TECHNICAL MEMORANDUM #1

RE: NEWPORT COASTAL STREAMS WATERSHED
DATE: December 13, 2006

Prepared for:	**Prepared by**:
County of Orange Resources & Development Management Department Environmental Resources	Tetra Tech, Inc. Irvine, CA

The County of Orange Resources and Development Management Department (RDMD) is in the process of developing Watershed Action Plans for each of the watersheds within Orange County. These Watershed Action Plans will be included as an appendix to the Drainage Area Master Plan (DAMP) and will provide specific information regarding the watershed setting, an assessment of the water quality, the plan of action within the watershed to improve the water quality, and the steps to be taken to assess the effectiveness of the program.

In each watershed the first step in the development of the Watershed Action Plan is an inventory of the existing studies that are available in that watershed. This Technical Memorandum for the Newport Coastal Streams Watershed summarizes the studies that were collected as part of this effort.

The Newport Coastal Streams watershed is located on the southern edge of the Orange County Coast, approximately 39 miles southeast of Los Angeles. It consists of small, mostly ephemeral streams including Buck Gully, Los Trancos Canyon, Muddy Canyon, Moro Canyon, and Emerald Canyon, draining the south and west areas of the San Joaquin Hills into the Pacific Ocean. Coastal areas between the Newport Bay watershed to the north and the Laguna Coastal Streams watershed to the east and south are included in the Newport Coastal Streams watershed.

The Region 8 Regional Water Quality Control Board (RWQCB) Basin Plan identifies the following receiving waters within the northern portion of the watershed:

- Buck Gully
- Los Trancos Canyon
- Muddy Canyon

The Region 9 RWQCB Basin Plan identifies the following receiving waters within the southern portion of the watershed:

- Moro Canyon
- Unnamed Intermittent Coastal Streams
- Emerald Canyon

Studies Sources / Authors

The data search within the Newport Coastal Streams Watershed included website searches and contact with staff from municipal agencies and non-profit organizations. The main study contributors include the City of Newport Beach, Coastkeeper, and the County of Orange Health

Care Agency (Environmental Health). The following table identifies the specific agencies and groups for which contact was made to obtain information.

Table 1. Data Research Contacts

Agency	**Comments**
EPA	No references.
United States Geological Survey	No references.
U.S. Army Corps of Engineers	No references.
California Department of Water Resources	No references.
State Water Resources Control Board	No references.
Regional Board, Santa Ana	1 report was obtained.
County of Orange RDMD	1 report was obtained.
County of Orange Health Care Agency	1 report was obtained.
SCCWRP	2 reports were obtained.
OCSD	No references.
City of Newport Beach	3 reports were obtained.
National Resources Defense Council	2 reports were obtained.
Coastkeeper	No references.

Through these sources, a total of 10 studies were obtained that provide information specific to the Newport Coastal Streams Watershed.

Geographical Extent of Studies

The studies that were obtained through the data collection effort were categorized as coastal or watershed studies. Of the 10 studies obtained, 6 were focused on the coastal area, 3 studies focused on the watershed, and 1 study focused on both areas.

Water Quality Data

A significant source of persistent water quality data in the watershed is the County of Orange Environmental Health Agency. County of Orange Environmental Health monitors the ocean water in the surf zone and specifically tests for bacteria. Sampling is performed by County of Orange Environmental Health at 17 locations, 8 of which are located at the beach. One sample is taken at each location every week. The Orange County Sanitation District samples at 1 location along the beach. At that location 5 samples are taken each week.

The County of Orange monitoring program has evolved through the changing requirements of the NPDES permits. The current program includes several types of monitoring programs. Within this watershed there are 4 monitoring stations in the bacteriological / pathogen monitoring program in which total coliforms, fecal coliforms, and *Enterococcus* is monitored.

Bibliography of Studies

A bibliography that includes the existing studies collected as part of this effort was developed and is included as Attachment 1 to this Technical Memorandum.

DRAFT TECHNICAL MEMORANDUM #2

RE: NEWPORT COASTAL STREAMS WATERSHED
DATE: DECEMBER 18, 2006

Prepared for:	**Prepared by**:
County of Orange Resources &	Tetra Tech, Inc.
Development Management Department	Irvine, CA
Environmental Resources	

The County of Orange Resources and Development Management Department (RDMD) is in the process of developing Watershed Action Plans (WAP) for each of the watersheds within Orange County. These WAPs will be included as an appendix to the Drainage Area Master Plan (DAMP) and will provide specific information regarding the watershed setting, an assessment of the water quality, the plan of action within the watershed to improve the water quality, and the steps to be taken to assess the effectiveness of the program.

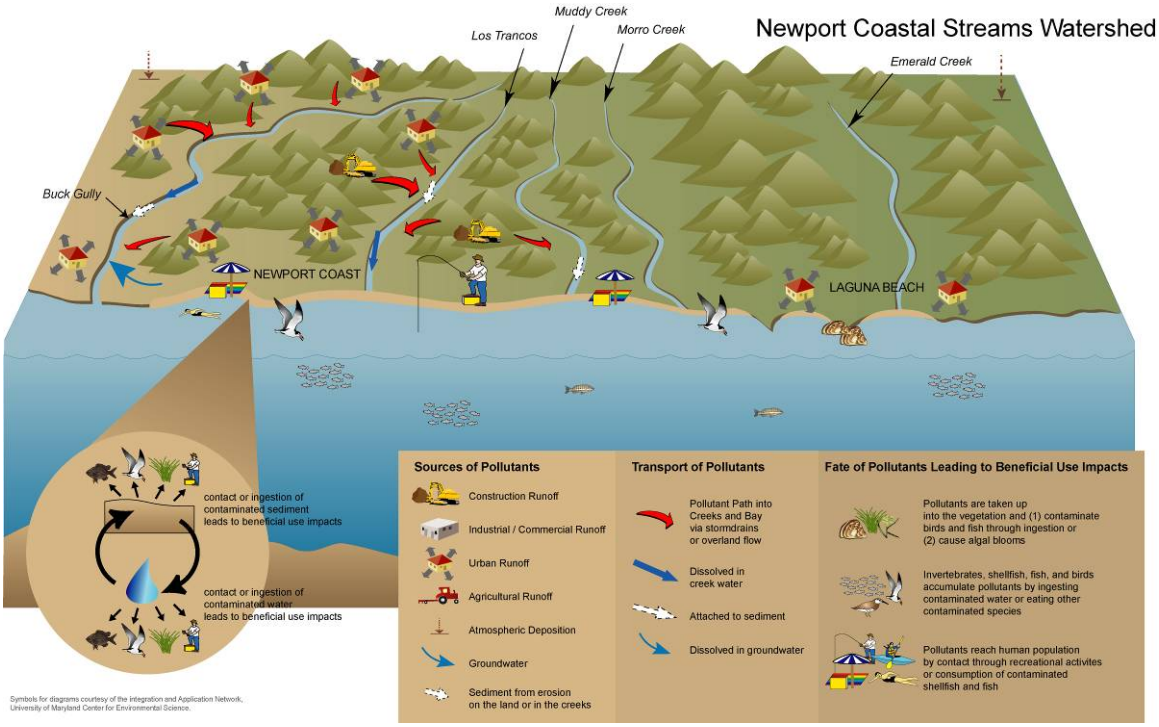
The first step in the development of the Watershed Chapter is an inventory of the existing studies that are available in the watershed. A technical memorandum, Technical Memorandum #1 (dated December 13, 2006), focused on the collection of the existing data. The data collection effort for that memorandum ended in December 2006 and includes studies completed and underway at that time. The second step in the development of the WAP is an assessment of the water quality data and identification of data gaps within the body of knowledge that has been generated for the Newport Coastal Streams Watershed. The assessment and identification of data gaps is presented in this technical memorandum (Technical Memorandum #2).

The Newport Coastal Streams watershed is located on the southern edge of the Orange County Coast, approximately 39 miles southeast of Los Angeles. It consists of small, mostly ephemeral streams including Buck Gully, Los Trancos Canyon, Muddy Canyon, Moro Canyon, and Emerald Canyon, draining the south and west areas of the San Joaquin Hills into the Pacific Ocean. Coastal areas between the Newport Bay watershed to the north and the Laguna Coastal Streams watershed to the east and south are included in the Newport Coastal Streams watershed.

Before assessing the water quality data, it is helpful to understand the water quality related processes at work within these waterbodies. The following figure provides a graphical representation of those processes. The processes include:

1. Source of pollutants – from where do the pollutants originate. In some instances the origination is known only generally; in others the specific origin is know.
2. Transport of pollutants – how are the pollutants transported from the sources into the receiving waters (the rivers and ocean).
3. Fate of pollutants – how do the pollutants impact various users of the system. The fate of the pollutants is directly tied to the impacts of the beneficial uses present in the watershed.

Figure 1. Conceptual diagram



WATER QUALITY DATA ASSESSMENT

There is a limited amount of water quality data that is available specific to the Newport Coastal Streams Watershed. Ten (10) studies were identified that provide water quality information specific to the Newport Coastal Streams Watershed. A matrix was developed to provide a detailed view of each of the studies / programs discussed in this technical memorandum. This matrix is referred to as the Newport Coastal Streams Environmental Matrix and includes information such as the specific constituents of concern included in the study / program, and details of the monitoring and management issues supported by that study / program. The Newport Coastal Streams Environmental Matrix is included in this technical memorandum as Attachment 1.

It is a significant challenge to assemble the report references into a meaningful framework that provides the reader with an idea of what type of data or results are available. In order to meet the various types of user needs that were envisioned, the data has been 'cut' in several directions. Each 'cut' or assessment represents the sum total of all the programs and studies that were assembled as part of this technical memorandum; the difference is only in the perspective taken in that assessment.

Assessment #1: Program Management and Policies

A reasonable question to ask when faced with the abundance of data that exists, is whether this data is providing stormwater program coordinators with the information

needed to manage the program and make informed decisions for the watershed. The knowledge needed at various stages in the program development must be able to build on previous efforts to attain constantly improving results. The following passage from Managing Troubled Waters (National Academy Co, 2003) explains this iterative process.

> *"The reality of imperfect knowledge about marine systems means that monitoring should be used as an opportunity to increase and refine our knowledge of them. Data and information derived from monitoring programs should be used to check, validate, and refine the assumptions, models, and understandings on which the monitoring was based. This iterative feedback increased predictive ability, reduces uncertainty, and ultimately reduces the monitoring effort needed. As discussed in Chapter 2, risk-free decision making is not achievable, and monitoring must be viewed as a way of reducing uncertainty, not of eliminating it."*

The following table identifies the aspects of a stormwater program that are needed to advance the knowledge of the systems and identifies the number of studies that are relevant to each category. Each of these categories is considered in relation to specific pollutants of concern or elements of the watershed system.

Table 1. Assessment #1 - Studies by Program Management Category.

