

SECTION C-3

PLAN DEVELOPMENT

**PROGRAM EFFECTIVENESS ASSESSMENT
2013-14**





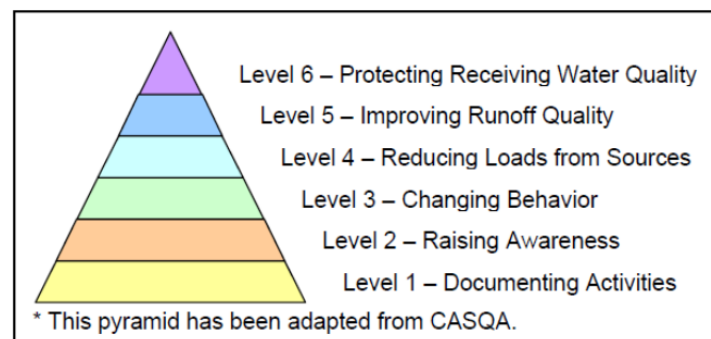
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C-3.0 Plan Development

C-3.1 Introduction (LIP Section A-3.1)

This section provides information on the approach taken by the County in developing and implementing its stormwater program. This section also discusses a number of studies that the County is participating in that will assist in achieving improvements in water quality in the future.

As described in detail in **Section C-2.5** of this PEA, the County utilizes the CASQA method of effectiveness assessment in order to demonstrate if program elements, activities, BMPs, etc., are resulting in desired outcomes. CASQA identifies six Outcome Levels (see pyramid below) and for each measure the County reports, the associated Outcome Level (more than one level may apply) is indicated by a colored triangle with a number.



C-3.2 Plan Development (LIP Section A-3.2)

The complexity of the Third Term Permits (and subsequently the Fourth Term Permits) necessitated the development of the LIP in order to provide a County-specific plan within the broader policy and program framework of the 2003 DAMP. The LIP focuses predominantly on the jurisdictional implementation of the model pollution prevention-oriented programs detailed in the 2003 DAMP. The County LIP is a dynamic document that is evaluated on a continuing basis by the County.

As implementation of pollution prevention programs has taken place and evolved, so too has the LIP. The County's stormwater program management has worked closely with all departments to ensure that the goals of the program are met in concert with the County's overall mission of providing and maintaining valuable resources and services to its residents. As County departments have used stormwater inspection forms, implemented model maintenance procedures and BMPs, completed environmental performance reports, etc., they have provided important feedback which has allowed program management to adjust the plan to refine parts of the program that may not be working optimally while continuing forward with elements that are effective.

C-3.3 BMP Effectiveness Investigations (LIP Section A-3.3)

An important element of the County's LIP is the implementation of additional/enhanced BMPs and/or the refinement of BMPs within the DAMP programs. The tables that follow list the BMP projects and BMP investigations implemented since the issuance of the Third Term MS4 Permits in 2002 and the Fourth Term Permits in 2009.



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Summary of County BMP Projects and Investigations

BMP/Project	Initiated (Reporting Period)	Completed (Reporting Period)	Projected completion	Watershed	CASQA Outcome Level
Structural Source Control/Treatment BMPs					
Ocean Institute BMP	2001-02	2002-03	Completed (& ongoing)	Dana Point Coastal Streams	
J01P28 Clear Creek System	2001-02	2003-04	Completed (& ongoing)	Aliso Creek	
J01P01 Munger Media Filter	2001-02	2006-07	Completed, but needs to be redesigned	Aliso Creek	Not in operation
Channel Diversion Facilities	2002-03	2002-03	Completed (& ongoing)	Santa Ana River	
Poche Beach UV Disinfection Facility- Demonstration Facility	2002-03	2003-04	Completed & retired	San Clemente Coastal Streams	
Poche Beach UV Disinfection Facility - Permanent Facility	2006-07	2009-10	Completed (& ongoing)	San Clemente Coastal Streams	
Selenium Removal Quick Start BMP	2004-05	2004-05	Completed	Newport Bay	
Nitrogen and Selenium Management Program BMP Pilot Test of Se and N removal BMPs	2006-07	2008-09	Completed	Newport Bay	
Nitrogen and Selenium Management Program New BMP Pilot Test of Se and N removal BMPs	2008-09	Ongoing	Ongoing	Newport Bay	
Peters Canyon Channel Waste Capture and Reuse Pipeline	2013-14	Design Phase	Ongoing	Newport Bay	
Baby Beach Storm Drain to Sanitary Sewer Diversion and First Flush Filtration System	2004-05	2005-06	Completed (& ongoing)	Dana Point Coastal Streams	
Bird Exclusion Fencing Baby Beach Public Pier	2004-05	2005-06	Completed (& ongoing)	Dana Point Coastal Streams	
Deepening of San Diego Creek Sediment Basin #2	2004-05	2005-06	Completed	Newport Bay	
Narco Channel Restoration	2005-06	2007-08	Completed	Aliso Creek	
Litter Control BMPs & Investigations					
(See also the discussion of Drainage Facilities and Infrastructure Maintenance in Section C-5.A.3)					



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Trash and Litter Monitoring Research Program	2007-08	Ongoing	Ongoing	San Gabriel River/Coyote Creek	
Newport Bay Trash Management Plan	2010-11	Ongoing	2016	Newport Bay	
Monitoring of Natural Sources from Ambient Geology	2007-08	Ongoing	Ongoing	Multiple	
Non-Structural Source Control BMPs					
Countywide Area Spill Control (CASC) Program	2001-02	N/A	Ongoing	Multiple Watersheds	
Beach Sweeping at Baby Beach - Bird Feces Control	2006-07	N/A	Ongoing	Dana Point Coastal Streams	

Summary of BMP Effectiveness Investigations

Project	Type of BMP	Manufacturer (if applicable)	Type of Analysis	Report Completed
J01P28 Clear Creek System	Media filter; UV disinfection	Clear Creek	Bacterial Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Ocean Institute BMP	Infiltrative swale; In-line separator	Stormceptor®	Runoff Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Poche Beach UV Disinfection - Demonstration Facility	Sediment basin; UV disinfection	Suntec Environmental	Bacterial Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Poche Beach UV Disinfection - Permanent Facility	Sand filter tanks; UV disinfection	Neptune Microfloc; Triogen	Bacterial Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Warner Channel - Wetland Vegetated Channel	Wetland Vegetated Channel	N/A	Nutrients, Selenium, and Flow Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
J01P01 Munger Media Filter	Media Filter	N/A	Bacteria, Solids, Nutrients, Metals Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Selenium Removal BMP	Multiple (Physical, chemical, biological)	N/A	Selenium Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Nitrogen and Selenium Management Program BMP Pilot Test of Se and N removal BMPs	Multiple (Physical, chemical, biological)	N/A	Selenium and Nitrogen Monitoring	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>



