:** No bacteria data. Effectiveness assumed to be 9% conservatively, for the reduction of FIB loads based on the City of Lake Forest's catch basin debris gate assumption. 65,000 lbs (32.5 tons) of debris is removed. **Optimization:** Cleaning schedule has been optimized through routine inspections which have provided basis for the amount of cleanings needed.	**Effectiveness:** No bacteria data. Effectiveness assumed to be 14% conservatively, for the reduction of FIB loads based on the City of Lake Forest's catch basin debris gate assumption. 65,000 lbs (32.5 tons) of debris is removed. **Optimization:** Cleaning schedule has been optimized through routine inspections which have provided basis for the amount of cleanings needed during wet weather. In general more cleaning are need during the wet season and the wetter the season.	**Maintenance:** In general, monthly cleanout and disposal of collected debris is conducted. **Maintenance Costs:** $2,945/ /cleaning annually = $35,000

TABLE E-1. CITY OF SAN CLEMENTE STRUCTURAL BMP PLANNING AND SCHEDULING

Project Name, Control Strategy, Location, and Targeted Pollutant(s)	Structural BMP Objectives and Analysis	BMP Description, Construction Schedule, and Costs	BMP Effectiveness Assessment and Optimization Adjustments Dry Weather	BMP Effectiveness Assessment and Optimization Adjustments Wet Weather	BMP Maintenance Program Description and Costs
Project Name: Water District "Smart Landscape" Rebate programs **Control Strategy:** On-site flow prevention source controls **Location:** Various **Target pollutants:** Irrigation runoff	**Objectives:** Water conservation and the elimination of landscape irrigation runoff. **Analysis:** Historically, 50%+ of potable water consumption within the region was by landscape irrigation, of which a significant portion was wasted as runoff. The elimination of Landscape irrigation runoff has been a goal of water supply agency conservation programs. Average savings for residential customers estimated at 49 gpd.	**Description:** Through the Municipal Water District of Orange County (MWDOC) in cooperation with SCWD, incentive programs relating to outdoor water conservation and the prevention of water waste (runoff) have been in effect since 2004/05. **Drainage Area:** 2.8 acres served by nozzles. **Construction Schedule:** Ongoing **Construction Costs:** Homeowner cost shared.	**Effectiveness:** Valves assumed to serve an average 750 square feet and reduce runoff by 40%, with equivalent reduction in bacteria and nitrogen discharge (based on SEEP study findings). **Optimization:** BMP proven to be effective for dry weather bacteria load reductions. Additional data would confirm trends.	**Effectiveness:** No anticipated wet weather benefits. **Optimization:** BMP not thought to be effective for wet weather.	**Maintenance:** Replacement of batteries and as needed maintenance. **Maintenance Costs:** Unknown.
Project Name: Prima Deshecha Canada Bio-Swale **Control Strategy:** On-site source/treatment control **Location:** Calle Nuevo at Los Mares to Calle Grande Vista at Avenida Vaquero **Targeted pollutants:** Fecal indicator bacteria Total dissolved solids Nutrients Trash Metals Organics Oil & grease	**Objectives:** The bioswale within the Prima Deshecha Canada watershed extends approximately 1.5 miles and parallels the concrete lined channel. In periods of dry weather a diversion gate is opened and all of the flow from the channel is diverted into the bioswale. The goal of the construction was to provide restoration as a permit condition of development. **Analysis:** The bioswale was analyzed as part of the 2010-11 Bacteria Source Identification Study performed by Weston Solutions. The study concluded that minor load reductions were observed. An enhancement and reconfiguration to the system to obtain better uptake through re-design and new plant palate would increase its effectiveness.	**Description:** The bioswale runs through the Shorecliffs golf course parallel to the concrete lined channel. It starts at the point where the channel daylights and runs 1.5 miles downstream, entering back into the channel roughly 0.4 miles from the ocean. **Drainage Area:** Approximately 5 acres. **Construction Schedule:** Completed **Construction Costs:**	**Effectiveness:** **Optimization:**	**Effectiveness:** **Optimization:**	**Maintenance:** Maintenance is confined to removing debris from the swale on a periodic basis for the life of the project. Plants are periodically replaced as needed. **Maintenance Costs:** Approximately $500 per month.

APPENDIX F:

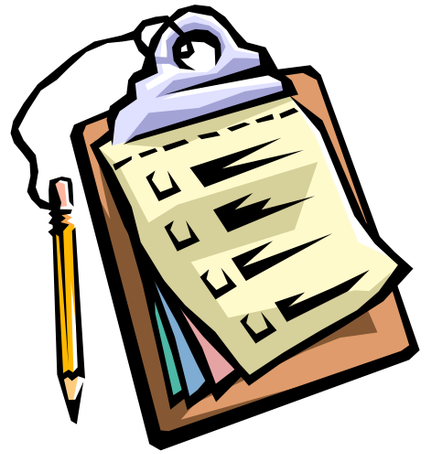
Watershed Permittee Non-Structural BMPs Planning and Scheduling

San Clemente Coastal Streams Watershed CLRP

The City of San Clemente, as the lead Watershed Permittee in the San Clemente Coastal Streams Watershed, has identified a number of preventative actions that involve management and source controls to address bacteria as well as other high priority constituents of concern in the San Clemente Coastal Streams Watershed. The following tables detail the Non-structural BMP Planning and Scheduling Component of the CLRP. The data that is included on the following tables is collected and reported annually as part of the Unified Annual Report.1

[1] The Unified Annual Report is available online at: http://www.ocwatersheds.com/DAMP_PEAreports.aspx