	Source Identification	Understanding processes	Developing new tools	Determine compliance with WQs/TMDLs	Evaluate Program/ Measure Effectiveness	Provide Early Warning
Bacteria	6	3	1	6	2	2
Nutrients	4	2	1	3	2	1
Inorganics-Metals	3	2	1	3	2	1
Organics-Pesticides	3	2	1	3	3	1
Toxicity	3	2	1	3	2	1
Water Chemistry	3	2	1	4	2	1
Fish Tissue	0	0	0	1	0	0

Assessment #2 – Study and Program Type

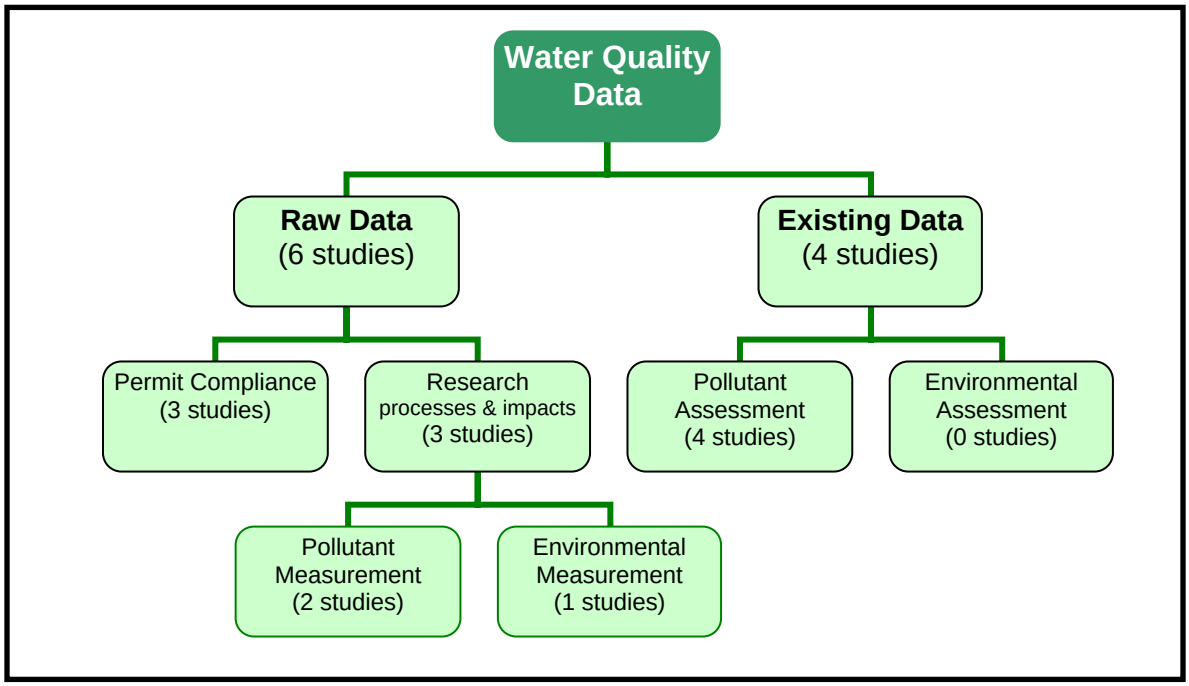
The 10 studies and programs identified within the Newport Coastal Streams Watershed have generated different types of water quality data. This data falls within two broad categories including: (1) generation of raw data and (2) assessment of existing data.

Raw data studies and programs include specific sampling or monitoring activities. A total of 6 studies are included in this category. New data was generated with two different objectives. The first objective was compliance with National Pollutant Discharge Elimination System (NPDES) permits. Compliance activities include the Orange County NPDES and Total Maximum Daily Load (TMDL) monitoring programs as well as monitoring programs conducted by other permitted facilities. The second objective in generating raw data was to understand the concentration levels or processes related to the pollutants, or the impacts of the pollutants, on the ecosystem. Studies targeting pollutant concentrations and processes generally involved direct measurements of the pollutants while studies targeting the impacts of the pollutants generally involved other environmental measurements. Some studies generated new data and used existing data and are included in both categories.

Studies that focused on the assessment of existing data were performed with the objectives of either understanding the behavior of a pollutant within the Newport Coastal Streams watershed system through direct measurement of those pollutants or understanding the impacts of the pollutants by measuring other environmental parameters. A total of 4 studies are included in this category.

The following figure shows the category breakdown of the studies as well as the general objective of the study.

Figure 2. Study Category Breakdown.



Assessment #3 – Study or Program Details

The final assessment that was made of the studies and programs was to look at basic details such as who performed the study and what pollutants were included in those studies and programs.

Within the Newport Coastal Streams Watershed the major generators of water quality data are the City of Newport Beach, the Southern California Coastal Water Research Project (SCCWRP), and the County of Orange. The following table identifies the organizations responsible for each of the 10 studies. For collaborative studies, the primary organization was used for the accounting below.

Table 2. Study Sources

Organization	# of Studies
City of Newport Beach	3
SCCWRP	2
County of Orange (RDMD, OCHCA)	2
National Resource Defense Council	2
Regional Water Quality Control Board	1

Each of the 10 water quality studies or programs that were identified as part of this data assessment addressed one or more specific pollutants. Six (6) categories of constituents were identified that encompass nearly all of the specific data that was monitored or assessed. These 6 categories include:

- Bacteria
- Nutrients

- Metals
- Pesticides
- Toxicity – various levels of toxicity studies were performed
- Conventional water chemistry – this includes a wide ranges of variables such as pH, hardness, and temperature

The following table shows the distribution of the studies within each of these categories. Many studies include work related to several constituents.

Table 3. Constituent Focus of Studies and Programs

Constituent	# of Studies
Bacteria	8
Nutrients	4
Metals	3
Pesticides	4
Toxicity	3
Water chemistry	4

DATA GAPS

Managing and improving water quality in an urban environment is a complex issue. The science needed to deal with many of the issues that arise during the management process is evolving, and in some cases has not yet developed to the point that important questions can readily be answered in absolute quantifiable terms. Examples where our understanding is not fully developed are as follows:

- Stormwater runoff modeling relative to pollutants of concern. This modeling is not totally reliable for predictive purposes and needs large data sets to calibrate.
- Methods (such as MST (microbial source tracking)) for more accurately identifying sources of pathogens in runoff (e.g., wildlife, pets, humans) are still being refined. Only qualitative methods exist at this time and they are not yet able to be directly translated into a loading assessment. For example, we may be able to say that 50% of the fecal coliform bacteria from a sample are from dogs but this does not imply that 50% of the loading of fecal bacteria is from dogs.
- The effectiveness of various BMPs (Best Management Practices) under varying conditions has not been systematically assessed under field conditions.

These and other data gaps have been identified to some extent in the research study reports, the research agenda for the Stormwater Monitoring Coalition, and the specific requirements of the NPDES permits. However, a thorough and conceptually organized listing of data gaps must stem from a thoughtful description of the key management questions related to the watershed. There are two reasons for this. First, there is a virtually infinite array of scientific data that could be gathered in a complex system such as this. It is essential to focus effort on those data types that are useful in decision making. Second, data gaps sometimes stem, not from the absence of data, but from the inability to adequately integrate existing data. Articulating clear questions enables studies

to be designed so that disparate data types can be combined as needed to address complex issues.

Pollutant Data Gaps

The list below identifies data gaps related to a specific pollutant, bacteria. A lengthier discussion of the bacteria-related data gaps follows the summary list below.

- *Bacteria*
  - Urban vs. natural sources
  - Rapid Bacteriological Indicators
  - MST (microbiological source tracking) identification methods

Bacteria

A special study will be performed to improve understanding of the correlations between levels of indicator bacteria in the surfzone (where most of the contact recreational activities take place) and levels in the stormdrains themselves. This study will be performed by the County as part of the Santa Ana Region Water Quality Monitoring Program based on the approach recommended by the Stormwater Monitoring Coalition.

The applicability of current bacteriological indicators for measuring human health risk and for identifying the sources of pathogen contamination needs further refinement. Two projects identified in SCCWRP Technical Report 35B *Stormwater Research Needs in Southern California* identify plans to address these issues. The first project (Project 12. *Develop rapid response indicator(s) for microbial contamination*) is focused on producing easily used field tests that would provide a reliable measure of bacteriological contamination within a few hours at most. The second project (Project 13. *Develop microbial source tracking protocol*) will select methods (primarily genetic-based) that provide the most dependable means of identifying and distinguishing among sources.

Considerable resources are being expended to reduce bacterial contamination from watershed sources, but in many cases storms drains continue to discharge large concentrations of fecal indicator bacteria (FIB). A study by SCCWRP will examine if FIB can grow in storm drain sediments. This study, *Storm Drains and Sediments as Reservoirs of Fecal Indicator Bacteria*, is being led by John Griffith.

Other Data Gaps

In addition to the data gaps related to specific pollutants, there are data gaps related to specific beneficial use impairments and the use attainability analyses relative to the achievability of a water quality goal. Specifically, what is the direct and indirect link between the beneficial use impairment by a pollutant and how is this linked to the water quality standard? In addition, what is the link between pollutant source control, and pollutant treatment management relative to achieving a specific water quality standard or goal? In other words, is there data to demonstrate that a goal is achievable or not? In the case of bacteria there may be a need to gather data relative to controllable sources to determine what is truly attainable and whether or not a use attainability analysis should be conducted relative to compliance requirements. Studies needed to answer many of

these questions (and eliminate the data gap) have been identified in the *Phase 1 Stormwater Quality Standards* report (SAWPA, 2005).

An additional data gap exists with the ability to use any given set of data for further analysis. Figure 2, which identifies the number of studies in each category, indicates a number of studies / programs generating new data. This may indicate that some of the studies have been conducted independent of the overall needs of the regulatory compliance goals throughout the watershed. The Stormwater Monitoring Coalition has recognized the need to develop a regional stormwater monitoring infrastructure. As part of the *Stormwater Research Needs in Southern California* report (SCCWRP, 2002), the coalition has identified 4 projects to address this need. These projects include (1) integrate and evaluate available data; (2) standardize sampling and analysis protocols; (3) develop a regional data infrastructure; and (4) measure BMP effectiveness.

An additional data gap that the Stormwater Monitoring Coalition (SCCWRP, 2002) has identified is a need to improve fundamental understanding of stormwater mechanisms and processes. To meet this need the following projects have been identified: (1) develop a system wide conceptual model; (2) Determine appropriate reference conditions; (3) develop a regional method for measuring beneficial use condition; and (4) identify relative contribution of nonpoint sources to urban runoff loads.

The final data gap identified by the Stormwater Monitoring Coalition (SCCWRP, 2002) is related to identifying receiving water impacts. The following studies were identified to address this need: (1) identify the causes of impact in receiving waters; (2) develop bioassessment indicators and protocols; (3) develop improved toxicity testing procedures; (4) develop raid response indicator(s) for microbial contamination; (5) develop microbial source tracking protocol; (6) evaluate BMP effects on receiving water impacts; and (7) develop improved indicators of peak flow impacts.

Several of the identified Stormwater Monitoring Coalition projects have been funded and are underway.