BMP Project Updates in the Santa Ana Region:

Newport Bay Watershed

Nitrogen and Selenium Management Program (NSMP)

Selenium and Nitrogen BMP Evaluation

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The Nitrogen and Selenium Management Program (NSMP) was created in 2004 in response to a general NPDES permit (Order No. R8-2004-0021, which was replaced by R8-2007-0041 and amended by R8-2009-0045) issued for the Newport Bay watershed to establish waste discharge requirements for certain groundwater-related discharges and to regulate *de minimus* discharges. The NSMP is a collaborative effort of more than 20 stakeholders, including various State, county, and local agencies, environmental groups, and private entities with the goal of developing management strategies and treatment technologies for both selenium and nitrogen for the watershed. The County, as Principal Permittee under the Orange County MS4 Permits, functions as Chair of the NSMP, providing program leadership and ensuring implementation of the work plan and compliance with the terms of the permit. A work plan was developed by the NSMP and approved by the Santa Ana Regional Board in 2005. The work plan focuses on the development of treatment technologies and BMPs; development of an offset, trading or mitigation program; and development of a tissue-based site-specific water quality objectives (SSO). Participation in the NSMP and implementation of the approved Work Plan constituted compliance with the permit. Since the permit expiration in December 2009, a Time Schedule Order (TSO) R8-2009-0069 (and subsequently R8-2013-0060 and amended by R8-2014-0025) has been in place to provide interim coverage for the NSMP stakeholders.

One of the work plan tasks was to evaluate BMPs for removal of selenium and nitrogen from surface water and groundwater discharges in the Newport Bay watershed. During 2005-06, a survey of existing and developing technologies was compiled and an initial assessment of applicability to the Newport Bay watershed was conducted. The field scale pilot testing of these technologies and the final report was completed during the 2006-07 reporting period. The summary report of selenium and nitrogen removal BMPs can be found at www.ocnsmp.com. The information gained from the pilot testing was used to develop a draft BMP Strategic Plan for the Newport Bay watershed during the 2008-09 reporting period. A proposed BMP Strategic Plan was subsequently submitted to the Santa Ana Regional Board in January, 2011 to conform to the requirements of Time Schedule Order 2009-0069. With the adoption of the Time Schedule Order 2013-0060 (as amended by R8-2014-0025), an updated BMP Strategic Plan was approved by the Santa Ana Regional Board in December 2013. Currently, NSMP stakeholders are working on the tasks outlined in the BMP Strategic Plan.

The BMP Strategic Plan is intended to be a living document that recognizes BMPs for the treatment of selenium are not yet proven technologies and that better understanding of groundwater in the watershed is needed. Therefore, the Plan uses a phased approach that incorporates adaptive management principles. The major components of the Plan include: baseline and source control activities; load reduction projects and offset mitigation program framework; regional monitoring program; and BMP/technology evaluation. The adaptive management process is intended to accommodate the anticipated regulatory actions affecting



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selenium and nitrogen management in the watershed and effects of selenium and nitrogen reduction projects, and will include the development of additional actions if the goal of the BMP Strategic Plan is not achieved. A schedule of both the BMP Strategic Plan elements and anticipated regulatory actions is included.

The BMP Strategic Plan includes information gathering on new pilot testing efforts and diversion projects. In addition to the pilot scale testing of the ABMet® System in 2009 and 2010, two additional product investigations have been undertaken:

1. Frontier Water has developed a technology claimed to be superior to ABMet®. With higher efficiency and smaller footprint, the new system may see applications in many parts of the watershed, especially locations where sewer diversion is not feasible.
2. Siemens' Water Division (now Evoqua Water Technologies) has developed Advanced Reactive Media System (ARMS) and conducted two static tests and one dynamic test using actual water samples collected from the Newport Bay watershed. The core of this proprietary treatment process is an iron-containing media which is oxidized under carefully controlled conditions. The media acts as an electron donor to chemically reduce soluble metal cations and oxyanions to insoluble forms. During the reaction, the treated contaminants are removed by surface adsorption and chemical incorporation into iron oxidation products. Results from the dynamic test have demonstrated that the ARMS process may be able to achieve removal of selenium below regulatory standards in a laboratory setting, however, the applicability of a large-scale ARMS system within the watershed to treat large flow volumes faces many challenges, including ammonia generation, sewer connection/waste handling, noise, land acquisition/easement, and aesthetics. These issues will need to be addressed before a field scale pilot test can be conducted.

A number of other emerging selenium treatment technologies are also being evaluated. These include proprietary media and processes by CCI, PureEffect, and Advanced Chemical Laboratories (ACL). Currently work is being carried out with these vendors to explore possibilities of bench scale tests of these technologies using water samples collected from the watershed, with the bench-scale testing proposal from ACL anticipated in the fourth quarter of 2014. If these early stage testing yield satisfactory performance data, field pilot tests may be conducted and the best technology (ies) will be determined based on performance, footprint, pricing, and other factors. These treatment technologies are generally more expensive (in terms of cost per pound of selenium removed) than diversion projects, however they could become viable options where selenium needs to be removed but diversion is not viable.

Selenium and Nitrogen BMP Implementation



In addition to the above treatment-type BMPs, three projects are in the design phase:

1. Peters Canyon Channel Water Capture and Water Reuse Pipeline Project - This project is designed to capture groundwater dewatering or seepage-related discharges from four locations in the lower Peters Canyon Wash. A total of about 229 lbs. of selenium loads will be intercepted annually before reaching the receiving water. The diverted water



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will be sent to Orange County Sanitation District (OCSD) and subsequently recycled by Orange County Water District's Groundwater Replenishment System. The feasibility studies and 60% design have been completed. The project, which is estimated to cost \$9.7 million, was awarded \$3.4 million from Orange County Transportation Authority (OCTA) Measure M2 Grant, and \$1 million from Prop. 84 One Water, One Watershed (OWOW) Grant administered by Santa Ana Watershed Project Authority. The City of Irvine (project lead), County/OCFCD, City of Tustin, California Department of Transportation (Caltrans), and Irvine Ranch Water District are participants of the project. The construction of the project is expected to start in the summer of 2015.