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Municipal fixed facilities and field programs – inventory, prioritization and BMP inspections		
Pollutants Addressed	Fertilizers, green wastes, pesticides, vehicle fuels, trash, bacteria.	
BMP Objectives and Analysis	Eliminate existing or potential stormwater pollutant loads from municipal fixed facilities and field program activities. Routine inspection of these properties and programs ensures the proper deployment and maintenance of BMPs.	
BMP Description	Municipalities own and operate numerous facilities, including maintenance yards, parks, office buildings, and other city properties. Model procedures for municipal fixed facility BMPs and field program BMPs have been developed to provide pollution prevention measures. These model procedures are incorporated into each City's Local Implementation Plan (LIP) and are posted on www.ocwatersheds.com/municipalactivities.aspx	
BMP Assessment and Optimization – Dry Weather	Overwatering, landscape maintenance, and vehicle fueling, cleaning, repair activities, and fire department training and maintenance activities present a few of the potential dry weather pollutant loads from municipal facilities. An inspection program helps ensure proper BMPs have been implemented to prevent impacts to surface water quality.	
BMP Assessment and Optimization – Wet Weather	Wet weather increases the potential for stormwater pollutant loads from municipal facilities. Inspection of facilities prior to the wet season should directly decrease the potential for wet weather pollutant laden discharges.	

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

San Clemente Coastal Streams Watershed - Municipal Fixed Facilities and Field Programs – Inventory, Prioritization and BMP Inspections					
Lead Entity	**Program Objectives and Outcomes**				**Local Implementation Plan Assessment**
	Number of High Priority Facilities Inspected Annually / Other Municipal Facilities Inspected As Needed		**Number of Facilities Lacking Adequate BMPs**		
	Baseline 2002-2003	***Reporting Year 2010-2011***	***Baseline 2002-2003[1]***	***Reporting Year 2010-2011***	
San Clemente	17 / 73	40 / 55	0	0	No formal City inspection program prior to 2003. Minimum BMPs defined in 2003. BMPs expanded in 2010 LIP update to include an Integrated Pest Management (IPM) Policy.

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Drainage Facility Operation and Maintenance		
Pollutants Addressed	Bacteria, sediment, nutrients, oil and grease, pesticides, other toxic compounds, and trash.	
BMP Objectives and Analysis	As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and storm water that may contain certain pollutants. Consequently these pollutants may accumulate in the system and must be removed periodically. In addition, the systems must also be maintained to function properly hydraulically to avoid flooding. Maintaining the system may involve the following activities: 1. Inspection and Cleaning of Stormwater Conveyance Structures, 2. Controlling Illicit Connections and Discharges, and 3. Controlling Illegal Dumping.	
BMP Description	Stormwater conveyance systems, including catch basins and dissipator basins, are inspected annually and cleaned as needed. Additionally, intermittent supplemental visual inspections and additional clean-outs are conducted during the wet season to determine if there are problem inlets where sediment/trash or other pollutants accumulate. Where field observations and/or monitoring data indicate significant problems, field investigations are conducted to detect and eliminate existing illicit connections and improper disposal of pollutants into the storm drain (i.e. identify problems where discharges or illegal connections may occur and follow up stream to determine the source(s)).	
BMP Assessment and Optimization – Dry Weather	Waste material removal decreases discharge of trash and other pollutants from all developed areas. During dry weather over watering, groundwater exfiltration, and vehicle washing provide the primary mode of transport of trash and other debris. This material collects in catch basins until the first storm event of the season. Collected debris provides a medium for bacteria propagation which can result in elevated bacteria concentrations in receiving waters, but do not directly correlate to human health risks. Frequent removal of waste material and the installation of debris gates should decrease storm drain bacteria concentrations and loads.	
BMP Assessment and Optimization – Wet	Wet weather first flush transports trash and other collected waste materials in MS4 structures into receiving waters. The removal of waste material from catch basins and other MS4	

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

Weather	structures prior to the wet season decreases the quantity of waste material that is transported to receiving waters. Removal of organic material should also provide some bacteria load reduction since the substrate is eliminated or reduced and therefore provide reduced propagation opportunities for bacteria.	

San Clemente Coastal Streams Watershed - Drainage Facility Operation and Maintenance

Lead Entity	Number of Catch Basins and Other MS4 Structures		Number of Catch Basins and MS4 Structures Inspected/Cleaned[1]		Linear Feet of MS4 Cleaned		Amount of Waste Material Removed from Catch Basins and MS4 Structures (tons)		Local Implementation Plan Assessment
	Baseline 2001-2002	*Reporting Year 2010-2011*	*Baseline 2001-2002*	*Reporting Year 2010-2011*	*Baseline 2001-2002*	*Reporting Year 2010-2011*	*Baseline 2001-2002*	*Reporting Year 2010-2011*	
San Clemente	1,263	2,205	954	1,911	34,320	18,955	5.6	15.5	Catch basins and other MS4 structures are inspected and maintained by the City Utilities department. Implementation has improved over the years and inspections are made of all catch basins and MS4 structures annually before October 1st and they are cleaned when needed.

Notes:
[1] Operation and Maintenance of Municipal Separate Storm Sewer System (MS4) and Structural Controls is conducted per Permit Requirement 3.a.(6)(b)(i-iv): (i) Inspection and removal of accumulated waste at least once a year between May 1 and September 30 of each year for all MS4 facilities; (ii) Additional cleaning as necessary between October 1 and April 30 of each year for facilities that receive or collect high volumes of trash and debris; (iii) Following two years of inspections, any MS4 facility that requires inspection and cleaning less than annually may be inspected as needed, but not less that every other year; (iv) Open channels must be cleaned of observed anthropogenic litter in a timely manner.