Attachment 1: Newport Coastal Streams Environmental Matrix

Table 4. Abbreviation Definitions

Abbreviation	Definition
BMP	Best Management Practice
DAMP	Drainage Area Management Plan
NPDES	National Pollutant Discharge Elimination System
NRDC	National Resources Defense Council
MST	Microbial Source Tracking
OCHCA	Orange County Health Care Agency
RDMD	Resources & Development Management Department
SCCWRP	Southern California Coastal Water Research Project
TMDL	Total Maximum Daily Load
WAP	Watershed Action Plan

Bibilography for the Newport Coastal Streams Watershed

Record #	Program Name or Report Title	Start Date	End Date	entity	Bacteria	nutrients	metals	pesticides	toxicity / TIE studies	water chemistry	fish tissue	sediments	comments	Source identification	understanding processes	Developing New Tools	determine compliance w/ WQ Standards & TMDLs	evaluate program & measure effectiveness	early warning		
1	Orange County NPDES/TMDL Program		ongoing	OC	1	1	1	1	1	1				1	1	1	1	1	1			
2	2004 Annual Ocean and Bay Water Quality Report	1975	ongoing	OCHCA	1									1			1		1			
4	Newport Bay and Coast ASBS Study		ongoing	City of Newport Beach	1	1	1	1	1	1				1	1		1	1				
5	Newport Coast Flow and Water Quality Assessment		ongoing	City of Newport Beach	1	1	1	1	1	1				1			1					
7	Runoff Source Identification in Buck Gully		ongoing	City of Newport Beach									quanitfy dry weather flow volumes	1								
13	Testing the Waters: A Guide to Water Quality at Vacation Beaches	2006	Aug-97	NRDC	1									1	1							
14	Water Quality at Southern California Beaches	2005		NRDC	1					1			water quality measurments of southern california beaches				1					
15	SARWQCB Watershed Management Initiative Chapter		2004	RWQCB	1	1								1								
16	Bioaccumulation of Contaminants in Flatfish of Southern California	1996	Jun-05	SCCWRP				1			1		PCB and DDT contaminants in flatfish tissues					1				
17	Model Monitoring Program for Large Ocean Discharges in Southern California	2002	2005	SCCWRP	1												1					
19	Water Quality and Marine Ecological Monitoring Studies for the Crystal Cove Development Project: Interim Report	Jan-00	3-Apr	RWQCB	1	1	1	1	1									1				

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EXECUTIVE SUMMARY

This "Watershed Action Plan (WAP)", Appendix D of the Drainage Area Management Plan (DAMP), was prepared to meet Section XVI of the municipal National Pollutant Discharge Elimination System (NPDES) Stormwater Permit - Order R8-2002-0010 and Section J and L of the municipal NPDES Stormwater Permit - Order R9-2002-0001, as described in **Section 12** of the **DAMP**. Commitments to watershed planning to address water quality issues are also included in **Section 3.0** of the **DAMP**.

Within Orange County there are both watershed and jurisdictional efforts to improve water quality. The jurisdictional efforts are captured as part of the Local Implementation Plans (LIPs). The Watershed Action Plan (WAP) was created to capture the regional efforts that are undertaken to provide a watershed-based collaborative effort to address constituents of concern in a specific watershed.

The purpose of this document is to present a planning framework for the Newport Coastal Streams Watershed to:

- Identify the most significant water quality issues related to urban runoff sources that can be addressed at a multi-jurisdictional watershed-scale,
- Focus jurisdictional pollution prevention and source control programs on local constituents, of concern, to identify treatment control opportunities,
- Incorporate prior data from planning studies,
- Identify indicators to track progress, and
- Ultimately develop an integrated plan of action for urban sources that results in meaningful water quality improvement in the Newport Bay Watershed.

The document also describes the numerous existing programs related to water quality and the activities conducted by the Watershed Permittees at the watershed scale.

The following sections comprise the WAP:

Section 1.0 describes the environmental setting of the watershed, discusses program coordination between the Watershed Permittees, and outlines the approach taken in plan development.

Section 2.0 provides an assessment of current water quality conditions and identifies issues and data gaps and constituents of concern. The constituents of concern identified for this watershed include fecal coliform and total coliform.

Section 3.0 provides information on how total maximum daily load (TMDLs) are developed and the schedule for future TMDLs.

Section 4.0 discusses pollution sources and provides an inventory of treatments and enhanced best management practices (BMPs) that have been implemented in the watershed.

Section 5.0 focuses on the recommendations for actions to be taken to address the water quality issues of the watershed and discusses the annual means of assessment of the program effectiveness.

D-1.0 INTRODUCTION

The designation of "Newport Coastal Streams Watershed" refers to the hydrologic watershed that is defined by drainage and only minimally by jurisdictional boundaries. The Newport Coastal Streams Watershed drains approximately 14 square miles to the Pacific Ocean within southern Orange County, California. The watershed encompasses all waters draining to the coast between Newport Bay and Laguna Coastal Streams watershed. This watershed includes the following water courses: Buck Gully, Los Trancos, Muddy Creek, Moro Creek, and Emerald Creek. The Newport Coastal Streams Watershed falls under both the Santa Ana and San Diego Regional Water Quality Control Boards (Regional Boards). The boundary between the two Regional Boards is between Muddy Creek (Santa Ana Regional Board) and Moro Creek (San Diego Regional Board).

The Watershed Permittees includes two cities within the watershed (Laguna Beach and Newport Beach), and unincorporated County of Orange. Based on their experience, a Watershed Action Plan (WAP) within the Drainage Area Management Plan (DAMP) has been developed to attain the following multiple objectives:

- To meet the requirements of, Section J and L of the municipal NPDES Stormwater Permit - Order R9-2002-0001 to develop a Watershed Urban Runoff Management Plan (WURMP). This WAP serves as a WURMP.

- To meet the requirement to update Appendix N of the DAMP as contained in the municipal National Pollution Discharge Elimination System (NPDES) stormwater permit (Order R8-2002-0010).

- To identify the most significant water quality issues and constituents of concern on a watershed scale and relate these to urban sources.

- To focus the pollution prevention and source control programs implemented at an individual jurisdiction level on the identified constituents of concern and to identify any jurisdiction-specific treatment control opportunities.

- To identify the water quality issues that are most appropriately addressed through a multi-jurisdictional watershed-scale approach.

- To identify information that is relevant to the Newport Coastal Streams Watershed that has been developed as part of local, watershed, or regional studies.

- To develop an integrated plan of action that results in meaningful water quality improvement in the Newport Coastal Streams Watershed and balances economic, social, and environmental constraints.

- To identify indicators to track progress that lead to improvements in the quality of the receiving waters.

The Watershed Permittees have developed Local Implementation Plans (LIPs) addressing programs and activities that are implemented or being pursued on a jurisdictional basis.

Watershed cities and stakeholder groups are also pursuing projects that are intended to have a positive effect on water quality issuing to receiving waters. These include the following major initiatives:

- Since 1990 the Watershed Permittees have developed and implemented common water quality programs within their own jurisdictions in response to the requirements of the municipal NPDES stormwater permit.

- Assembly Bill (AB) 411 went into effect in 1999, posting new requirements for surfzone/beach water testing along the California coastline. The Health Care Agency (OCHCA) performs the required testing and postings of beach closures within Newport Bay.

- Since 2003, each Watershed Permittee has implemented a Local Implementation Plan (LIP, 2003 DAMP Appendix A). 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 can, in most cases, be focused on targeted constituents of concern to be identified through the monitoring program.

The Newport Coastal Streams WAP borrows much of its organization, structure, and terminology from the 2003 DAMP of which it is an appendix. The following sections are included in the WAP:

- **Section 1.0** describes the watershed and environmental setting, the program management coordination between the Watershed Permittees and other stakeholders, and the approach taken to develop the plan.

- **Section 2.0** assesses the water quality information available and identifies the water quality issues and constituents of concern.

- **Section 3.0** provides details on the development of TMDLs and provides information on the schedule for future TMDLs in the watershed.

- **Section 4.0** discusses the urban sources of pollution, the available treatments for pollution control, and an inventory of enhanced BMPs that have been implemented in the watershed that address specific pollutants of concern.

- **Section 5.0** focuses on the recommendations for actions to be taken to address the water quality issues of the watershed and discusses the annual means of assessment of the program effectiveness.

The Newport Coastal Streams WAP is intended as a living document, one capable of being modified as new information becomes available and problems are addressed. It identifies the current state of knowledge on the issues facing the Newport Coastal Streams. It also identifies the actions to which the Watershed Permittees have made commitments. Annual assessments

will be made to identify the progress on these actions and the schedule for continued efforts related to that action. This assessment will be reflected through annual updates to the strategy tables described in **Section 5.0** and included as an Exhibit to the WAP.

D-1.1 Watershed Setting

For the purposes of organizing water quality improvement efforts for a watershed-based methodology, the Newport Coastal Streams Watershed consists of all waters draining into the Pacific Ocean between Newport Bay to the north and the Laguna Coastal Streams watershed to the east and south. The Newport Coastal Streams Watershed is located in southern Orange County, approximately 39 miles south of Los Angeles and 71 miles north of San Diego. The entire watershed spans 14 square miles (**Figure D-1**). It consists of small, mostly ephemeral streams including Buck Gully, Los Trancos Canyon, Muddy Canyon, Moro Canyon, and Emerald Canyon Creeks, draining the south and west areas of the San Joaquin Hills into the Pacific Ocean.

Approximately one-quarter of the Newport Coastal Streams Watershed is urbanized. Of the remaining land, virtually all is un-developable due to mountainous slopes or protected habitat. About 8 square miles of open space area within the watershed are set aside as the Crystal Cove State Park and in the Natural Community Conservation Plan & Habitat Conservation Plan (NCCP/HCP). The NCCP/HCP includes Laguna Coast Wilderness Park, and the Newport Beach, Irvine Coast, and Laguna Beach Marine Life Refuges. The watershed is bounded by the Newport Bay Watershed to the north and by the Laguna Coastal Streams watershed to the south and east.

There is currently one major northeast-southwest transportation route (Newport Coast Drive) and one southeast-northwest transportation route (Hwy 1) that provides access to the Newport Coastal Streams Watershed. The Pacific Coast Highway (Hwy 1) parallels the coast along the Pacific Ocean. Major roadways of the Newport Bay Watershed are shown in **Figure D-2**. School Districts are shown in **Figure D-3a**; cities are shown in **Figure D-3b**; water districts are shown in **Figure D-3c;** and parks and open space are shown in **Figure D-3d**. Existing land use within the watershed is show in **Figure D-4**.

Figure D-1: Location Map

See next page for figure.

Figure D-1 Location Map
Newport Coastal Streams

Figure D-2: Transportation

See next page for figure.

Figure D-2 Major Transportation Routes Newport Coastal Streams

Figure D-3a: Unified School Districts

See next page for figure.

Figure D-3a Unified School Districts
Newport Coastal Streams

Figure D-3b: City Boundaries

See next page for figure.

Figure D-3b Cities
Newport Coastal Streams

Figure D-3c: Water Providers

See next page for figure.

Figure D-3c Water Districts
Newport Coastal Streams

Figure D-3d: Parks & Open Space

See next page for figure.