2. Santa Ana Delhi Channel Diversion Project - similar to the Peters Canyon Channel project, this project will divert dry weather base flow from Santa Ana-Delhi Channel to OCSD to remove about 40 lbs. of selenium per year, among other pollutants. The cities of Santa Ana, Costa Mesa, and Newport Beach as well as the County and OCFCD are project proponents. The project has completed the feasibility studies/report phase and has secured OCTA Measure M2 Grant funding. The construction of the project is expected to start in 2016.
3. Big Canyon Wash Comprehensive Selenium Management Program - This program includes many tasks to reduce selenium loads in this small watershed (2 square miles) located entirely within the City of Newport Beach, which funds the program. One of the projects is to divert several storm drains that have very high selenium concentrations in order to reduce the selenium input to the watershed. The expected load reduction is approximately 10 lbs. of selenium per year. The NSMP has provided technical support to the program, including monitoring and a water study by Daniel B. Spethens and Associates.

All Watersheds

Countywide Area Spill Control (CASC)

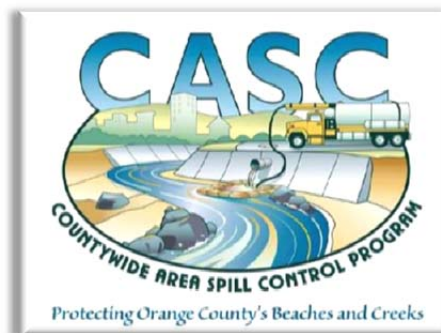
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The CASC program began in 2000 as a pilot project between the County and the Orange County Sanitation District (OCSD) to proactively prevent and respond to sanitary sewer overflows (SSOs) in the unincorporated North Tustin area. During the 2009-10 reporting period, in response to Fourth Term Permit requirements, CASC evolved into a true countywide program.

The main focus of CASC remains the containment and recovery of large Sanitary Sewer Overflows (SSOs) which have the potential to significantly impact receiving waters resulting in beach closures and health advisory postings.

The overall objectives of CASC are to:

- Create broader awareness regarding the causes of SSOs and development of measures that can be implemented in order to prevent them;
- Improve the interagency coordination when responding to SSOs;
- Identify the resources needed when responding and



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mitigating impacts;

- Develop predictive tools for identifying potential impacts; and
- Protect the beneficial uses of the local water bodies.
- Implement the program throughout the entire Orange County area.



CASC Response on April 18, 2012, Santa Ana River



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Since implementation of the program countywide in 2010, CASC has been activated a total of 8 times, resulting in the diversion of over 3.8 million gallons of impacted receiving waters to the sanitary sewer system:

Incident Triggering CASC Activation	Receiving Waters	Date	Type	Volume Diverted to Sanitary Sewer (Gallons)
Sanitary Sewer Force Main Rupture	Tijeras Creek/San Juan Creek/Doheny Beach	3/23/2010	SSO (public)	2,500,000
Manufactured Homes Community, Lake Forest	Aliso Creek	6/25/2010	SSO (private)	2,400
Sanitary Sewer Force Main Rupture, Newport Coast	Buck Gully Creek/Little Corona Beach	7/2/2010	SSO (public)	710,000
Automotive Manufacturer Corporate Office, Irvine	Peters Canyon Channel	1/13/2011	Other (fountain discharge)	100,000
Residential Apartment Complex, Anaheim	Santa Ana River	4/12/2012	SSO (private)	1,900
Residential Apartment Complex, Anaheim	Santa Ana River	4/18/2012	SSO (private)	77,500
Packaging Products Manufacturer, Buena Park	Fullerton Creek/Coyote Creek/San Gabriel River	7/25/2012	Other (clarifier discharge)	355,000
Ammonia Refrigeration Leak, Santa Ana	Santa Ana Delhi Channel	2/4/2013	Other (ammonia discharge)	200
Sewer line blockage resulting in sewage overflow	Santa Ana-Delhi Channel	8/31/2013	SSO (public)	77,000
			Total:	3,824,000

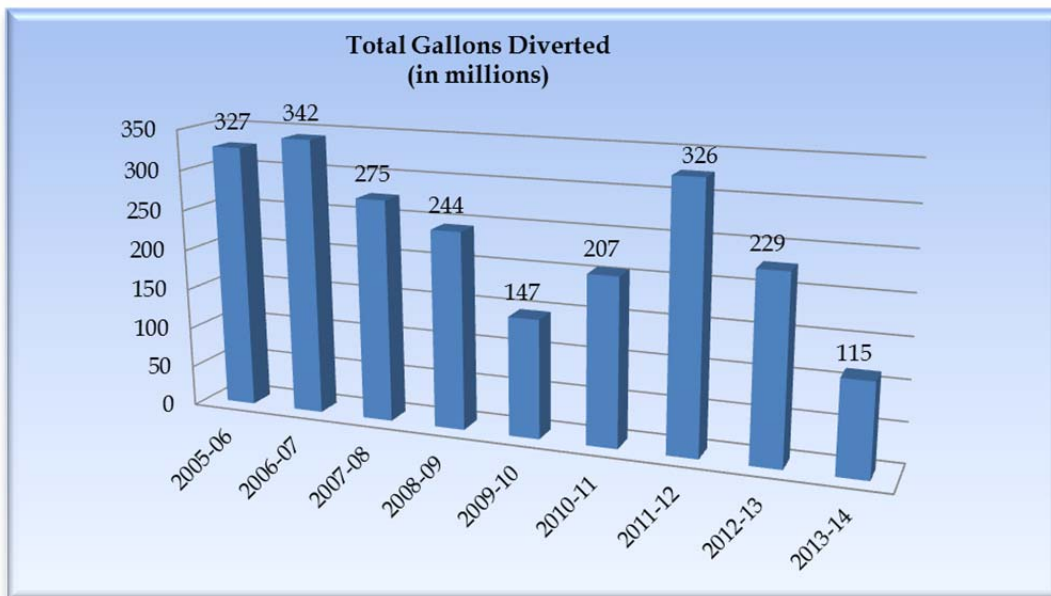
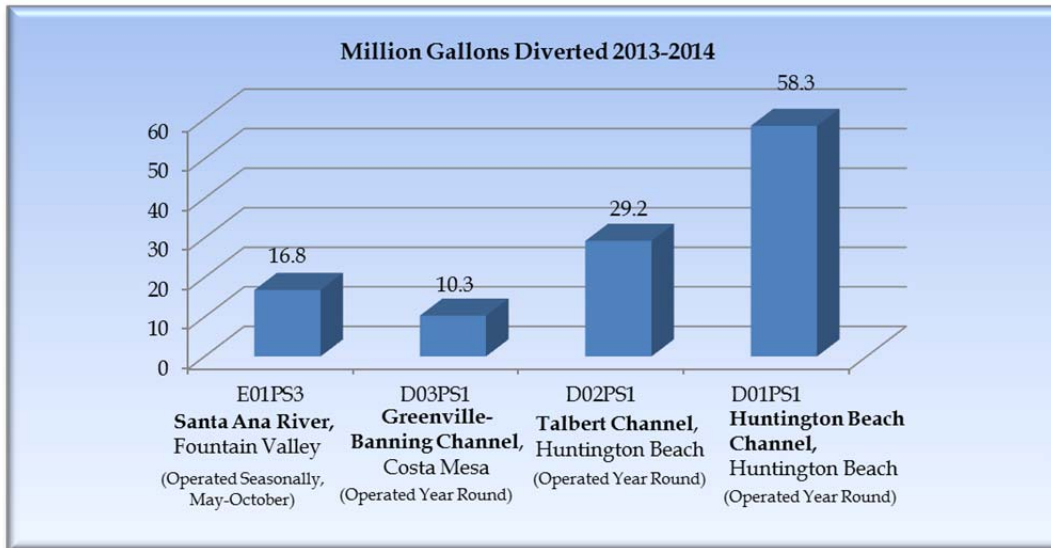
Plans for the CASC program during the 2014-15 reporting period and beyond include: 1) further coordination between the Orange County Stormwater Permmittees and sanitary sewer system waste discharge requirements groups; 2) additional work to finalize a Memorandum of Understanding (MOU), which defines roles and responsibilities, to be executed by all participating municipalities and agencies ; and 3) continued development and implementation of GIS technologies for potential advanced spill modeling capabilities.