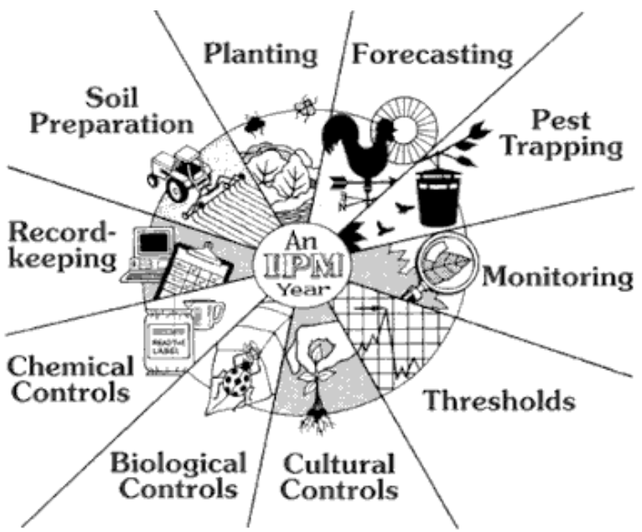
San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Street Sweeping		
Pollutants Addressed	Metal particulates, trash, and green wastes.	
BMP Objectives and Analysis	Street sweeping is a source control BMP, which removes litter and other pollutants at the source. Removal of metals, toxics, trash and debris from the street curb and prevents waste from being transported downstream to receiving waters.	
BMP Description	Street sweeping uses mechanical pavement cleaning practices to minimize pollutant transport to receiving water bodies. Mechanical broom and vacuum-assisted wet sweepers are estimated to reduce nonpoint pollution 5 to 30% and nutrient content up to 15%. Dry vacuum sweepers, being a newer design, have higher removal efficiencies with estimates ranging from 35 to 80% for nonpoint pollution and 15 to 40% for nutrient content. It is estimated that 90% of street contaminants will accumulate within 12 inches of the curb. *Sources: http://www.lowimpactdevelopment.org/ffxcty/2-5_streetsweeping_draft.pdf* *http://www.catchment.crc.org.au/pdfs/technical199908.pdf* *http://www.sandiego.gov/thinkblue/pdf/streetsweeppilotfinalreport.pdf*	
BMP Assessment and Optimization – Dry Weather	The City of San Diego conducted a Targeted Aggressive Street Sweeping Pilot study and found that vacuum sweepers were more effective in reducing storm water constituent concentrations than the mechanical and regenerative-air sweepers. The study further found that optimal load reductions were achieved by the vacuum machine at an aggressive, twice per week frequency. The mechanical sweeper was most effective at removing debris and contaminants at a less aggressive, once per week frequency.	
BMP Assessment and Optimization – Wet Weather	The City of San Diego's Street Sweeping Pilot study found that there was a 56% & 71% reduction in Total Copper, Lead and Zinc, using a mechanical and vacuum sweeper, respectively, in wet weather runoff compared to non-swept streets.	

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

San Clemente Coastal Streams Watershed – Street Sweeping							
Lead Entity	**Public Curb-Miles Swept**				**Amount of Waste Material Removed by Street Sweeping (tons)**		**LIP Assessment**
	Miles Swept in Watershed		**Frequency of Sweeping**				
	Baseline 2005-06	***Reporting Year 2010-11***	***Baseline 2005-06***	***Reporting Year 2010-11***	***Baseline 2001-2002***	***Reporting Year 2010-11***	
San Clemente	19,000	21,500	See Frequency in LIP Assessment	See Frequency in LIP Assessment	44.23	376	Street sweeping occurs twice per month in priority areas and monthly elsewhere in the City.

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Integrated Pest Management		
Pollutants Addressed	Sediment, nutrients, bacteria, organics, and pesticides	
BMP Objectives and Analysis	Integrated pest management (IPM) is a strategy that focuses on the long-term prevention of pests or their damage through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics. The techniques are utilized simultaneously to control pest populations in the most effective manner possible.	
BMP Description	IPM programs utilize monitoring techniques and economic thresholds to determine when to implement control strategies, which are then used according to established guidelines only after monitoring indicates that such treatment is appropriate. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms and the environment.	
BMP Assessment and Optimization – Dry Weather	Runoff from lawn and garden irrigation can transport pesticides down the streets through gutters into the storm drains. IPM uses a combination of biological, cultural, physical/mechanical and chemical management tools. In addition to public outreach and education regarding the proper use, storage and disposal of pesticides, in conjunction with water conservation, the Permittees conduct dry weather water quality monitoring to monitor for the following pesticides: Chlorpyrifos, Diazinon, Dichlorvos, Dimethoate, Disulfoton, Malathion, Bifenthrin, Cyfluthrin, Cypermethrin, L-Cyhalothrin and Permethrin.	
BMP Assessment and Optimization – Wet Weather	Stormwater runoff can transport pesticides down the streets through gutters into the storm drains. IPM uses a combination of biological, cultural, physical/mechanical and chemical management tools. In addition to public outreach and education regarding the proper use, storage and disposal of pesticides, the Permittees conduct wet weather water quality monitoring to monitor for the following pesticides: Chlorpyrifos, Diazinon, Dichlorvos, Dimethoate, Disulfoton, Malathion, Bifenthrin, Cyfluthrin, Cypermethrin, L-Cyhalothrin and Permethrin.	