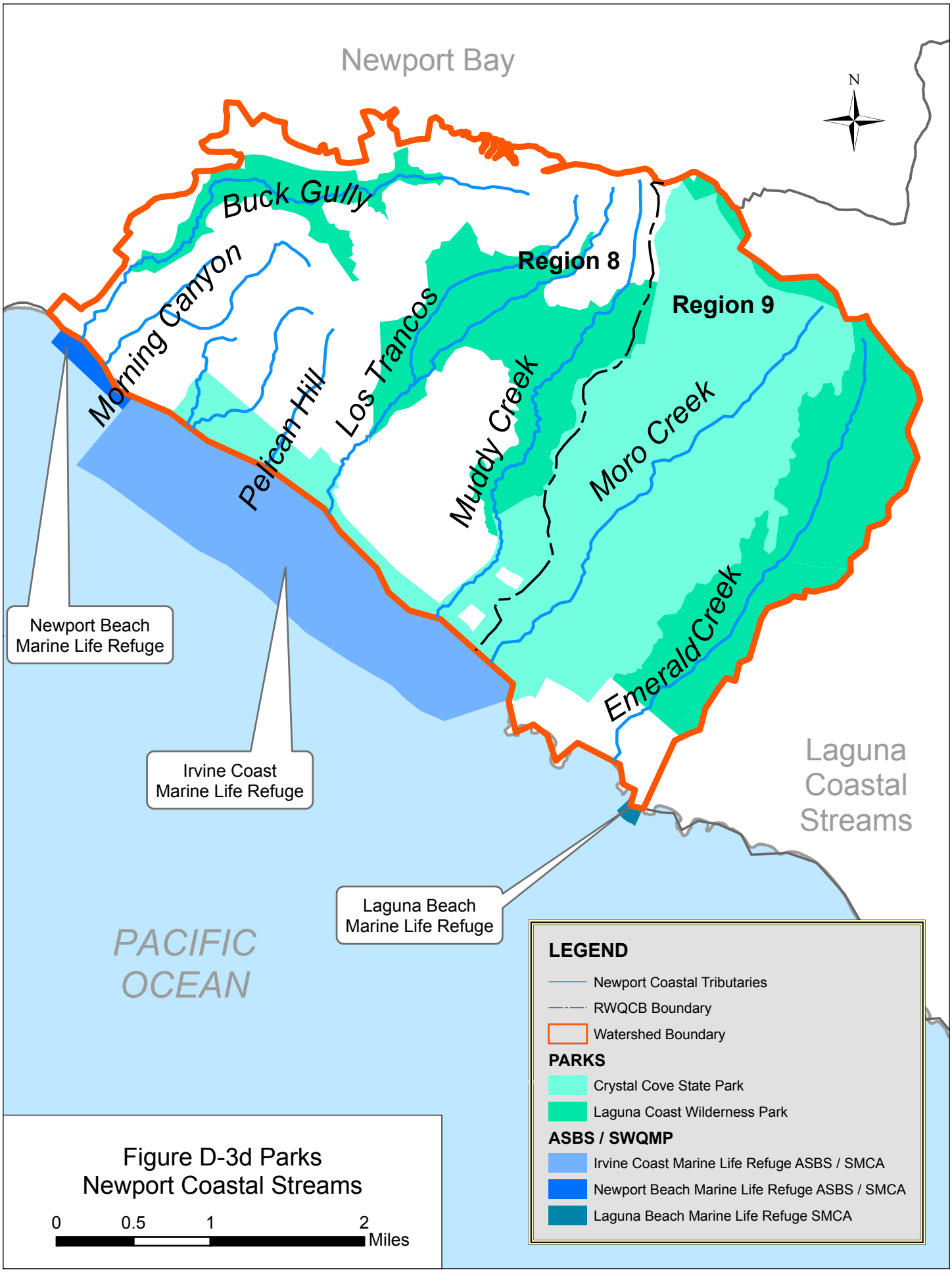

Newport Bay
N
Buck Gully
Morning Canyon
Region 8
Region 9
Los Trancos
Pelican Hill
Muddy Creek
Moro Creek
Emerald Creek
Newport Beach
Marine Life Refuge
Irvine Coast
Marine Life Refuge
Laguna Beach
Marine Life Refuge
Laguna
Coastal
Streams
PACIFIC
OCEAN
LEGEND
Newport Coastal Tributaries
RWQCB Boundary
Watershed Boundary
PARKS
Crystal Cove State Park
Laguna Coast Wilderness Park
ASBS / SWQMP
Irvine Coast Marine Life Refuge ASBS / SMCA
Newport Beach Marine Life Refuge ASBS / SMCA
Laguna Beach Marine Life Refuge SMCA
Figure D-3d Parks
Newport Coastal Streams
0
0.5
1
2
Miles

Figure D-4: Land Use - Existing

See next page for figure.

Figure D-4 Land Use
Newport Coastal Streams

D-1.2 Beneficial Uses

The Newport Coastal Streams Watershed is within the jurisdiction of the Santa Ana Regional Board and the San Diego Regional Board. The portion of the watershed (Muddy Creek and north) within the Santa Ana Regional Board has been identified within the subunit of the Lower Santa Ana River Basin (designated Hydrologic Unit 801.11). The Water Quality Control Plan for the Santa Ana River Basin (hereafter, Santa Ana Basin Plan) lists only the nearshore zone of the ocean waters within the Newport Coastal Streams Watershed as having designated beneficial uses. The portion of the watershed (Moro Canyon and south) within the San Diego Regional Board has been identified within the subunit of the Orange County Coastal Streams (designated Hydrologic Unit 1.11). The Water Quality Control Plan (hereafter, San Diego Basin Plan) identifies beneficial uses for Moro Canyon, unnamed intermittent coastal streams, and Emerald Canyon and the Pacific Ocean.

The following existing beneficial uses are designated in the Basin Plans for the above streams and ocean:

AGR – agricultural supply
IND – industrial service supply
NAV - navigation
REC1 – contact water recreation
REC2 – non-contact water recreation
COMM – Commercial and sportfishing
WARM – warm freshwater habitat
BIOL – preservation of biological habitats of special significance
WILD – wildlife habitat
RARE – rare, threatened, or endangered species
SPWN – spawning, reproduction, and development
MAR – marine habitat
SHEL – shellfish harvesting

Table D-1 shows the beneficial uses associated with each waterbody.

Table D-1: Beneficial Uses – Newport Coastal Streams Watershed

	Beneficial Use																				
Name	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Hydrologic Unit
Ocean Waters																					
Pacific Ocean / Nearshore Zone	+		•			•		•	•	•				•	•	•	•	•	•		
Inland Surface Streams																					
Moro Canyon	+	•						○	•		•				•						1.11
unnamed intermittent coastal streams	+	•						○	•		•				●						1.11
Emerald Canyon	+	•						○	•		•				•						1.11

• Existing Beneficial Use ○ Potential Beneficial Use + Excepted from MUN

The following is a description of the relevant beneficial use designations:

Agricultural Supply (AGR) – Used for farming, horticulture or ranching. Uses may include irrigation, stock watering, and support of vegetation for range grazing.

Industrial Services Supply (*IND*) – waters used for industrial activities that do not depend primarily on water quality. These uses many include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Navigation (*NAV*) – Include uses of water for shipping, travel or other transportation by private, commercial or military vessels.

Contact Water Recreation (REC1) – Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, white water activities, fishing, or use of natural hot springs.

Non-Contact Water Recreation (REC2) – Includes uses of water for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beach combing, camping, boating, tidepool, and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Commercial and Sportfishing (COMM) – Includes uses of water for commercial or recreational collection of fish or other organisms, including those collected for bait. These uses may include, but are not limited to, uses involving organisms intended for human consumption.

Biological Significance (BIOL) – Preservation of Biological Habitats of Special Significance. Supports designated areas or habitats, including, but not limited to, established refuges, parks, sanctuaries, ecological reserves or preserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.

Warm Freshwater Habitat (WARM) –Supports warm water ecosystems that may preserve and enhance aquatic habitats, vegetation, fish and wildlife, including invertebrates.

Wildlife Habitat (WILD) – Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE) – Includes uses of water that support habitat necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered. Among plants or animal species which were used in the designation of specific water bodies with RARE beneficial uses are: least Bell's vireo (bird), California least tern (bird), light-footed clapper rail (bird), California brown pelican (bird), Belding's savannah sparrow (bird), willowy monardella (plant), humpback and blue whale (mammals), bald eagle (bird), tidewater goby (fish),

southwestern willow flycatcher (bird), salt-marsh bird's beak (plant), Pacific green sea turtle (reptile), and western snowy plover (shore bird). The RARE designation is placed on water bodies where the protection of a threatened or endangered species depends on the water either directly or to support its habitat.

Spawning, Reproduction, and Development (SPWN) – Includes uses of water to support high quality aquatic habitats necessary for reproduction and early development of fish and wildlife.

Marine Habitat (*MAR*) – Include uses of water to support marine ecosystems that are not limited to, preservation and enhancement of marine habitats, vegetation (e.g., kelp), fish and shellfish, and wildlife (e.g., marine mammals and shorebirds).

Shellfish Harvesting (SHEL) – Includes uses of water to support habitats necessary for shellfish (e.g., clams, oysters, limpets, abalone, shrimp, crab, lobster, sea urchins, and mussels) collected for human consumption, commercial or sports purposes.

D-1.3 Constituents of Concern

As discussed in the Introduction, the focus of the WAP is to address the constituents of concern within the watershed. The constituents of concern in the Newport Coastal Streams Watershed are those pollutants for which a TMDL has been developed or is proposed to be developed. These pollutants, which include fecal coliform and total coliform, are discussed in more detail in **Section 3.0**.

D-1.4 Watershed Program Management

Program management of various water quality improvement programs within the Newport Coastal Streams Watershed occurs at two distinct levels: (1) activities conducted by the Watershed Permittees individually in implementing jurisdictional programs in their LIPs based on the model programs in the DAMP and in compliance with the municipal NPDES stormwater permits and (2) activities conducted by the Watershed Permittees and others collectively to address specific water quality issues on a watershed scale identified through the Water Quality Planning Process (see **DAMP Section 3**).

Based upon the annual watershed assessment (discussed in **Section 5.0**), the Watershed Permittees and other participating jurisdictions will work together to address the priority water quality issues identified through the watershed planning processes. It is anticipated that water quality issues that are determined to be specific to a jurisdiction would be referred to that jurisdiction and thereafter be addressed as a jurisdictional program initiative through the LIP. Alternatively, the issue may originate from multiple jurisdictions within the watershed. In this instance, the problem would be addressed as a watershed cooperative effort.

Updates to this program will be the subject of annual reporting each November, which will include a water quality assessment and revisions to the listed water quality improvement initiatives.

D-2.0 WATER QUALITY ASSESSMENT

The Watershed Action Plans of the DAMP focus on the water quality within particular watersheds and how the water quality is impacted by urban discharges. Urban discharges include surface runoff from residential, commercial, and industrial areas. Pollution sources that are not considered as part of the urban watershed planning responsibilities are atmospheric deposition and agricultural runoff. The following figure (**Figure D-5**) demonstrates the physical processes involved with generation of pollution and its fate and transport.

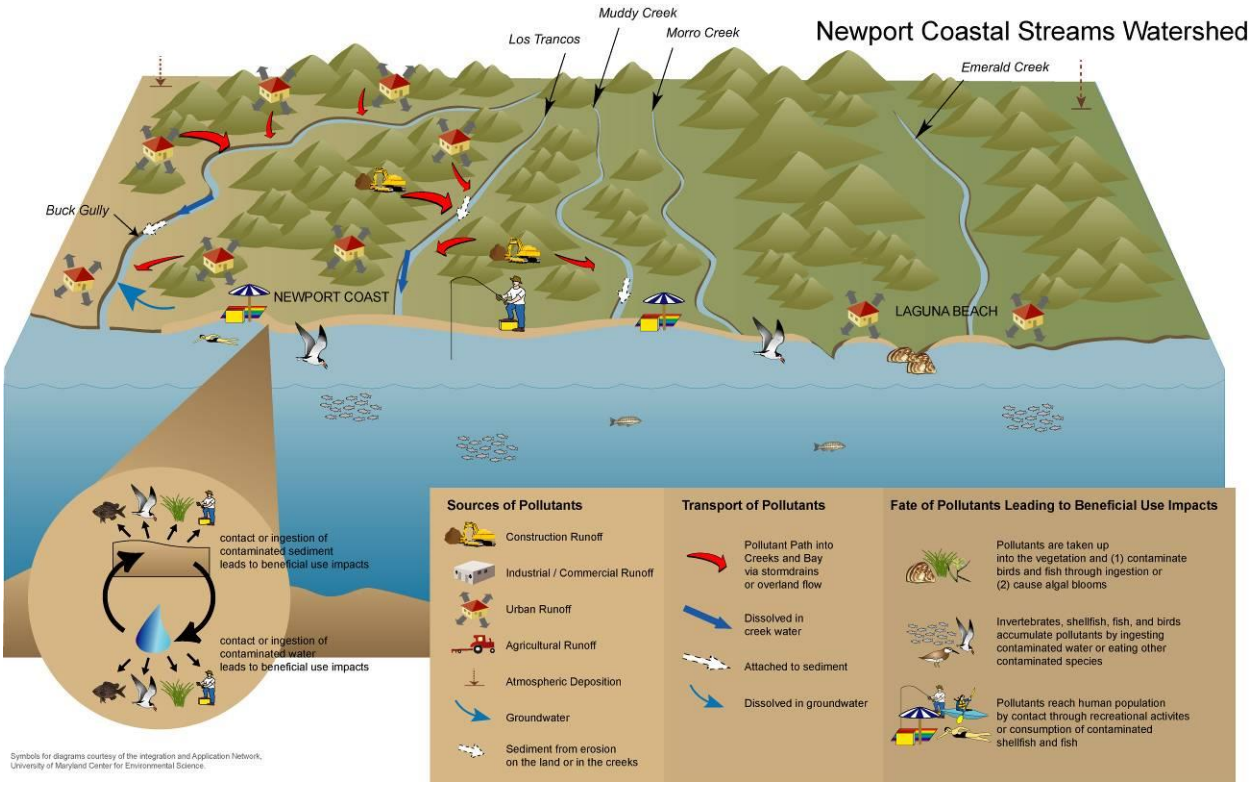


Figure D-5: Newport Coastal Streams Watershed Processes.