Channel Diversion Facilities

Since 2003-04 the County has operated four urban runoff diversion facilities in north Orange County to intercept dry weather runoff before it can impact the water quality of ocean beaches. These facilities divert runoff to the sanitary sewer collection system where it is treated before discharge offshore through OCSD's ocean outfall. In the 2013-14 reporting period the north Orange County diversion facilities diverted a total of 115 million gallons of dry weather runoff. Diversion volumes were lower than reported in 2012-13 (229 million gallons), and substantially less compared to program highs observed in 2005-06 and 2006-07 (327 and 324 million gallons respectively).

2013-14 Summary of Diversions of Dry Weather Flows to Sanitary Sewer





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The lower 2013-14 diversion volumes were attributable to several factors. During the reporting period only two of the four dry weather diversions: Santa Ana River and Huntington Beach Channel pump stations were in continuous operation. The Greenville-Banning Channel diversion was only operated for a few months as water in the channel was primarily diverted to supply the City of Costa Mesa's Talbert Park Wetlands project. Damage to the inflatable rubber dam at the Talbert Channel diversion resulted in limited operation of the diversion during 2013-14. As the Talbert Channel diversion was originally designed as an interim approach the County is currently exploring options for a permanent design or removal of the diversion altogether as channel bacteriological water quality data downstream were excellent throughout the reporting period despite the diversion's limited operation. Overall, decreased channel flow due to below average rainfall and runoff reductions due to drought restrictions also contributed to a lower volume of water being diverted during the reporting period.

BMP Project Updates in the San Diego Region:

Aliso Creek Watershed

J01P28 Clear Creek Treatment System



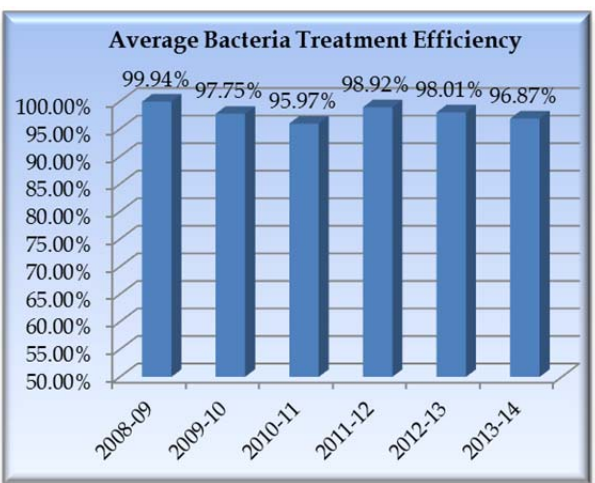
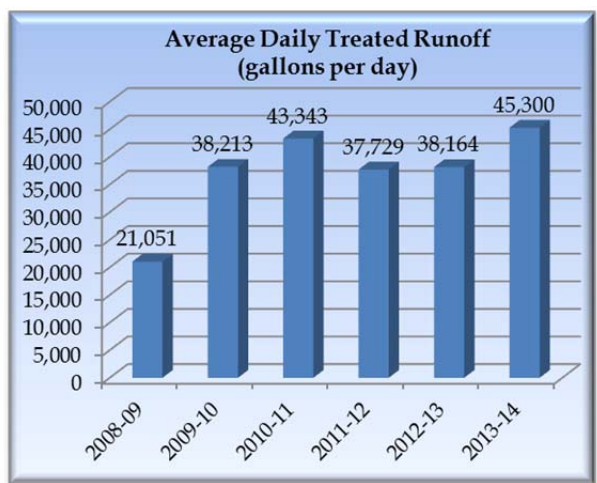
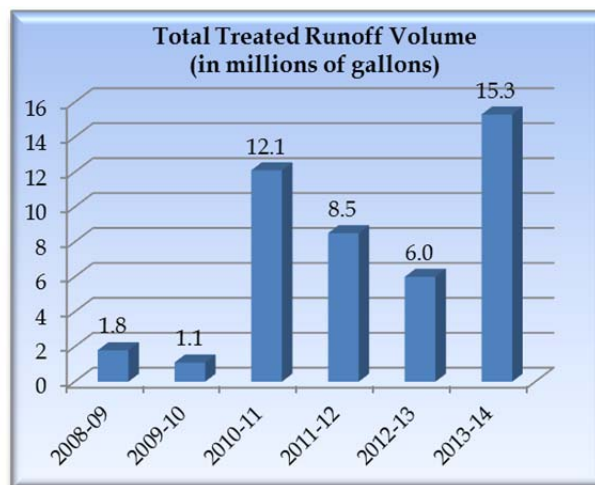
This mechanical urban runoff treatment facility was constructed in Aliso Viejo to treat dry weather urban runoff from the Aliso Viejo Town Center contributory drainage area (pipe J01P28) prior to its discharge to Aliso Creek. The treatment system consists of sand filtration and ultraviolet (UV) light disinfection, and was designed to remove bacteria, suspended solids, and associated particulate pollutants at a maximum rate of 200,000 gallons/day. The facility draws its influent runoff from the J01P28 energy dissipation basin. Facility construction was completed in June 2003, at a total cost of approximately \$750,000.