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

San Clemente Coastal Streams Watershed – Integrated Pest Management										
Lead Entity	**Permittee Has Adopted IPM Policy**	**Program Objectives and Outcomes**								**Local Implementation Plan Assessment**
		Total Pounds of Active Ingredient Applied of:								
		Pyrethroid		**Organophosphate**		**Phenylpyrazole**		**Herbicide**		
		Baseline 2009-2010	***Reporting Year 2010-11***	***Baseline 2009-2010***	***Reporting Year 2010-11***	***Baseline 2009-2010***	***Reporting Year 2010-11***	***Baseline 2009-2010***	***Reporting Year 2010-11***	
San Clemente	Yes	0	0	0	0	0	0	165.5	240.4	The City continues to support moving away from reliance on pesticides by implementing its IPM program at all municipal facilities.

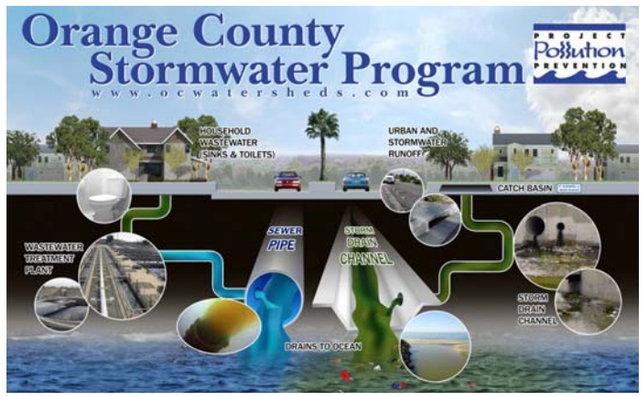
San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Fertilizer Management		
Pollutants Addressed	Sediment, nutrients, bacteria, organics, and pesticides.	
BMP Objectives and Analysis	Fertilizers are nutrients applied to soil or plants to promote plant growth or health. Fertilizers commonly used in landscapes contain both nitrogen and phosphorus. Soluble forms of nitrogen and phosphorus can leach through soils or move off-site in surface runoff causing algal blooms or eutrophication within the local waterways. Fertilizers also play an important role in promoting plant growth that protects soil from erosion and enhances landscape aesthetics. Because of the necessity for soil nutrients and the potential for adverse effects on local waterways due to the loss of these nutrients through runoff and leaching management guidelines are necessary as a means of reducing the loss of fertilizers into water bodies.	
BMP Description	Foliar and soil analysis should be utilized whenever possible to assist in the determination of the nutrient status of plants and the soil where they are growing. Nutrient testing can be an important management tool for determining baseline nutrient levels in order to adjust application rates appropriately.	
BMP Assessment and Optimization – Dry Weather	Runoff from lawn and garden irrigation can transport fertilizer down the streets through gutters into the storm drains. In addition to public outreach and education regarding the proper use, storage and disposal of fertilizer, in conjunction with water conservation, the Permittees conduct dry weather water quality monitoring to monitor for nutrients and phosphorus.	
BMP Assessment and Optimization – Wet Weather	Stormwater runoff can transport fertilizer down the streets through gutters into the storm drains. In addition to public outreach and education regarding the proper use, storage and disposal of fertilizer, the Permittees conduct wet weather water quality monitoring to monitor for nutrients and phosphorus.	

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

San Clemente Coastal Streams Watershed – Fertilizer Management							
Lead Entity	**Program Objectives and Outcomes**						**Local Implementation Plan Assessment**
	Acres of Land Treated with Fertilizer		**Total Pounds of Active Ingredient Applied of:**				
			Nitrogen		**Phosphorus**		
	Baseline 2001-2002	***Reporting Year 2010-11***	***Baseline 2001-2002***	***Reporting Year 2010-11***	***Baseline 2001-2002*[1]**	***Reporting Year 2010-11***	
San Clemente	245	325	24,911	13,528	3,725	5,516	The City has continued to decrease its reliance on the use of fertilizers by encouraging the use of drought tolerant landscaping and other conservation measures.

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

EXISTING NON-STRUCTURAL BMPS – MUNICIPAL ACTIVITIES		
Resident and Business Education and Outreach		
Pollutants Addressed	Bacteria, sediment, nutrients, oil and grease, pesticides, other toxic compounds, and trash.	
BMP Objectives and Analysis	Project Pollution Prevention is the model public education and outreach campaign of the Orange County Stormwater Program. It is built upon a foundation of cooperative Permittee development of programs and materials, implementation at Countywide and city levels, and the validation of its success through the use of opinion surveys and other direct and indirect measures of public knowledge and behavior.	
BMP Description	Outreach to resident and businesses includes development of materials that focus on specific pollutants of concern, stormwater topics, or target specific audiences. At a minimum, all of the program materials: • Explain the difference between the storm drain and sanitary sewer system, and emphasize that water in the storm drain does not receive treatment before entering our waterways. • Focus on specific pollution-causing behaviors and address them directly to increase the likelihood of changing those behaviors and reducing pollution. • Emphasize the relevant impact of stormwater pollution to the target audience. • Include a positive alternative to pollution-causing behaviors. • Tailor the personality, focus and depth of program messages appropriately for each audience and venue. • Include a hotline number to call to report water pollution problems.	
BMP Assessment and Optimization – Dry Weather	The principal means of both evaluating the effectiveness *Project Pollution Prevention* and informing the ongoing development of the campaign is the use of telephone public opinion surveys, which are conducted every three years. Responses to the 2009 Survey indicated incremental and statistically significant changes in behavior and increases in awareness since the 2005 Survey. Responses to the 2009 Survey indicated that Orange County residents were more willing than in previous surveys to undertake behaviors protective of water quality. These behaviors included picking up pet waste and disposing of it properly. Those taking part in all seven identified “protective behaviors” increased by almost one-third.	
BMP Assessment and Optimization – Wet Weather		