Within the Newport Coastal Streams Watershed there have been several major initiatives to monitor and assess the water quality:

- The NPDES Program began in 1990 and is anticipated to continue into the foreseeable future.

- The OCHCA (in cooperation with OCSD) has been testing coastal waters in Orange County over the past 40 years for bacteria that indicate the possible presence of disease-causing organisms. Monitoring in the surfzone is performed by OCHCA. Monitoring data are compared to the bacteria water quality standards established following the adoption of AB411.

D-2.1 Summary of Monitoring Activities

The major monitoring programs in the Newport Coastal Streams watershed are described below.

D-2.1.1 NPDES Monitoring and Assessment Program

NPDES permits are issued for a 5-year term and are issued on an area-wide basis. The first municipal NPDES Stormwater Permit was for the period 1990-1996; the Second Term Permit covered 1996-2002; and the Third Term Permit covers 2002-2007. Each of the permits has required the development and implementation of a monitoring program to support an effective County-wide urban stormwater management program.

D-2.1.1.1 First Term Permit Monitoring Program 1991 - 1999

The monitoring program for the First Term Permit, which extended through 1998, consisted of four elements—field screening, channel monitoring, harbor/bay monitoring, and sediment sampling.

- Field Screening was performed to detect the presence of illegal discharges or illicit connections. Physical and chemical analyses were conducted in the field. The annual evaluation of each station included two dry-weather samplings and one storm sampling. No field screening monitoring stations were located within the Newport Coastal Streams watershed included.

- Channel monitoring focused on specific watercourses with beneficial uses identified in the Basin Plan. Stations were monitored monthly and during storms. Samples were collected using automatic samplers and analyzed for pH, electrical conductivity, turbidity, nutrients, total suspended solids, volatile suspended solids, and total recoverable metals.

- Harbor/bay sites were monitored semiannually and during storms for nutrients in the water column and trace metals and organics in the sediment. In addition sediment sampling was conducted semiannually from designated channels and several bays and harbors. Samples were evaluated for metals, pesticides, herbicides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs).

D-2.1.1.2 Second Term Permit Monitoring Program 1999 - 2005

The First Term Permit monitoring program was continued into the second permit term. In 1999 the 99-04 Plan was developed and implemented as a transition program between the second and third term permits. This Plan revised the geographic focus of the monitoring effort by designating "warm spots" (where constituents are substantially above system-wide averages) and "Critical Aquatic Resources" or CARs. The CARs were prioritized and additional monitoring stations selected to gather data at those sites. In the Newport Coastal Streams Watershed there were no "warm spots" or CAR monitoring locations.

D-2.1.1.3 Third Term Permit Monitoring Program 2005 - present

Three kinds of monitoring are included in this plan.

- Core Monitoring – routine and related to small-scale or site-specific problems and processes,
- Regional Monitoring – periodic, collaborative, and larger-scale surveys, and
- Special Studies – tightly focused and relatively short-term studies.

The following is a list of the seven Program Elements of the Monitoring Plan. Each of the three types of monitoring listed above are considered and incorporated as appropriate into each of the program elements. The monitoring stations associated with each program element are included in **Figure D-6**.

Long-term mass emissions monitoring – includes measurements of key pollutants, loads, and exceedances to monitor progress. Within the Newport Coastal Streams Watershed, there are no established stations.

Estuary / wetlands monitoring – includes measurements of key pollutants, loads and biological community parameters to describe impacts of urbanization on estuarine and wetland ecosystems. No estuary/wetlands monitoring stations are located in this watershed.

Bacteriological/ pathogen monitoring – uses a suite of bacterial indicators to determine the impacts of stormwater and non-stormwater runoff and identify spatial and temporal patterns of elevated concentrations to prioritize problem areas. Stations were identified at coastal drains and channels. The following four channel sites are located in the Newport Coastal Streams watershed:

- Buck Gully
- Pelican Point Creek
- Waterfall Creek
- Muddy Creek

Urban stream bioassessment monitoring – uses a triad of indicators (bioassessment, chemistry, and toxicity) to define the impacts to stream communities and the relationship of the impacts to runoff. No bioassessment sites have been selected in the Newport Coastal Streams watershed.

Dry weather reconnaissance – uses measurements of key pollutants to identify illegal discharges and illicit connections. Throughout the County approximately 30 sites will be monitored, with 10 additional sites selected at random. No sites are located in the Newport Coastal Streams watershed.

Land use correlations– uses available experimental designs to identify changes in runoff and sediment load associated with the urbanization of previously agricultural land. Two land use sites will represent both a flat and a hillside agricultural plot. Seven monitoring locations that cover three experimental conditions and a reference condition have been selected; all sites are located in the City of Irvine. None of these sites are located in the Newport Coastal Streams watershed.

TMDL monitoring – TMDLs have not yet been established in this watershed; therefore, no TMDL monitoring is performed.

D-2.1.2 OCHCA Bacteria Monitoring

Over the past 40 years the OCHCA and local sanitation agencies (OCSD and SOCWA) have been testing the coastal waters in Orange County for bacteria that indicate possible presence of human disease-causing organisms. As of 1999, new requirements for frequent testing of surfzone waters and stringent criteria for beach water closures went into effect as part of AB411. Samples are collected weekly at approximately 150 ocean, bay, and drainage locations throughout coastal Orange County. Within the Newport Coastal Streams Watershed, there are 18 sample locations. **Figure D-6** shows the subwatersheds and the monitoring locations within the Newport Coastal Streams Watershed.

D-2.1.3 SCCWRP Bight Study

SCCWRP coordinates regular monitoring efforts of the Southern California Bight from Point Conception to the Mexico border. The most recent Bight '03 Study was divided into three program components—coastal ecology, water quality, and shoreline microbiology. These studies include monitoring stations in close proximity to the Newport Coastal Streams watershed, both to the north (Newport Bay) and in the ocean at the "Orange Shelf". No monitoring stations are located within the watershed. Additional reports as part of the Coastal Ecology component of the Bight '03 Study will include: Sediment Chemistry, Benthic Macrofauna, and Demersal Fish and Megabenthic Invertebrates.

Figure D-6: Subwatersheds & Monitoring Locations

See next page for figure.

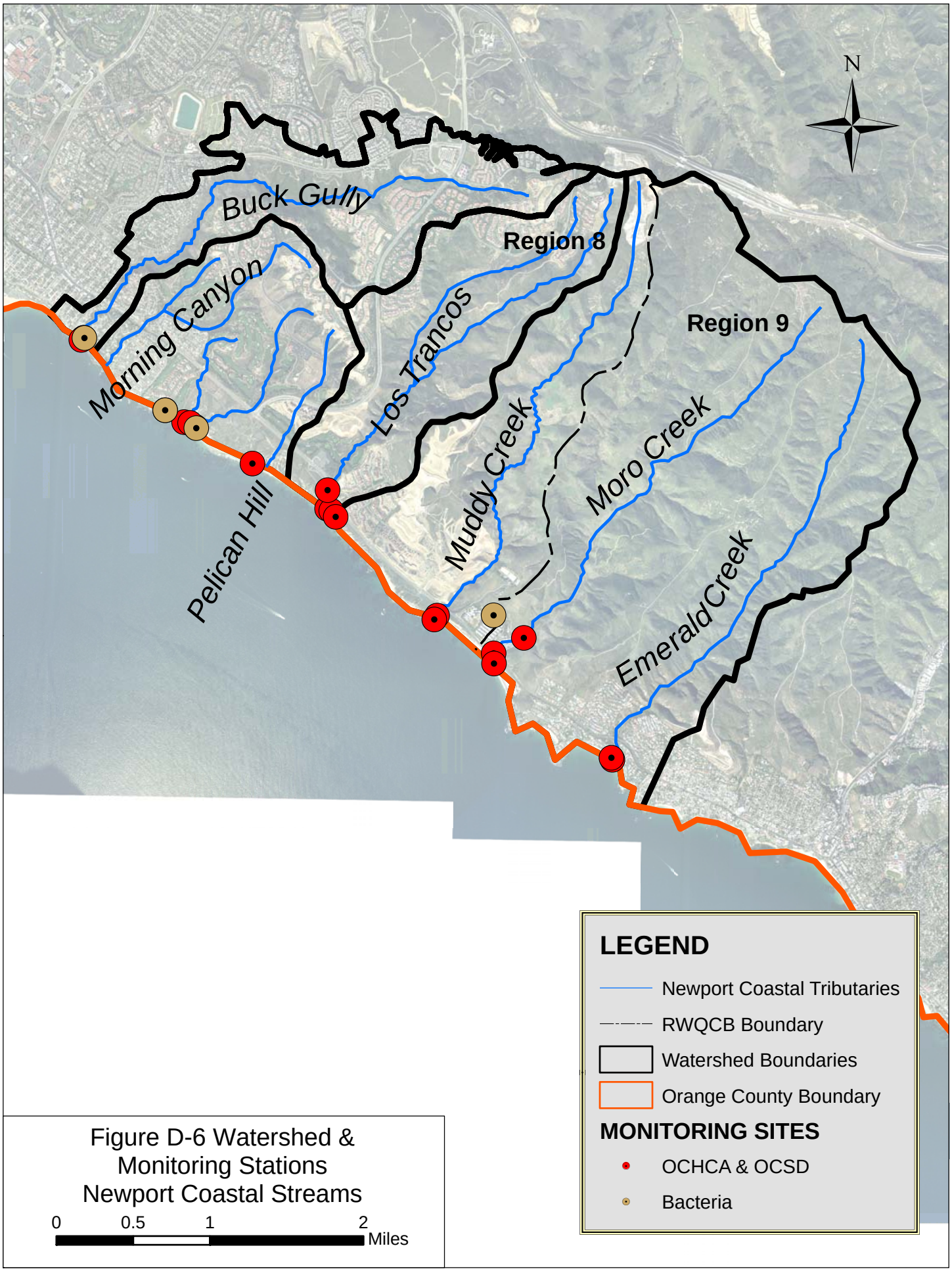


Figure D-6 Watershed & Monitoring Stations Newport Coastal Streams

D-2.2 Assessment of Data and Studies

It is a significant challenge to assemble the studies and programs in the Newport Coastal Streams watershed into a meaningful framework that identifies the type of data or results available. To meet the various user needs for this document, data collected in this data collection effort (ending in December 2006) were evaluated for different aspects or perspectives, including program management and policies, study and program type, and study or program details. A total of 11 studies were collected as part of this data collection effort. Details of these studies is included in the Newport Coastal Streams Environmental Matrix, Exhibit D-1 to this WAP.