Facility operation was initiated in July 2003 and operated until August 2005, when operations were suspended due to premature clogging of filter media, excessive backwash frequency, and difficulty in accessing the basin for maintenance. Following construction of a heavy equipment pad adjacent to the basin and securing a higher backwash discharge allowance from the South Orange County Wastewater Authority, the facility restarted in 2007 and operated only intermittently through May 2010 due to sequential failure and replacement of facility components, periodic discharges of very fine sediments to the basin which necessitated facility shutdown for cleaning. However, several process plumbing modifications made during this period reduced maintenance frequency and improved operational dependability. The facility was successfully restarted in early June 2010 and has since provided very effective and reliable service.

During the 2013-14 reporting year, the facility provided consistent year round service, operating 92% of the year with occasional shutdowns for rainy periods, subsequent storm runoff, and maintenance. The facility treated approximately 15.3 million gallons of runoff at an average flow rate of 45,300 gallons per day. The average bacteria treatment efficiency was 96.9% and is expected to improve as a result of major facility reconditioning in the subsequent months following the reporting period. The following figures summarize the performance of the J01P28 Clear Creek Treatment System for the 2013-14 reporting period.



J01P28 2013-14 Clear Creek Treatment System Performance Summary



J01P01 Munger Storm Drain Sand/Media Filter

This sand filter was intended to treat dry season urban runoff from the Munger Storm Drain (J01P01) prior to its discharge to Aliso Creek. The system consisted of a pre-sedimentation vault, pump station/wet well and sand filter vault, with discharge to the creek. The system was expected to provide meaningful removal of suspended solids, bacteria, and other pollutants.

The project was constructed in 2005 with funds from a State Water Resources Control Board Proposition 13 grant. However, upon construction it was immediately apparent that the system was substantially undersized to treat the required flow rate, and could not be operated in an effective manner. The system was operated at a much lower flow rate as a pilot facility to evaluate the performance effectiveness of the sand filtration treatment technology. The performance evaluation was completed in January 2007, and demonstrated 90% removal of all three fecal indicator bacteria, with meaningful removal of other particulate pollutants. Results affirmed the treatment effectiveness of the technology for continuous dry weather runoff.



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The filter system has been inactive since 2007 pending a redesign and expansion of the treatment system. Prior to initiating redesign, in late 2011 the consultant completed an evaluation of emerging treatment technologies which might be superior to sand filter expansion. The evaluation identified a proprietary biofiltration media product by Filterra/Kristar for bacteria removal from storm runoff which could provide better bacteria removal on a smaller facility footprint and at lower implementation costs; however, its treatment capability has not yet been demonstrated under the continuous dry weather runoff conditions prevailing at Munger. The County considered the feasibility of a Munger-specific pilot scale to evaluate this promising but unproven treatment technology. The County continues to have discussions with the City of Lake Forest to determine the direction of the next phase.

Narco Channel Restoration in Laguna Niguel Regional Park



This project featured the restoration of approximately 1,000 feet of Narco Channel immediately adjacent to Laguna Niguel Regional Park. The project involved the transformation of a section of earthen and rock-lined trapezoidal channel devoid of vegetation to a more natural drainage corridor for both water quality improvement and wildlife habitat benefits. Restoration elements included: dredging within the stream channel; bank regrading, widening, and terracing, and planting of native wetland and riparian vegetation within the channel and along the stream banks.



Pre-restoration



Post-restoration

The City of Laguna Niguel received a \$1.4 million grant from the State Water Resources Control Board to implement the project. The County administered the design, general construction, and plant establishment phases of the contract on behalf of the City.

Project construction was initiated in 2007, and completed in January 2008 with the planting of native vegetation. Native vegetation was fully established in 2012 (see photo).



Dana Point Coastal Streams Watershed

Baby Beach BMPs



Water quality at Baby Beach in Dana Point Harbor had been historically characterized by persistent exceedances of AB411 bacteria standards, corresponding extended water quality advisory postings by Orange County Health Care Agency and “F” grades in Heal the Bay’s annual Beach Report Card.

Since 2001 the County and other entities have implemented a number of water quality management practices which have collectively contributed to a dramatic improvement in bacterial water quality at Baby Beach. The Health Care Agency uses Beach Mile Days posted (BMD) as a metric of bacterial quality which reflects both the extent of beach frontage as well as the time period affected. In 2000, Baby Beach cumulative water quality advisory posting activity at Baby Beach was 12.78 BMD posted, out of a maximum 16.61 BMD possible. Since 2009, postings have fluctuated between 0.53-2.57 BMD per year.

Additionally, Baby Beach was delisted for fecal coliform (one of three tested indicator bacteria) from the 2010 303(d) List and the Heal the Bay Annual Beach Report Card has given Baby Beach good scores over the past five years. Scores for the Baby Beach sites have included mostly “A” and “B” grades during this period with the exception of 2012-13 and 2013-14 when one out of four sampling sites received one “C” grade (www.healthebay.org).

An assessment of current bacterial water quality at Baby Beach is provided in the Baby Beach Dana Point Harbor Bacterial Indicator TMDL Annual Progress Report, which can be found as an attachment to the 2013-14 San Diego Region Unified Program Effectiveness Assessment (Unified PEA). Data analysis shows that the TMDL 50% waste load reduction milestone for dry weather has been achieved for all indicators with the exception of the single sample maximum for *Enterococcus*. Nonparametric seasonal Kendall test results for Baby Beach bacteria data show a statistically significant decline in concentrations of total coliform, fecal coliform, and *Enterococcus* in Baby Beach waters. Existing and planned future BMPs and special studies to address remaining waste load reductions at Baby Beach are described in Sections C-4 and C-7 of the Unified PEA.