San Clemente Coastal Streams Watershed Permittee Non-structural BMP Planning and Scheduling

San Clemente Coastal Streams Watershed – Resident and Business Education and Outreach									
Lead Entity	**Program Objectives and Outcomes**								**Local Implementation Plan Assessment**
	Percentage of Catch Basins Stenciled with "No Dumping Drains to Ocean" or Similar Phrase		**Number of Hotline Calls or Other Reports of Illegal Dumping Cases Reported**		**Number of Resident and Business Impressions**		**Number of Doggy Waste Bags Distributed**		
	Baseline 2005-2006	***Reporting Year 2010-11***	***Baseline 2001-2002***	***Reporting Year 2010-11***	***Baseline 2001-2002***	***Reporting Year 2010-11***	***Baseline 2001-2002***	***Reporting Year 2010-11***	
San Clemente	100%	100%	10	95	31,500	3,175,481	NR	270,000	Catch basin stenciling and hotline reporting have been ongoing since prior to 2001. Public educational efforts by the City increased in response to the 2002 Permit. Dog waste bag dispensers began have been installed and are stocked at City sites with high use and need such as along the San Clemente Beach Trail.

Memorandum
Engineering Division

November 8, 2012

To: Coastal Advisory Committee (CAC)
From: Tom Bonigut, Assistant City Engineer
Subject: Potential Meeting with Coastal Commission Staff

At its September 2012 meeting, the CAC expressed interest in a potential meeting with Coastal Commission staff, and agreed to agendize this item for formal discussion. Key items for the CAC to discuss include:

- Clarify the goal/purpose of the meeting
- Develop specific meeting topics. At its September 2012 meeting possible topics included:
    - Overview/background of the CAC including mission
    - Key activities of the CAC
    - Poche plan and issues
- Identify the 2-3 CAC members that would attend

If after this discussion the CAC determines that it would like to schedule a meeting with Coastal Commission staff, City staff will provide an update to the City Manager and City Council. As the CAC would be representing the City and is an advisory body to the City Council, the City Council must be afforded the opportunity to concur with such a meeting and also to identify any Councilmembers that may wish to also join this meeting.

Excellence
Integrity
Service

COUNTY OF ORANGE
HEALTH CARE AGENCY/ENVIRONMENTAL HEALTH
SOCWA (Doheny Outfall) Ocean Bacteriological Monitoring Program

Enterococcus (ENT), Fecal Coliform (FC), Total Coliform (TC) Colony Forming Units / 100 ml Sample
NS – NOT SAMPLED
Date posted: 11/1/12

Beach Name	Lab	StationID	Location	Type	9/20/2012	9/24/2012	9/27/2012	10/1/2012	10/4/2012	10/8/2012	10/10/2012	10/15/2012	10/17/2012
San Clemente	RA	S-15	Poche Beach	Enterococcus	=120	=10	=340	=490	>2000	=40	>2000	=1000	=380
San Clemente	RA	S-15	Poche Beach	Fecal Coliforms	=720	=20	=280	=6800	>2000	=20	>2000	=400	=130
San Clemente	RA	S-15	Poche Beach	Total Coliforms	=420	=40	=240	=2800	>2000	=30	>2000	=640	=240
San Clemente City Beach	RA	S-17	North Beach	Enterococcus	=50	<10	<10	<10	=60	<10	=10	=60	=12
San Clemente City Beach	RA	S-17	North Beach	Fecal Coliforms	=70	<10	=30	<10	=30	<10	=10	=40	=16
San Clemente City Beach	RA	S-17	North Beach	Total Coliforms	=80	=10	=50	=60	=60	<10	=40	=60	>10
San Clemente City Beach	RA	S-19	450' North of Pier	Enterococcus	=130	=20	=50	=50	=50	=20	<10	=210	=10
San Clemente City Beach	RA	S-19	450' North of Pier	Fecal Coliforms	=60	=90	<10	=56	=30	=120	=50	=380	=120
San Clemente City Beach	RA	S-19	450' North of Pier	Total Coliforms	=300	=80	=30	=30	=50	=70	=10	=760	=310
San Clemente State Beach	RA	S-21	Avenida Calafia	Enterococcus	=20	=4	=18	=2	=42	<2	=2	=110	=410
San Clemente State Beach	RA	S-21	Avenida Calafia	Fecal Coliforms	=10	=20	=26	=6	=28	=4	=6	=190	=560
San Clemente State Beach	RA	S-21	Avenida Calafia	Total Coliforms	=40	=10	=36	=6	=10	=10	=6	=200	>660
San Clemente State Beach	RA	S-23	Las Palmeras	Enterococcus	=50	=4	=8	=150	=20	=2	<2	=40	=10
San Clemente State Beach	RA	S-23	Las Palmeras	Fecal Coliforms	=10	=2	=2	=22	=8	<2	<2	=70	=2
San Clemente State Beach	RA	S-23	Las Palmeras	Total Coliforms	=20	<2	<2	>20	=2	<2	=9	=120	=2

AB411 Single Sample Standards	
Total Coliforms	10,000
Fecal Coliforms	400
Enterococci	104
Fecal to Total Coliform ratio	1,000 total coliform, if ratio exceeds 0.1
AB411 30-Day Geometric Mean Standards	
Total Coliforms	1,000
Fecal Coliforms	200
Enterococci	35

All values expressed in cfu/100 ml.