Assessment #1: Program Management and Policies

When faced with the abundance of data that exist, it is appropriate to assess whether the data are providing stormwater program coordinators with the information needed to manage the program and make informed decisions for the watershed. The knowledge needed at various stages in the program development must be able to build on previous efforts to attain constantly improving results. The following passage from *Managing Troubled Waters* (National Academy Co, 2003) explains this iterative process.

> *"The reality of imperfect knowledge about marine systems means that monitoring should be used as an opportunity to increase and refine our knowledge of them. Data and information derived from monitoring programs should be used to check, validate, and refine the assumptions, models, and understandings on which the monitoring was based. This iterative feedback increased predictive ability, reduces uncertainty, and ultimately reduces the monitoring effort needed. As discussed in Chapter 2, risk-free decision making is not achievable, and monitoring must be viewed as a way of reducing uncertainty, not of eliminating it."*

The following table (**Table D-2**) identifies the management categories of a stormwater program that are needed to advance the knowledge of the systems and identifies the number of studies within the data collection effort that are relevant to each category. Each of these categories is considered for specific pollutants of concern or elements of the watershed system. The table shows that the majority of the study effort has been placed in identifying sources and determining compliance with water quality standards and TMDLs. Less study efforts have been made towards developing new tools and providing early warning systems. This indicates the need to further assess the management needs in these areas and potentially focus efforts on improving the level of knowledge in these areas if deemed necessary.

Table D-2: Assessment #1 - Studies by Program Management Category*.

	Source Identification	Understanding Processes	Developing New Tools	Determine Compliance with WQs/TMDLs	Evaluate Program/ Measure Effectiveness	Provide Early Warning
Bacteria	6	3	1	6	3	2
Nutrients	4	2	1	3	3	1
Inorganics-Metals	3	2	1	3	3	1
Organics-Pesticides	3	2	1	3	4	1
Toxicity	3	2	1	3	3	1
Water Chemistry	3	2	1	4	2	1
Fish Tissue	0	0	0	1	0	0
TOTAL	22	13	6	23	18	7

*Note: Each study may fall under one or more management categories

Assessment #2 – Study and Program Type

The 11 water quality studies identified in the Newport Coastal Streams Watershed have generated different types of water quality data. The data fall into two broad categories—generation of raw data and assessment of existing data. Raw data studies and programs include specific sampling or monitoring activities and account for most of the 11 studies added to the bibliography. New data were generated with the following two objectives:

- Compliance with NPDES permits, monitoring, and directives for TMDL monitoring.

- Provide an understanding of the concentration levels or processes related to the pollutants, or the impacts of the pollutants, on the ecosystem. Studies targeting pollutant concentrations and processes generally involve direct measurements of the pollutants while studies targeting the impacts of the pollutants generally involve other environmental measurements (e.g., analysis of fish tissue).

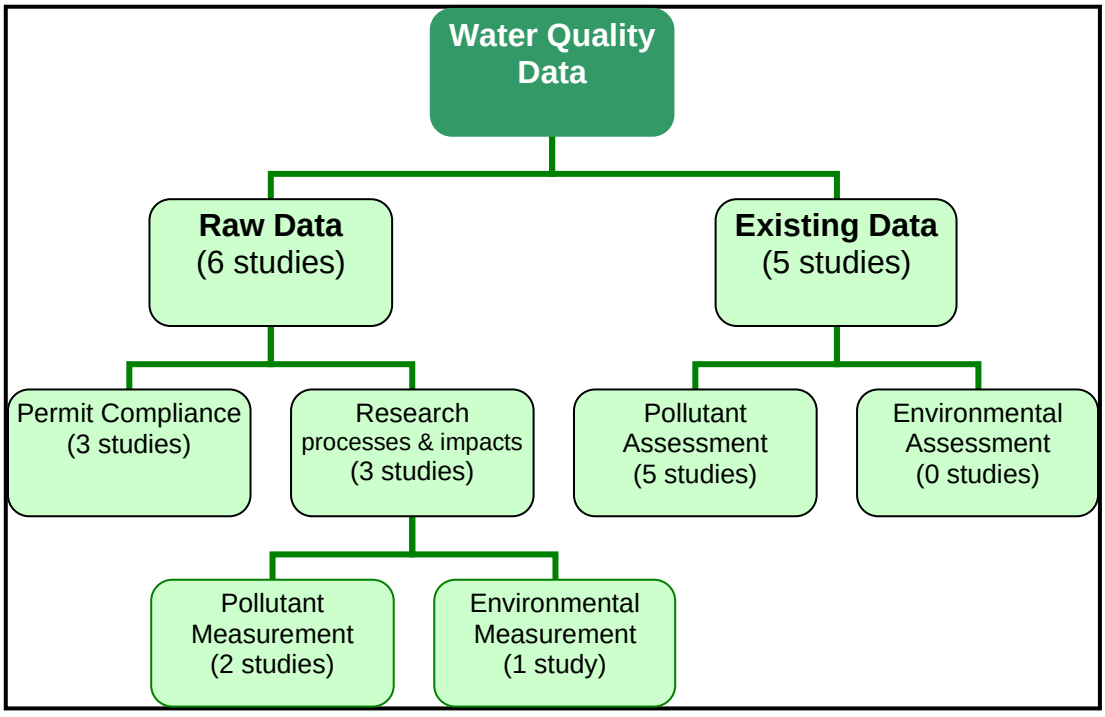
Studies that focus on the assessment of existing data are performed with the objective of:

- Understanding the behavior of pollutants within the Newport Coastal Streams system through direct measurement of the pollutants, or

- Understanding the impacts of the pollutants by measuring other environmental parameters.

The following figure (**Figure D-7**) shows the category breakdown of the studies as well as the general objective of the study.

Figure D-7: Study Type Breakdown



Assessment #3 – Study or Program Details

The final assessment that was made of the studies and programs was to look at basic details such as who performed the study and what pollutants were included in those studies and programs.

Within the Newport Coastal Streams Watershed the major generators of water quality data are the City of Newport Beach, the Southern California Coastal Water Research Project (SCCWRP), and the County of Orange. The following table (**Table D-3**) identifies the organizations responsible for each of the 68 studies. For collaborative studies, the primary organization is included in the table.

Table D-3: Study Sources

Organization	Number of Studies
City of Newport Beach	3
SCCWRP	2
County of Orange (RDMD, OCHCA)	2
National Resource Defense Council	2
Regional Water Quality Control Board	2

Each of the 10 water quality studies that were identified as part of this data assessment addressed one or more specific pollutants. Six (6) categories of constituents were identified that encompass nearly all of the specific data that was monitored or assessed. These 6 categories include:

- Bacteria
- Nutrients
- Metals
- Pesticides
- Toxicity – various levels of toxicity studies were performed
- Conventional water chemistry – this includes a wide ranges of variables such as pH, hardness, and temperature

The following table (**Table D-4**) shows the distribution of the studies within each of these categories. Many studies include work related to several constituents.

Table D-4: Constituent Focus of Studies and Programs

Constituent	Number of Studies
Bacteria	9
Nutrients	5
Metals	4
Pesticides	5
Toxicity	4
Water chemistry	4

D-2.3 Water Quality Status

D-2.3.1 Impaired Waters

Under section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop a list of water quality limited segments—waters that 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 that state or local jurisdictions establish priority rankings for water quality impairment on the list and develop action plans, referred to as TMDLs, to improve water quality.

The SWRCB and the Regional Board staff have evaluated each addition, deletion, and change to section 303(d) based on all the data and information available for each water body and pollutant. These recommendations are based upon "all existing and readily available data and information" (40 CFR 130.7(b)(5)). In developing the recommendations, the SWRCB staff used the recommendations and analysis of the Regional Board as the basis of its analysis.

A new listing policy was used to develop the 2006 303(d) list. Based on that policy, some data, for purposes of developing the section 303(d) list, are sufficient by themselves to demonstrate non-attainment of standards. Examples of these listing factors are (1) numeric data exceeding numeric water quality objectives, maximum contaminant levels, or California/National Toxics

Rule water quality criteria and (2) use of numeric evaluation values focused on protection of consumption of aquatic species. Other data types require that multiple lines of evidence be used for listing and de-listing. The listing factors that require multiple lines of evidence are (1) toxicity, (2) health advisories, (3) nuisance, (4) beach postings, (5) adverse biological response, and (6) degradation of aquatic life populations or communities. Each of these lines of evidence generally needs evidence of the presence of the pollutant(s) that cause or contribute to the adverse condition.

The 2006 303(d) list of impaired waters (approved by the SWRCB on October 25, 2006) within the Newport Coastal Streams Watershed is presented in **Table D-5**. It should be noted that this list is updated every 2 years and will be replaced within this Watershed Action Plan.

Table D-5: 2006 303(d) List and TMDL Priority Schedule – Newport Coastal Streams Watershed

Type	Name	Hydro Unit	Pollutant/Stressor	Source	Estimated Size Affected	Proposed TMDL Completion
R	Buck Gully Creek	801.11	Fecal Coliform	Source Unknown *Listing is downstream of Pacific Coast Highway*	0.3 miles	2019
			Total Coliform	Source Unknown *Listing is downstream of Pacific Coast Highway*	0.3 miles	2019
R	Los Trancos Creek (Crystal Cove Creek)	801.11	Fecal Coliform	Source Unknown *Listing is downstream of Pacific Coast Highway*	0.19 miles	2019
			Total Coliform	Source Unknown *Listing is downstream of Pacific Coast Highway*	0.19 miles	2019

(Note: R – Rivers)

Figure D-8 includes a map that shows the 303(d) listed receiving waters.

Figure D-8: Receiving Waters

See next page for figure.