San Clemente Coastal Streams Watershed

Poche Clean Beach Project



The Poche Clean Beach Project (Poche CBP) is a sand filtration and ultraviolet (UV) light disinfection facility in San Clemente for the treatment of urban runoff from Prima Deshecha Channel prior to discharge to the surf zone at Poche Beach. Historically Poche Beach has been chronically posted for exceeding AB 411 bacteria standards by the Orange County Health Care Agency (OCHA).

The Poche CBP is situated on railroad right of way adjacent to the channel, where an inflatable diversion dam directs dry weather runoff into the facility for treatment. Facility construction was completed in 2009 at a cost of approximately \$3 million, with funding support from the



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State Clean Beaches Initiative, the City of San Clemente, the County, and the public interest group Miocean. South Coast Water District (SCWD) operates the facility on the County's behalf, with City of San Clemente and the County sharing facility operational costs. The facility is intended to operate primarily during the April - October AB411 period. Rainstorm events and major maintenance activities limit operations.

Poche CBP initiated operation in July 2010. Under Coastal Development Permit (CDP) conditions, the facility was required to discharge treated outflow just downstream of the diversion dam within the channel. Facility performance data during August - December 2010 documented treatment rates averaging 0.75 million gallons per day and bacterial treatment efficiencies of 93-95% for the three fecal indicator bacteria. However, receiving water response data demonstrated that the water quality benefit of treated runoff was not delivered to the surf zone due to recontamination through the intervening scour pond between the channel and the ocean. There was no reduction in AB411 bacteria standards exceedances in the surf zone. Potential sources of pond bacteria included large numbers of shorebirds congregating at the pond and regrowth of bacteria within the pond sediments.

During the 2011-12 reporting period, Poche CBP operated under a temporary CDP approval to discharge closer to the ocean via a pipe extending to the end of wooden bulkhead along the upcoast side of the scour pond. Based on 2012 receiving water response results demonstrating the benefit of the temporary relocation of treated outflow discharge to the end of the wooden bulkhead, the County applied for an amendment to the CDP with the California Coastal Commission to authorize permanent relocation of the discharge to allow a greater opportunity for treated runoff to bypass the scour pond and outflow to the receiving ocean. The Coastal Commission approved the amendment on February 2013 providing for the extension of the treated outflow discharge closer to the ocean.

During the 2013-14 reporting period the Poche CBP treated and discharged a total of 147 million gallons, averaging 781,455 gallons per day. The Poche facility continued to provide consistent service and bacteria treatment to the dry weather runoff to within acceptable health standard levels. However, the surfzone exceedances of AB411 enterococcus standards continued to persist despite the relocation of the treated outflow discharge to the end of the wooden bulkhead.

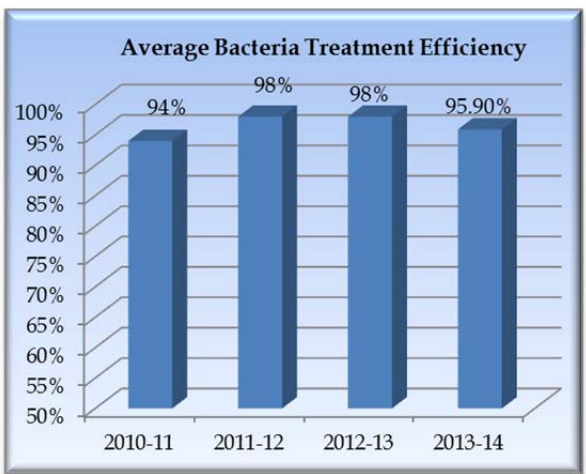
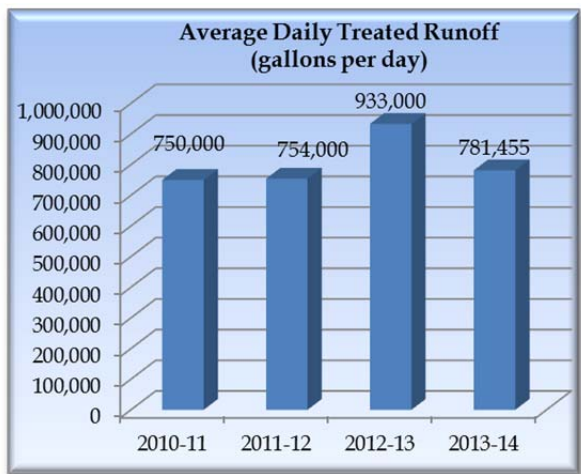
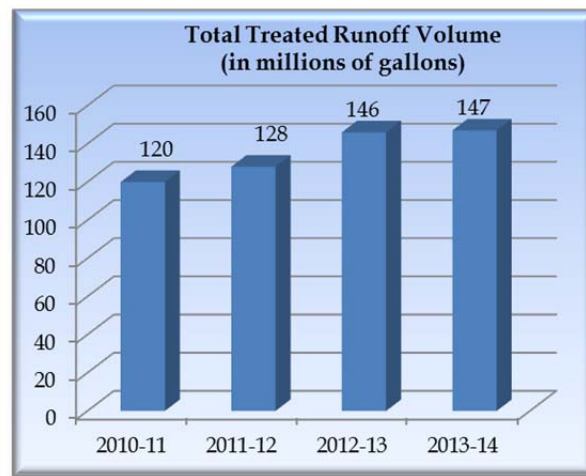
During the summer of 2013, extraordinarily large numbers of seagulls were observed congregating along the beach intertidal area potentially negatively contributing to the surfzone water quality. This increase in bird numbers coincided with the conclusion of the Prima Deshecha landfill summer falconry program. Following several consecutive weeks of posted warnings for failing to meet health standards, the City of San Clemente initiated a falconry dispersal program at Poche Beach. The falconry bird dispersal program appears to have improved the surfzone water quality, which met all health standards for the duration of 2013. The overall surfzone water quality continued to show improvements with the initiation of landfill and beach falconry programs in 2014. Improvements to Poche Beach water quality were recognized when Poche Beach did not appear on the Heal the Bay Beach Report Card 2013-2014 "Beach Bummer" List for the first time in six years.