CITY OF SAN CLEMENTE ● ENVIRONMENTAL PROGRAMS

SEPTEMBER 2012 CLEAN OCEAN PROGRAM UPDATE

7.B.

Meetings

9/11	Watershed Task Force Meeting	(D.McIntosh)
9/13	Coastal Advisory Committee Meeting	(T.Bonigut)
9/17	CR&R South County Recycling Coordinators Meeting	(D.McIntosh)
9/20	County of Orange Recycling Coordinator's Meeting	(D.McIntosh)

Public Outreach

	EVENTS	
September	Tour of San Clemente City Sewage Treatment Facility - 65 Students	(J.Elston)
9/7	Art Auction Watershed	(D.McIntosh)
9/15	Coastal Clean-up Day	(D.McIntosh)
9/29	National Drug Take Back Day	(D.McIntosh)
	PRINT	
9/27	San Clemente Times ad, "You Wouldn't Wash Your Car In The Ocean..."	
9/13	San Clemente Times ad, "Overwatering"	
	INTERNET	
9/1-30	City of San Clemente www.san-clemenete.org - hq camera page "Only Rain Down the Drain"	
9/1-30	City of San Clemente www.san-clemenete.org- "Remember, Only Rain Down the Drain"	
	TELEVISION/MEDIA EXPOSURE	
9/3,10,17,24	Community Calendar, Cox Ch. 30 - Universal Waste Collection Service	
9/3,10,17,24	Community Calendar, Cox Ch. 30 - What To Do If You See A Spill	
September	Cox Channel 30 - Curiosity Quest - videos various episodes	
September	Cox Channel 30 - Trash in the Pacific with Captain Charles Moore video	
On going	PSA- Public Service Announcement on Cox Ch. 30, "The Ocean Begins at Your Front Door - Litter"	
On going	PSA- Public Service Announcement on Cox Ch. 30, "The Ocean Begins at Your Front Door - General"	

Staff Training

8/15	California's 75% Recycling Goal seminar	(D.McIntosh)

Storm Drain Maintenance Program

Catch Basins Cleaned	76
Storm Drain Line Inspected	810 linear ft.

Street Sweeping Program

Material Collected/Recycled:	40,880 lbs. debris (20.44 tons)
# of Parking Citations Issued:	469

Water Quality Code Compliance

Verbal Warnings	0
Notices of Non-Compliance	4
Administrative Citations	3
Stop Work	0

Water Quality Inspections

Grease Interceptor (GI)	6
WQMP	31

Recycling & Solid Waste Program

Red Tag Violation Warnings	297
Waste Management Plans	57
Complaints and Calls Received	301
Abandoned Bulky Item Requests	186

Attachments

July	City of San Clemente 2012 Solid Waste & Recycling Tons Summary July Report.
September	City of San Clemente Environmental Code Enforcement Action September 2012 Reports
9/27	San Clemente Times ad, "You Wouldn't Wash Your Car In The Ocean..."
9/13	San Clemente Times ad, "Overwatering"

CR&R

CITY OF SAN CLEMENTE 2011-2012

SOLID WASTE & RECYCLING TONS SUMMARY REPORT

JULY 2012

RESIDENTIAL

MONTH	CURBSIDE DIVERTED	CURBSIDE LANDFILLED	CURBSIDE DIVERSION %	7000 MULTI FAM DIVERTED	MULTI FAM LANDFILLED	MULTI FAM DIVERSION %	TOTAL RESI DIVERSION %
Jul-11	1,332.96	1,609.42	45.30%	171.28	162.65	51.29%	45.91%
Aug-11	1,416.77	1,738.99	44.89%	174.18	165.39	51.29%	45.52%
Sep-11	1,354.38	1,617.98	45.57%	157.85	149.90	51.29%	46.10%
Oct-11	1,335.40	1,389.36	49.01%	167.65	159.21	51.29%	49.25%
Nov-11	1,261.62	1,670.33	43.03%	151.32	143.69	51.29%	43.79%
Dec-11	1,120.63	1,565.98	41.71%	154.01	146.25	51.29%	42.67%
Jan-12	1,189.99	1,598.50	42.68%	147.65	140.21	51.29%	43.48%
Feb-12	1,084.42	1,406.11	43.54%	142.22	135.05	51.29%	44.32%
Mar-12	1,191.97	1,509.27	44.13%	165.41	157.08	51.29%	44.89%
Apr-12	1,215.62	1,477.48	45.14%	158.84	150.84	51.29%	45.77%
May-12	1,391.58	1,670.04	45.45%	142.46	135.29	51.29%	45.94%
Jun-12	1,274.83	1,622.16	44.01%	159.07	151.05	51.29%	44.71%
Jul-12	1,053.47	1,761.26	37.43%	148.56	141.08	51.29%	38.72%
2012 YTD TOTAL	8,401.88	11,044.82	**43.20%**	1,064.21	1,010.60	**51.29%**	**43.98%**