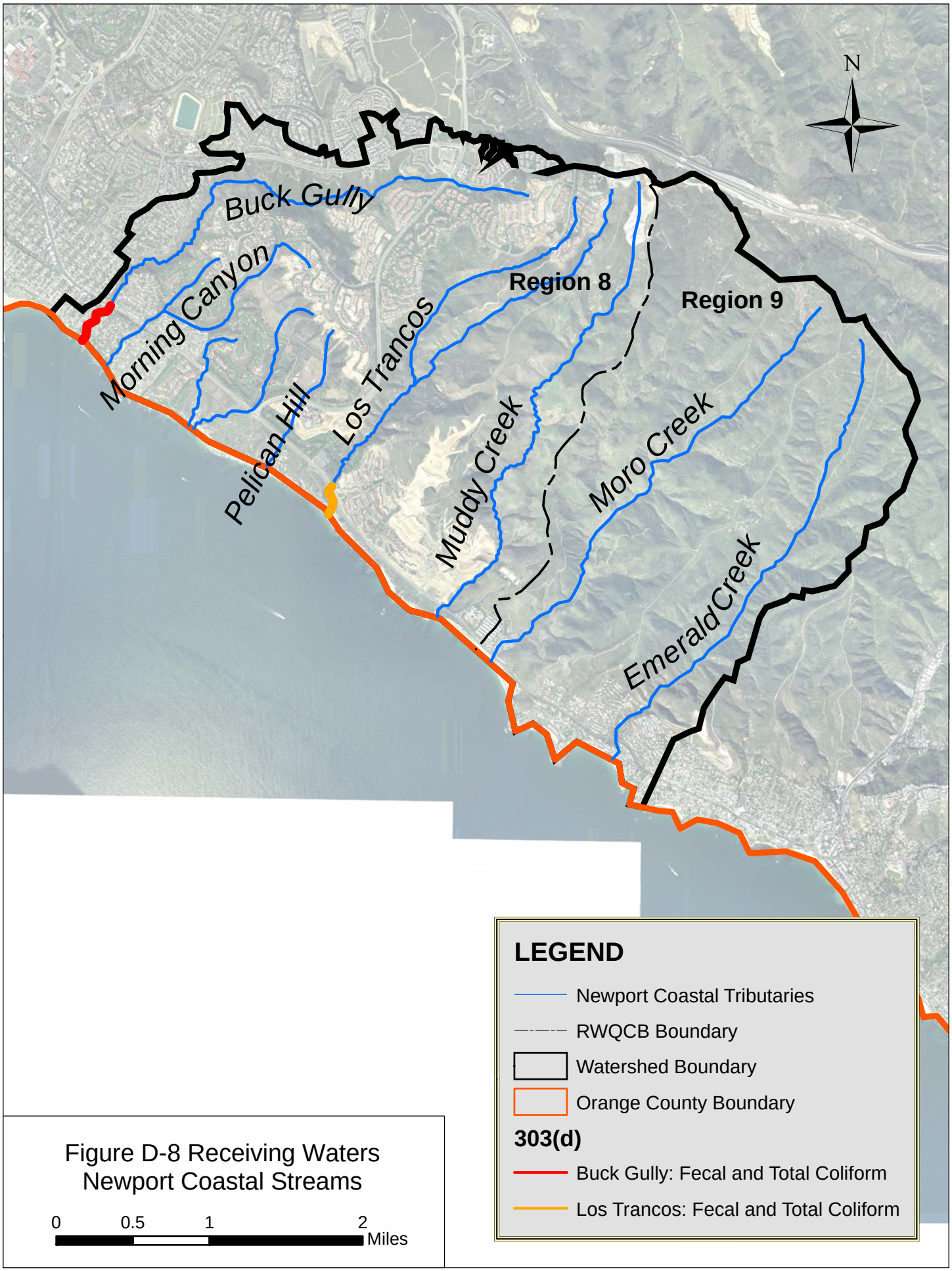


Figure D-8 Receiving Waters
Newport Coastal Streams

D-2.3.2 AB411 Summary

The 2006 Annual Ocean and Bay Water Quality Report (OCHCA, 2007) summarizes monitoring activities that took place in the Newport Coastal Streams Watershed. Four sites are monitored along the 3.2 miles of beach front. In 2006 there was 1 beach postings from April-October, equal to several previous years (2002-2004) and low compared to previous year ranges when postings ranged from 9 to 0. In 2006 there were 3 postings throughout the 2006 calendar year. This is a slight increase from previous years (2003-2005) but a decrease compared with other previous years (2000-2001) when total postings ranged from 1 to 9.

D-2.4 Priority Water Quality Needs

Managing and improving water quality in an urban environment is a complex issue. The science needed to deal with many of the issues that arise during the management process is evolving and in some cases has not yet developed to the point that important questions can readily be answered in absolute quantifiable terms.

These and other data gaps have been identified to some extent in the research study reports, the research agenda for the Southern California Stormwater Monitoring Coalition, and the specific requirements of the NPDES permits. However, a thorough listing of data gaps must stem from a thoughtful description of the key management questions related to the watershed. There are two reasons for this. First, there is virtually an infinite array of scientific data that could be gathered in a complex system such as this. It is essential to focus efforts on those data types that are useful in decision making. Second, data gaps sometimes stem, not from the absence of data but, from the inability to adequately integrate existing data. Articulating clear questions enables studies to be designed so that disparate data types can be combined as needed to address complex issues.

D-2.4.1 Pollutant Data Gaps

The list below identifies data gaps related to specific pollutant categories. It should be noted that some of the gaps do not relate to urban sources which is the primary focus of the Watershed Action Plan. A lengthier discussion of each pollutant category follows the summary list below.

- *Bacteria*
    - Relative magnitude of urban versus natural sources
    - Sources
    - Rapid bacteriological indicators
    - MST identification methods

D-2.4.1.1 Bacteria

Identification of the source of bacteria is a difficult question. In the Newport Coastal Streams Watershed identifying and quantifying the contribution of urban and natural sources of bacterial impairment in the watershed is a data gap. Specific efforts are not yet underway to identify the sources of bacteria. Natural sources are likely to be a significant contributor due to

the amount of natural park area in the watershed. A program similar to the Newport Bay Fecal Coliform Source Identification and Management Plan Project may be developed within this watershed at a future date. This type of project would allow the County and local watershed cities to implement pollution reduction and prevention programs, which will lead to improved water quality at public beaches and to achieving bacteriological standards.

The applicability of current bacteriological indicators for measuring human health risk and for identifying the sources of pathogen contamination needs further refinement. Two projects identified in SCCWRP Technical Report 35B, *Stormwater Research Needs in Southern California,* identify plans to address these issues. The first project (Project 12. *Develop rapid response indicator(s) for microbial contamination*) is focused on producing easily used field tests that would provide a reliable measure of bacteriological contamination within a few hours at most. The second project (Project 13. *Develop microbial source tracking protocol*) will select methods (primarily genetic-based) that provide the most dependable means of identifying and distinguishing among sources. A portion of funding for this project is provided by the Newport Bay watershed Permittees through funding of the broader NPDES program. It is expected that findings from the effort will have application to the Newport Coastal Streams watershed.

Considerable resources are being expended to reduce bacterial contamination from watershed sources, but in many cases storm drains continue to discharge large concentrations of bacteria. A study by SCCWRP will examine if bacteria can grow in storm drain sediments. This study, *Storm Drains and Sediments as Reservoirs of Fecal Indicator Bacteria*, is being led by John Griffith. It is expected that the findings from this effort will have application to the Newport Coastal Streams watershed.

D-2.4.2 Other Data Gaps

Other data gaps that exist are not pollutant specific. These data gaps are related to a broader understanding of pollutants, such as how they travel, how they impact the habitat, how to develop regional stormwater infrastructure. The following describes actions being taken to address these data gaps.

D-2.4.2.1 Stormwater Infrastructure

Guidance on how to use existing data for further analysis is limited. **Figure D-7**, which identifies the number of studies in each category, indicates an imbalance between the number of studies/programs generating new data and those drawing conclusions from existing data sets. The Southern California Stormwater Monitoring Coalition has recognized the need to develop projects to (1) integrate and evaluate available data (Project 1); (2) standardize sampling and analysis protocols (Project 2); (3) develop a regional data infrastructure (Project 3); and (4) measure BMP effectiveness (Project 4).

D-2.4.2.2 Stormwater Mechanisms and Processes

The Stormwater Monitoring Coalition has identified a need to improve fundamental understanding of stormwater mechanisms and processes. To meet this need the following project have been identified: (1) develop a systemwide conceptual model (Project 5); (2)

determine appropriate reference conditions (Project 6); (3) develop a regional method for measuring beneficial use condition (Project 7); and (4) identify relative contribution of nonpoint sources to urban runoff loads (Project 8).

Additionally, a study will be performed by the County as part of the Santa Ana Region Water Quality Monitoring Program through the Estuary / Wetlands Monitoring Program to assess the transport modes of pollutants into wetland upland areas. The transport modes include two mechanisms: (1) by floating on the surface of the water and collecting on the land/water interface and (2) through periodic flooding of contaminated stormwater into the upland areas. The design process for the study will be developed in cooperation with the Regional Board and SCCWRP.

D-2.4.2.3 Receiving Water Impacts

The final data gap identified by the Stormwater Monitoring Coalition is related to identifying receiving water impacts. The following studies were identified to address this need: (1) identify the causes of impact in receiving waters (Project 9); (2) develop bioassessment indicators and protocols (Project 10); (3) develop improved toxicity testing procedures (Project 11); (4) develop raid response indicator(s) for microbial contamination (Project 12); (5) develop microbial source tracking protocol (Project 13); (6) evaluate BMP effects on receiving water impacts (Project 14); and (7) develop improved indicators of peak flow impacts (Project 15).

Several of the identified Stormwater Monitoring Coalition projects have been funded and are underway. Projects that are underway or completed included Projects 2, 5, 8,9, 10, 12, 13, and 15.

D-3.0 TMDLS AND ASBS REQUIREMENTS IN THE WATERSHED

In addition to the NPDES permits, the major regulatory requirements in the Newport Coastal Streams watersheds are defined by the TMDLs and the State Water Quality Protection Areas (SWQPAs, formerly Areas of Special Biological Significance (ASBS)).

D-3.1 TMDLs

Section 303(d) of the Clean Water Act requires each state to identify waters that are not meeting the water quality standards for their applicable beneficial uses. This process involves requesting and compiling readily available data and comparing these data to the appropriate water quality objectives (WQOs). The waterbody-pollutant combinations exceeding WQOs at predefined frequencies, which are specified in the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, are placed on the 303(d) list of impaired waters. Section 303(d) also requires states to establish a priority ranking for waterbody-pollutant combinations on the 303(d) list and to subsequently establish TMDLs for each.

The goal of the TMDL process is to attain water quality standards and protect the beneficial uses of water bodies. It is defined as "the sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background" (40 CFR 130.2) and requires that the capacity of the water body to assimilate pollutant loadings (the loading capacity) is not exceeded.

The TMDL process begins with the development of a technical analysis which includes the following seven components: (1) a **Problem Statement** describing which WQOs are not being attained and which beneficial uses are impaired; (2) identification of **Numeric Targets** which will result in attainment of the WQOs and protection of beneficial uses; (3) a **Source Analysis** to identify all of the point and nonpoint sources of the impairing pollutant in the watershed and to estimate the current pollutant loading for each source; (4) a **Linkage Analysis** to calculate the Loading Capacity of the waterbodies for the pollutant; i.e., the maximum amount of the pollutant that may be discharged to the waterbodies without causing exceedances of WQOs and impairment of beneficial uses; (5) a **Margin of Safety** to account for uncertainties in the analyses; (6) the division and **Allocation** of the TMDL among each of the contributing sources in the watersheds, wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint and background sources; and (7) a description of how **Seasonal Variation and Critical Conditions** are accounted for in the TMDL determination. The write-up of the above components is generally referred to as the technical TMDL analysis.

In addition to a technical TMDL analysis, the state is required to incorporate the TMDLs and their appropriate implementation measures into the State Water Quality Management Plan (40 CFR 130.6(c)(1), 130.7), such as the Santa Ana Regional Water Quality Control Plan (Basin Plan). After a TMDL is adopted as an amendment to the Basin Plan (amendments are initially developed by the Regional Board staff, then approved by the Regional Board, State Water Resources Control Board, and State Office of Administrative Law), it is submitted to EPA and reviewed. Approval from EPA is the last step in the TMDL process.

D-3.1.1 Status of Future TMDL Development

TMDLs will be developed in the future for all waterbody-pollutant combinations on the current 303(d) list. The Proposed 2006 303(d) list is the active, approved list (approved by the SWRCB on October 25, 2006).