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The County will continue to collaborate with the City of San Clemente in efforts to improve conditions at Poche Beach by: 1) continuing to identify and conduct bacteria source control and runoff reduction efforts in the contributory watershed; 2) implementing and evaluating pilot programs to discourage shorebird congregation at the beach; and 3) continuing to collaborate on outlet maintenance strategies which will attempt to maintain safe public beach access, further improve the pass of treated runoff; and minimize the frequency, duration, and magnitude of bacteria-rich outflow from the scour pond to the ocean. The figures below summarize the performance of the Poche Clean Beach Project for 2013-14.

Poche Clean Beach Project Performance Summary



C-3.4 Improvements in Stormwater Science (LIP Section A-3.4)

The County as Principal Permittee continues to conduct and sponsor investigations and special studies that will better characterize the sources of pollutants in urban and stormwater runoff, and the impacts these pollutants exert on beneficial uses in receiving waters. During the reporting period the County participated in the following studies:



2013 Southern California Bight Regional Monitoring Program (Bight’13)

Southern California Bight (SCB) is the 400 miles of recessed coastline from Point Conception to Cabo Colnett (south of Ensenada), Mexico. It is an important and unique ecological resource. However, the highly urbanized coastal zone of the SCB is one of the most densely populated coastal regions in the country, which creates stress upon its marine environment. Even though over \$31 million is spent each year on monitoring, only 5% of the area of the SCB is routinely monitored. To improve the quality and efficacy of existing monitoring programs, and improve capacity for regional assessments, Southern California Coastal Water Research Project (SCCWRP) initiated a series of monitoring efforts throughout the SCB in 1994, 1998 , 2003, and 2008.

Bight’13 is the fifth regional survey. There are five major elements in Bight’13: Contaminant Impact Assessment, Nutrient Impact, Debris Assessment, Marine Protected Areas, and Microbiology.

The County, as the Principle Permittee, has participated in the Bight’13 Planning Committee and is participating in Contaminant Impact Assessment, Debris Assessment, and Microbiology work groups.

Regional Research Monitoring Program (Stormwater Monitoring Coalition “SMC”)



The County continues to participate with other southern California Phase I municipal stormwater programs, Caltrans, NPDES regulatory agencies and SCCWRP in the SMC. The goal of the SMC is to identify region-specific research needs to better understand stormwater mechanisms and impacts, and to collectively sponsor the development of assessment techniques and methodologies that will enable more informed and consistent stormwater management decision-making across the region. The SMC relationship was formalized in an agreement signed in 2000, extended in 2007, and undergoing further renewal. The current member agencies are:

- California Regional Water Quality Control Board, Los Angeles Region
- California Regional Water Quality Control Board, San Diego Region
- California Regional Water Quality Control Board, Santa Ana Region
- City of Long Beach
- County of Orange, OC Public Works
- County of San Diego
- Los Angeles County Department of Public Works (LACDPW)
- Riverside County Flood Control and Water Conservation District
- San Bernardino County Flood Control District
- Ventura County Watershed Protection District
- Southern California Coastal Water Research Project (SCCWRP)
- Caltrans
- State Water Resources Control Board
- City of Los Angeles
- US Environmental Protection Agency (through a separate MOU)



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The multi-agency collaboration has demonstrated its effectiveness in identifying common needs and using public funds in coordinating regional stormwater research efforts. To date, the SMC has initiated a dozen research projects identified in the research agenda. Annual reports summarizing SMC project accomplishments can be downloaded from the SMC website at: <http://www.socal-smc.org/Reports.aspx>. A new research agenda for the next five years was developed during the reporting period.

Newport Bay Watershed Trash Management Plan

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Trash in surface waters is a concern for environmental management. It can cause significant water quality, biological and aesthetic problems including inhibiting the growth of aquatic vegetation, harming aquatic organisms by ingestion or entanglement, conveying other pollutants such as toxic substances, and causing visual blight on shorelines. A major source of trash in the environment is from intentionally or accidentally discarded items in watershed drainage areas which can be transported in storm drains to the creeks, rivers and ocean during and after rainstorms. Each year the Orange County Permittees make significant efforts to minimize trash and litter levels at significant expense.

In December 2012 the County was awarded a grant from the Coastal Impact Assistance Program for a project to improve the ability of public agencies to manage trash in the environment. The goals of the project are to 1) develop and implement tools needed to understand and remediate trash, and 2) apply these tools towards developing a trash management plan for the Newport Bay Watershed. During the 2013-14 reporting period project efforts focused on gathering existing data on structural and institutional trash management controls and initial efforts to integrate this data into a GIS-based model, including analysis to determine data gaps and identify representative subwatershed areas to examine trash management efforts at a high resolution.

C-3.5 Regulatory Directives

13225 Directive for Aliso Creek

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On March 2, 2001 the San Diego Regional Board issued a written directive pursuant to California Water Code Section 13225 to the County of Orange, Orange County Flood Control District and the Aliso Creek watershed cities (Watershed Permittees). The directive found that the Watershed Permittees may be discharging waste with high bacteria concentrations from municipal storm drain outfalls into Aliso Creek and its tributaries. As a result the Watershed Permittees were directed to conduct an evaluation of the relative contribution of the urban stormwater discharges to the impairment of beneficial uses or the exceedances of water quality objectives and, where necessary, take appropriate measures to eliminate the sources of pollution.

The County is responsible for implementing elements of its LIP in unincorporated areas of the County. The County's unincorporated areas within the Aliso Creek watershed contain one storm drain outfall that meets the initial directive minimum size criteria of 39 inches, but otherwise does not contain drainage areas with significant urban land use. Therefore, the



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County's main responsibilities pursuant to the Regional Board's Directive (now incorporated in Fourth Term Permit requirements) include coordinating the Watershed Permittees' activities, conducting the monitoring program, compiling Watershed Permittee information and monitoring data, and developing prototype bacteria BMP projects (see prior discussion on J01P28 Clear Creek System and J01P01 Munger Storm Drain Sand/Media Filter).