COMMERCIAL

MONTH	2030 COMMERCIAL DIVERTED	COMMERCIAL ROLL OFF DIVERTED	PUBLIC WORKS	BIO SOLIDS	SELF HAUL GREENWASTE	TOTAL COMMERCIAL DIVERTED	COM DIRECT LANDFILLED	COMM ROLL OFF RESIDUE/DIRECT LANDFILLED	TOTAL COMMERCIAL LANDFILLED	TOTAL COM DIVERSION %
Jul-11	128.50	216.42	0.00	219.92	265.77	830.61	869.71	79.36	949.07	46.67%
Aug-11	141.55	181.25	150.50	333.10	265.77	1,072.17	960.92	153.76	1,114.68	49.03%
Sep-11	125.49	201.41	95.63	282.75	265.77	971.05	858.40	101.73	960.13	50.28%
Oct-11	114.19	196.89	201.93	327.59	293.89	1,134.49	888.74	140.10	1,028.84	52.44%
Nov-11	129.98	164.04	104.81	306.37	293.89	999.09	904.98	94.68	999.66	49.99%
Dec-11	129.94	221.33	202.82	412.03	293.89	1,260.01	901.76	62.01	963.77	56.66%
Jan-12	137.89	166.08	123.54	373.56	236.23	1,037.30	904.36	124.53	1,028.89	50.20%
Feb-12	118.53	183.99	134.56	329.68	236.23	1,002.99	900.55	112.87	1,013.42	49.74%
Mar-12	120.40	176.37	97.81	373.63	236.23	1,004.44	953.75	108.56	1,062.31	48.60%
Apr-12	130.13	146.00	174.31	265.19	0.00	715.63	931.57	137.05	1,068.62	40.11%
May-12	135.29	101.61	93.61	285.86	0.00	616.37	985.44	106.71	1,092.15	36.08%
Jun-12	136.33	144.43	44.44	285.94	0.00	611.14	997.55	118.73	1,116.28	35.38%
Jul-12	126.34	116.36	21.94	309.30	0.00	573.94	983.20	124.15	1,107.35	34.14%
2012 YTD TOTAL	904.91	1,034.84	690.21	2,223.16	708.69	**5,561.81**	6,656.42	832.60	**7,489.02**	**42.62%**

INCLUDES MRF DIVERTED & SOURCE SEPARATED

C&D PROCESSING

PRIMA SELF HAUL

MONTH	4060 CR&R SJC MRF DIVERTED	CR&R SJC MRF LANDFILLED	4060 CRT STANTON DIVERTED	CRT STANTON LANDFILLED	4060 SOURCE SEPARATED C&D DIVERTED	ROLL OFF LANDFILLED	TOTAL C&D DIVERSION %	PRIMA SELF HAUL DIVERTED	PRIMA SELF HAUL LANDFILLED	TOTAL PRIMA DIVERSION %
Jul-11	281.58	116.48	0.00	0.00	82.46	99.56	62.76%	509.71	123.55	80.49%
Aug-11	232.56	96.01	0.00	0.00	135.38	7.35	78.07%	459.13	108.89	80.83%
Sep-11	333.34	118.34	0.00	0.00	101.08	25.32	75.15%	360.42	85.04	80.91%
Oct-11	320.32	109.37	3.48	0.41	65.21	12.19	76.13%	425.88	95.77	81.64%
Nov-11	248.89	87.13	0.00	0.00	192.34	32.52	78.67%	323.32	69.07	82.40%
Dec-11	357.69	132.78	0.00	0.00	85.15	68.46	68.76%	275.56	54.81	83.41%
Jan-12	337.68	96.26	0.00	0.00	47.52	14.89	77.61%	254.05	60.88	80.67%
Feb-12	409.82	126.79	0.00	0.00	95.37	13.86	78.22%	199.61	41.35	82.84%
Mar-12	280.77	95.45	6.01	0.70	116.22	0.63	80.64%	279.48	68.22	80.38%
Apr-12	200.18	81.04	0.00	0.00	73.19	4.12	76.25%	255.42	60.30	80.90%
May-12	320.68	118.59	0.00	0.00	130.27	10.26	77.78%	283.14	68.56	80.51%
Jun-12	235.86	90.83	0.00	0.00	130.34	9.90	78.43%	450.48	111.64	80.14%
Jul-12	407.70	119.65	0.00	0.00	63.92	3.65	79.27%	336.42	83.06	80.20%
2012 YTD TOTAL	2,192.69	728.61	6.01	0.70	656.83	57.31	**78.40%**	2,058.60	494.01	**80.65%**

OVERALL TOTAL

MONTH	TOTAL RECYCLED	TOTAL LANDFILLED	OVERALL DIVERSION	3040 FOOD WASTE PROGRAM
Jul-11	3,223.53	3,060.73	**51.30%**	14.93
Aug-11	3,504.78	3,231.31	**52.03%**	14.59
Sep-11	3,291.76	2,956.71	**52.68%**	13.64
Oct-11	3,465.75	2,795.15	**55.36%**	13.32
Nov-11	3,187.45	3,002.40	**51.49%**	10.87
Dec-11	3,262.81	2,932.05	**52.67%**	9.76
Jan-12	3,024.07	2,939.63	**50.71%**	9.88
Feb-12	2,941.13	2,736.58	**51.80%**	6.70
Mar-12	3,054.22	2,893.66	**51.35%**	9.92
Apr-12	2,628.20	2,842.40	**48.04%**	9.32
May-12	2,893.45	3,094.89	**48.32%**	8.95
Jun-12	2,870.94	3,101.86	**48.07%**	9.22
Jul-12	2,593.07	3,216.05	**44.64%**	9.06
12 MO TOTAL	**36,717.63**	**35,742.69**	**50.67%**	**125.23**
2012 YTD TOTAL	**20,005.08**	**20,825.07**	**49.00%**	**63.05**

THIS REPORT REFLECTS THE MOST UP-TO-DATE INFORMATION FOR ALL MONTHS LISTED.