Table D-5 identifies the waterbodies in the Newport Coastal Streams watershed that are on the 2006 303(d) list. These listings were originally on the 2002 303(d) list. The 2006 list is based on the 2002 list, unless a change was recommended. No modifications were recommended for the Buck Gully Creek and Los Trancos Creek bacteria listings; therefore, they were carried over onto current 303(d) list. The 2002 list indicated a low TMDL priority for these impairments, while they have a proposed TMDL completion date of 2019 according to the 2006 303(d) list. Unless there is a future change in listing status, prior to 2019, bacteria TMDLs will be developed and approved to address these impairments. The Regional Board or EPA will likely lead the TMDL development effort , which will include stakeholder involvement . Additional data collection can help confirm impairments and/or identify potential sources that can be addressed to reduce bacteria loadings.

D-3.2 SWQPAs / ASBS Areas

State Water Quality Protection Areas (SWQPAs) are a nonterrestrial marine or estuarine area designed to protect marine species or biological communities from an undesirable alternation in natural water quality, including, but not limited to, Areas of Special Biological Significance (ASBS) that have been designated by the State Water Resources Control Board through its water quality planning process. ASBS area a subset of SWQPAs. Within the Newport Coastal Streams watershed the SWQPAs include the Newport Beach Marine Life Refuge and the Irvine Coast Marine Life Refuge. The locations of both are shown on **Figure D-3d**.

On November 16, 2000 the Santa Ana Regional Board issued Cease and Desist Order (CDO) No. 00-87. The CDO requires the existing discharges of waste into ASBS (now SWQPAs) to be eliminated two years from the date of issuance of the CDO and prohibits new discharges of waste, including storm water and non-storm water runoff from developed areas to discharges into ASBS/SWQPA sites. Many of the projects implemented to comply with this CDO are included in **Section D-4.3 and 4.4 –** Existing and Proposed Enhanced Structural BMPs.

D-4.0 BMP INVENTORY

In developing a plan to address water quality within the Newport Coastal Streams Watershed, it is important to (1) understand the sources of pollution within the watershed and (2) know the specific source and treatment controls that have been implemented (or proposed to be implemented) within the watershed to deal with the watershed constituents of concern. This section provides the available information for these two areas and identifies the related knowledge gaps that exist.

D-4.1 Watershed Pollution Sources

Pollution sources in the Newport Coastal Streams Watershed include urban runoff, open space runoff, groundwater, permitted discharges, atmospheric deposition, agriculture, and wildlife. Because the mandate of the Orange County Stormwater Program is to address urban runoff, this Watershed Action Plan and planning effort will focus mainly on the urban sources.

The urban sources in the watershed include runoff generated during storm events and non-storm related runoff from municipal facilities, residential, commercial, and industrial areas and parks.

D-4.2 Existing and Proposed Enhanced Non-Structural BMPs

Non-structural BMPs include many activities that are performed by the individual jurisdictions pursuant to their LIP (DAMP Appendix A). These activities include, but are not limited to, good housekeeping practices, street sweeping, catch basin stenciling, public outreach and education. Enhanced non-structural BMPs include activities in which a specific pollutant of concern for that watershed is addressed. The pollutant of concern for this watershed is bacteria. Non-structural projects that address bacteria in this watershed include the draft landscaping ordinance is anticipated for approval as part of the Runoff Reduction Plan. No additional enhanced non-structural BMPs are in place for this watershed.

D-4.3 Existing Structural Enhanced BMPs

Structural BMPs include engineered facilities that are designed to remove pollutants. These facilities can include, but are not limited to, wetlands, bioswales, extended detention basins, and proprietary separator units. Enhanced structural BMPs include facilities in which a specific pollutant of concern for that watershed is addressed. Enhanced BMPs are considered to be regional and treat runoff from more than a single developed area, such as a single residential tract.

The following structural enhanced BMPs have been constructed in the watershed (**Table D-6**).

Table D-6: Existing Enhanced Structural BMPs

Project	Location	Performance Measures
Lost Trancos and Muddy Creek Diversion Projects	Crystal Cove State Park	Flow Reduction
Pacific Coast Highway Swale	PCH at Crystal Cove State Park	Bacteria Reduction
Morning Canyon Stabilization Project	Morning Canyon	Bacteria Reduction
ET Controller Program	Newport Coast Community	Flow Reduction

D-4.3.1 Buck Gully Diversion and Filtration Project

Orange County Coastkeeper partnered with the City of Newport Beach to set up a test facility that would collect runoff from Buck Gully Creek. This water that would normally flow into the ocean was filtered to an acceptable level for reuse as irrigation water at a nearby golf course. Since there were no facilities in place to deliver the water to the golf course, the filtered water was diverted to the Orange County Sanitation district via a nearby sewer connection. Coastkeeper ran the pumps and filters for a year and demonstrated that it is economically feasible to recycle urban runoff for landscaping. It is no longer operated.

D-4.3.2 Los Trancos and Muddy Creek Diversion Projects

In approximately 2002, diversion projects were constructed at Los Trancos and Muddy Creek in Crystal Cove State Park. At both locations the runoff is diverted to the Orange County Sanitation District.

D-4.3.3 Pacific Coast Highway Swale

In response to a 2000 lawsuit between Orange County Coastkeeper and Caltrans, a bio-swale was constructed along Pacific Coast Highway in the Newport Coast area.

D-4.3.4 Morning Canyon Stabilization Project

This project constructed along Morning Canyon includes native planting areas that act as a vegetated buffer strip. The project also includes grade control structures to stabilize the canyon and slow the water to allow for infiltration.

D-4.3.5 ET Controller Program

As part of the City of Newport Beach's Runoff Reduction Plan, ET Controllers are being installed throughout the Newport Coast. Approximately 500-600 controllers will be installed with project completion in 2007.

D-4.4 Proposed Structural Enhanced BMPs

The following structural enhanced BMPs have been proposed in the watershed and are in planning stages (**Table D-7**).

Table D-7: Proposed Enhanced Structural BMPs

Project	Location	Performance Measures
North Pelican Point Diversion project	North Pelican Canyon in Crystal Cove State Park	Flow Reduction
Buck Gully Stabilization Project	Buck Gully Creek	Bacteria Reduction

D-4.4.1 North Pelican Point Diversion Project

A diversion is proposed at North Pelican Point Canyon within Crystal Cove State Park. The construction is pending due to funding but is expected to be constructed in 2007. Diverted water will be conveyed to the Orange County Sanitation District system.

D-4.4.2 Buck Gully Stabilization Project

This project will include a wetland and retention/detention pond to provide water quality benefits. Grade Control Structures are also proposed to stabilize the channel and slow the water to encourage infiltration. This project is pending due to funding but is anticipated to be constructed in 2009-2010.

D-4.5 Recommendations for BMPs in the Watershed

New candidate BMPs can be prevention or removal oriented and can be considered either for updating baseline BMPs or for incorporation as watershed-based BMPs. New BMPs are generally identified from one or more of the following:

- A review of technical literature (such as the ASCE/EPA database);
- A review of existing control programs;
- Demonstration or research projects;
- Input from consulting firms and municipalities already involved in new BMP implementation; or
- Other sources.

Consistent with DAMP Section 3.0, the process for BMP selection and implementation at the watershed scale involves consideration of a candidate BMP with respect to:

- The Watershed Permittees' needs, goals, and objectives
- Consistency with federal and state programs
- Economies from streamlined analysis and implementation procedures
- Opportunities for flexibility in the development of management alternatives
- Decision-making based on environmental and local considerations
- Effective Capital Improvement Program planning and budgeting

The following table (**Table D-8**) has been modified from that presented in DAMP Section 7.0 referencing the effectiveness of BMPs for specific pollutants. Specifically the types of BMPs

have been reduced to reflect those that are more effective in reducing the pollutants of concern within the Newport Coastal Streams Watershed. In particular the infiltration BMPs (shaded in the table) have high removal efficiencies for all pollutants of concern in this watershed.

Table D-8: BMPs that Target Newport Coastal Streams Watershed Pollutants of Concern

	INFILTRATION (1)			*WET PONDS AND WETLANDS*		BIOFILTERS		*FILTRATION*	
Pollutant of Concern	**TC-10 Infiltration Trench**	**TC-11 Infiltration Basin**	**TC-12 Retention/ Irrigation**	**TC-20 Wet Pond**	**TC-21 Constructed Wetland**	**TC-31 Vegetated Buffer Strip**	**TC-32 Bioretention**	**TC-40 Media Filter**	**TC-60 Multiple Systems**
Bacteria & Viruses	H	H	H	H	H	H	H	H	H

(1) Including trenches and porous pavement.

H High removal efficiency

Sources: International Stormwater Best Management Practices Database (2001), including Analysis of treatment system performance (1999 - 2005), dated February 2006

California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook – New Development and Redevelopment (January 2003 with September 2004 Errata)

Guide for BMP Selection in Urban Developed Areas (2001)

Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (1993)

D-5.0 PLAN IMPLEMENTATION AND ASSESSMENT

D-5.1 Plan Implementation

Strategy Tables have been developed for the Newport Coastal Streams Watershed that identifies the specific actions that are being undertaken to improve urban water quality within the watershed. These strategy tables are specific to the constituents of concern for the watershed and include information on past progress as well as the scheduled tasks to support this action. On an annual basis these tables will be updated to identify the progress made in that year as well as the schedule for the subsequent year. The Newport Coastal Streams Watershed Strategy Tables are included as **Exhibit 2** to this Watershed Action Plan.

D-5.2 Plan Assessment

Effectiveness Assessment is the process that managers use to evaluate whether their programs are resulting in desired outcomes, and whether these outcomes are being achieved efficiently and cost-effectively (CASQA, 2003). A principle objective of the Watershed Action Plan is to present an integrated plan of action that will result in meaningful water quality improvements in the Newport Coastal Streams Watershed while balancing economic, social and environmental constraints. This plan of action is laid out in the strategy tables which are referenced in **Section 5.1** and included herein as **Exhibit 2**. The program effectiveness assessment strategy requires the identification and thereafter annual consideration of measures that indicate whether progress is being made toward attainment of this objective and the other program objectives discussed in **Section 1.0**.

Assessment measures that are pertinent to the Watershed Action Plan are related to the confirmation of progress on the actions identified in the strategy table. The assessment of progress is integrated in the strategy tables through the annual update to the tables that require documentation on the progress that has been made on that specific action. Reasonable progress on these action items indicates that the Watershed Action Plan is effective.

D-6.0 REFERENCES

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Nomenclature (Abbreviations)

Table D-9: Abbreviation Definitions

Abbreviation	Definition
NPDES	National Pollutant Discharge Elimination System
OCHCA	Orange County Health Care Agency
SCCWRP	Southern California Coastal Water Research Project
TMDL	Total Maximum Daily Load
BMP	Best Management Practice
USEPA / EPA	United States Environmental Protection Agency
DAMP	Drainage Area Management Plan
LIP	Local Implementation Plan
OCSD	Orange County Sanitation District
RWQCB	Regional Water Quality Control Board
GIS	Geographic Information System/Science
USACE	United States Army Corps of Engineers
SWRCB	State Water Resources Control Board
RDMD	Resources & Development management Department
PCB	Polychlorinated Biphenyls
PAH	Polycyclic Aromatic Hydrocarbons
CARs	Critical Aquatic Resources
UCLA/UCI	University of California Los Angeles / Irvine
WLA / LA	Waste Load Allocation / Load Allocation
CTR	California Toxics Rule
RMA	Resource Management Associates
NTS	Natural Treatment System
CASQA	California Stormwater Quality Association

EXHIBIT D-1

ENVIRONMENTAL MATRIX

EXHIBIT D-2

STRATEGY TABLES