The County on behalf of the Watershed Permittees submits an annual Aliso Creek water quality data assessment monitoring report on March 1st of each year (Aliso Creek Watershed Runoff Management Plan Water Quality Data Assessment Annual Report). Findings from the 2013 annual report indicate that overall there has been continued improvement with reductions in bacteria loads from stormdrains, and water quality improvements in downstream receiving waters. These reductions appear to be linked to a few related factors including: several years of below average rainfall, water conservation efforts, and BMP related reductions. Of the BMPs being implemented, wetlands and channel restoration projects have resulted in the highest consistent bacteria load reductions. Two Aliso Creek BMP projects that have shown significant reductions are the Laguna Hills Wetlands at J05 (Aliso Hills Channel) and the Narco Channel restoration project. The Laguna Hills wetland involved construction of a large approximately 977 acre in-channel wetland while the Narco Channel restoration project (see C-3.3) included restoration of a 1,000 foot section of riprap channel with native wetland and riparian vegetation in 2007. Since 2003 the Aliso Hills and Narco subwatersheds have shown a 96.7% and 91.5% reduction respectively in summer bacteria loads due in part to these projects.

In February 2010 the San Diego Regional Board adopted TMDLs for indicator bacteria to address impaired beaches and creeks in the San Diego region including Aliso Creek and its tributaries, the Aliso Creek mouth, and Aliso Beach. On April 4, 2011, the Beaches and Creeks Indicator Bacteria TMDLs received final approval from the State Office of Administrative Law. As a first step to fulfilling the future requirements of the TMDLs, the County and Watershed Permittees completed development of a Comprehensive Load Reduction Plan (CLRP) to address bacteria impaired segments and other 303(d) listings within the Aliso Creek Watershed. This plan was submitted to the San Diego Regional Board on October 4, 2012. In addition to detailing existing and planned BMPs within the watershed the CLRP describes a series of proposed special studies to better define and optimize future watershed efforts.

One special study begun in 2013-14 is to look at the effectiveness of different BMPs types being implemented throughout the watershed. Initial efforts in the Aliso Creek Watershed have focused on determining wet weather reductions from the previously noted Narco Channel restoration project. In addition to bacteria load reductions the project had shown notable reductions in ammonia, total Kjeldahl nitrogen, phosphorus, cadmium, copper, and zinc during a 2012 dry weather study but no data was currently available on potential reductions during wet weather. The one storm sampled during the reporting period at Narco Channel proved too large flattening or washing out much of the established channel vegetation and negating any associated pollutant load reductions. Efforts for the reporting year 2014-15 include targeting a smaller storm for monitoring at Narco Channel.



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Coyote Creek Metals TMDL

Coyote Creek, a tributary of the San Gabriel River, was identified on the Clean Water Act Section 303(d) list as impaired by copper, thereby requiring a TMDL to be developed according to a schedule established in a consent decree approved in March 1999. EPA independently found impairments for lead and zinc and established technical TMDLs for all three metals. Zinc was subsequently deleted from the 2010 303(d) list as a pollutant in Coyote Creek, but remains in the TMDL for anti-degradation requirements.

No dry weather TMDLs were established for Coyote Creek, but a dry weather wasteload allocation for copper was established to help protect the downstream San Gabriel River Estuary. Wet weather TMDLs were established for copper, lead, and zinc.

These TMDLs were established for the Los Angeles Regional Water Quality Control Board (Los Angeles Regional Board), since most of the San Gabriel River watershed exists within that region, but 54% of the Coyote Creek subwatershed lies in Orange County, within the purview of the Santa Ana Regional Board. The Santa Ana Regional Board included the TMDLs in the fourth term permit and required development of a Source Control Plan and Monitoring Program (SCP) to address the Metals TMDL.

In 2009, the County, as Principle Permittee, initiated SCP development. A Work Group was convened, consisting of the County and the cities of Anaheim, Brea, Buena Park, Cypress, Fullerton, La Habra, La Palma, Los Alamitos, Placentia, and Seal Beach, to help guide SCP development. The SCP was finalized and approved by the Work Group in June 2010.

Though not required by the Permit, monitoring under the SCP was begun under the initiative of the Permittees in 2010 and is ongoing. Results suggest that of the three metals, the primary concern in the watershed is wet weather copper concentrations which frequently exceed water quality objectives. The California State Legislature passed SB346 to phase out copper content in brake pads in California to less than 5% by 2021, which is expected to help bring watershed copper concentrations into compliance.

Newport Bay Fecal Coliform TMDL Update

The fecal coliform TMDL for Newport Bay was adopted in 1999 to improve bacterial quality, reduce public health risks, and improve water contact recreational activities. Based on a visual evaluation of trends in long-term data from Newport Bay sites, it appears that average fecal coliform concentrations have decreased substantially over time on a Bay-wide scale. In addition, the frequency of "high" (>400 MPN/100mL) and "very high" (> 4,000 MPN/100mL) fecal coliform concentrations has also decreased substantially. The TMDL requires an updated TMDL report based upon findings from a Source Identification Project¹ and recommendations in the Source Management Plan². The final report *Recommended Revisions to the Newport Bay*

¹ Grant, Stanley B, S. Jiang, B. Sanders, K. McLaughlin, J. Ahn, R. Litton, and L. Ho. Newport Bay Fecal Indicator Bacteria Source Identification Project, July 26, 2009.

² EOA, Inc. Newport Bay Fecal Coliform Source Management Plan, December 31, 2009.



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Fecal Coliform TMDL is expected to be provided to the Santa Ana Regional Board during the 2014-15 reporting period.

C-3.6 Plan Development Modifications

On October 3, 2013, the County of Orange, Orange County Flood Control District and Santa Ana Region Permittees submitted the Report of Waste Discharge (ROWD) to both the US EPA and Santa Ana Regional Water Quality Control Board pursuant to the requirements of Section XXIII of Order No. R8-2009-0030 NPDES No. CAS618030. On May 20, 2014, the County of Orange, Orange County Flood Control District and San Diego Region Permittees submitted the Report of Waste Discharge (ROWD) to both the US EPA and San Diego Regional Water Quality Control Board pursuant to the requirements of Section K.2.b of Order No. R9-2009-0002 NPDES No. CAS0108740. Both the Santa Ana Region and San Diego Region ROWDs presented specific recommendations for the continuation and future development of the Orange County Stormwater Program based upon a consideration of the effectiveness of the Program and need for additional pollutant control initiatives. The following recommendations were presented in the ROWDs related to plan development:

1. **Continue to implement the strategic countywide/jurisdictional management approach.**
2. **Develop a comprehensive Watershed Plan** to evaluate the watersheds and to prioritize implementation efforts and associated resource allocation.
3. **Develop pilot program(s) for regional water quality** or groundwater recharge BMPs
4. **Develop model program(s) for water quality/quantity trading** to facilitate off-site BMP implementation where appropriate and to address existing developed areas.