City of San Clemente

Chronology by Officer Case Type and Action Type

For the Period 9/1/2012 thru 9/30/2012

Case No.	Case Name	Site Address	Watershed
Date Opened	Case Type	Parcel No.	
Status	Sub-Type		

ENV-HYDROCARBONS

ENV2012-0071 **15031**

9/18/2012	ENVIRONMENTAL	2016 S El Camino Real	M00
COMPLAINT TAKEN	ENV-HYDROCARBONS	690-443-02	

Date	*Action Type*	*Action Notes*
9/18/2012	NOTICE OF NON-COMPLIANCE	(9/19/2012 7:57:39 AM BH) Action Created (9/19/2012 7:57:39 AM BH) Advised to: 1) Discontinue all prohibited discharges to the MS4. 2) Implement and have all contractors implement proper required cleaning BMPs. **Vactor cleaned grease out of alley. Hapa J's to be back billed.

1 Sub Total **ENV-HYDROCARBONS**

ENV-PATHOGENS/COLIF

ENV2012-0077 **15058**

9/25/2012	ENVIRONMENTAL	700 S El Camino Real	M00
COMPLAINT TAKEN	ENV-PATHOGENS/COLIF	692-142-43	

Date	*Action Type*	*Action Notes*
9/25/2012	NOTICE OF NON-COMPLIANCE	(9/27/2012 8:32:53 AM JT) Action Created (9/27/2012 8:32:53 AM JT) The owner was advised to make necessary repairs to prevent further harm to the environment. He was also told that the streets would be cleaned and he would be responsible to pay for the clean up.

1 Sub Total **ENV-PATHOGENS/COLIF**

ENV-SEDIMENT

ENV2012-0070 **15097**

8/8/2012	ENVIRONMENTAL	170 AVENIDA DE LA PAZ	M00
COMPLAINT TAKEN	ENV-SEDIMENT	057-062-26	

Date	*Action Type*	*Action Notes*
9/12/2012	$100 ADMIN CITATION ISSUED	(9/12/2012 10:59:43 AM BH) Action Created (9/12/2012 10:59:43 AM BH) Advised to: implement proper required erosion control bmps on vacant lot to assure copliance with city code by 9/26/12 or fine of $200 will be imposed.

ENV2012-0072 **15056**

9/21/2012	ENVIRONMENTAL	603 S El Camino Real	M00
COMPLAINT TAKEN	ENV-SEDIMENT	692-411-01	

Date	*Action Type*	*Action Notes*
9/21/2012	$100 ADMIN CITATION ISSUED	(9/24/2012 8:22:11 AM JT) Action Created (9/24/2012 8:22:11 AM JT) He was asked to clean the sediment from the street to the storm drain.

ENV2012-0078 **15109**

9/26/2012	ENVIRONMENTAL	170 AVENIDA DE LA PAZ	M00
COMPLAINT TAKEN	ENV-SEDIMENT	057-062-26	

Date	*Action Type*	*Action Notes*

Case No.	Case Name	Site Address	Watershed
Date Opened	Case Type	Parcel No.	
Status	Sub-Type		

9/26/2012	$200 ADMIN CITATION ISSUED	(9/28/2012 10:28:50 AM BH) Action Created (9/28/2012 10:28:50 AM BH) Advised to: implement proper required erosion control BMPs on vacant lot at 170 Ave La Paz by Monday, October 1, 2012 or fine of $500 will be imposed.

3 Sub Total **ENV-SEDIMENT**

ENV-TRASH AND DEBRIS

ENV2012-0079 **15110**

9/26/2012	ENVIRONMENTAL	110 N El Camino Real	M00
COMPLAINT TAKEN	ENV-TRASH AND DEBRIS	058-081-22	

Date	*Action Type*	*Action Notes*
9/26/2012	NOTICE OF NON-COMPLIANCE	(9/28/2012 10:48:43 AM BH) Action Created (9/28/2012 10:48:43 AM BH) Advised to 1) clean all trash and debris off the ground and place in refuse container. 2) Implement proper required house keeping BMPs. 3) discontinue all prohibited discharges to the MS4.

1 Sub Total **ENV-TRASH AND DEBRIS**

ENV-WASTEWATER

ENV2012-0080 **15111**

9/25/2012	ENVIRONMENTAL	207 S El Camino Real	M00
COMPLAINT TAKEN	ENV-WASTEWATER	692-402-08	

Date	*Action Type*	*Action Notes*
9/25/2012	NOTICE OF NON-COMPLIANCE	(9/28/2012 2:58:00 PM BH) Action Created (9/28/2012 2:58:00 PM BH) Advised to: 1) Discontinue all prohibited discharges to the MS4. 2) Implement proper required cleaning BMPs.

1 Sub Total **ENV-WASTEWATER**

7 Total of ALL Actions

Memorandum
Engineering Division

November 8, 2012

To: Coastal Advisory Committee
From: Mary Vondrak, Senior Management Analyst
Subject: Potential Future Agenda Items

The following is a list of potential topics that the CAC is considering for future meetings, based on input from CAC members during prior meetings.

December

1. NPDES MS4 Audit Results and Recommendations (tentative)
2. Pharmaceutical Collection -- Drop Box

January

1. Sustainable Purchasing Policy (tentative)

In addition to the above, the CAC discussed the potential to agendize discussions on a possible plastic bag ban and street sweeping program changes.