Santa Monica Bay Beaches Wet-Weather Bacteria Total Maximum Daily Load Implementation Plan Jurisdictional Groups 1 and 4

Submitted by

County of Los Angeles: Lead Agency, Jurisdiction 1
City of Malibu: Lead Agency, Jurisdiction 4
California Department of Transportation

August 31, 2005

NSMB J1/4
Bacteria TMDL Implementation Plan

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Table of Contents

Executive Summary

1. Introduction 1-1

1.1 TMDL Summary 1-1

1.1.1 TMDL Development History 1-1
1.1.2 Jurisdictional Groups 1 and 4 1-1
1.1.3 Compliance Requirements 1-2
1.1.4 Compliance Water Quality Objectives 1-2
1.1.5 Compliance Schedule 1-5

1.2 Coordinated Shoreline Monitoring Plan 1-5

1.3 Implementation Plan Participants 1-6

1.3.1 Responsible Agencies 1-6
1.3.2 Stakeholders 1-7
1.3.3 Other Implementation Plans 1-7

1.4 Objectives of Implementation Plan 1-7

2. Summary of Technical Analyses 2-1

2.1 Existing Conditions 2-1

2.1.1 Source Identification and Prioritization 2-1
2.1.2 Hydrogeology and Aquifers 2-8
2.1.3 Surface Water Hydrology 2-11

2.2 General Opportunities for Multiple Beneficial Uses 2-13

2.2.1 Water Supply and Reuse 2-13
2.2.2 Recreational Uses 2-14
2.2.3 BMP Location Evaluation 2-14

2.3 Description of Potential Non-Structural activities 2-14

2.3.1 Public Information and Participation 2-16
2.3.2 Industrial/Commercial 2-19
2.3.3 Development Planning 2-20
2.3.4 Development Construction 2-23
2.3.5 Public Agency Activities 2-24

2.4 Description of Structural BMPs 2-26

2.4.1 On-Site (structural source control) Options 2-26
2.4.2 Regional and Sub-Regional Structural Options 2-29

2.5 Regulatory and Permitting Considerations 2-30

2.5.1 Local Considerations 2-30
2.5.2 State and Federal Considerations 2-31
2.5.3 Permit Requirements for Direct Discharge to Waters 2-32
2.5.4 Treatment and Reuse Solutions 2-35

2.5.5 Issues Regarding Implementation of Options Consistent With the State and Federal Regulations 2-35
2.6 Monitoring Considerations 2-36

3. Plan Development and Evaluation 3-1
3.1 Methodology 3-1
3.2 The Compliance Triangle 3-1
3.2.1 Low Cost Alternative 3-2
3.2.2 Low Risk Alternative 3-3
3.2.3 Maximum Beneficial Reuse Alternative 3-4
3.3 Alternatives Comparison for Area-Wide Implementation .. 3-5
3.4 Subwatershed Focusing 3-5
3.5 Commit-Pilot-Consider Model 3-5
3.5.1 Implementation Requirements and Potential Effectiveness 3-8
3.5.2 Commit-Pilot-Consider 3-8
3.6 Assessment of Effectiveness 3-9
3.6.1 Presumptive Approach 3-9
3.6.2 Targeted Monitoring-Based Approach 3-11
3.7 Implementation Plan Framework 3-12

4. Implementation Plan Commitments 4-1
4.1 General Approach 4-1
4.2 Plan Execution 4-3
4.3 Monitoring 4-4
4.3.1 Water Quality Monitoring Recommendations 4-4
4.3.2 Hydrologic Loading Estimates 4-6
4.3.3 Structural BMP Monitoring 4-6
4.4 Additional Future Detailed Studies Needed 4-7
4.4.1 Identification of the Most Relevant Human Health Indicators Study 4-7
4.4.2 Hydrology vs. Bacteria Loading 4-7
4.4.3 Bacteria Seasonal Variation Study 4-9
4.5 Reporting 4-9

5. Subwatershed-Specific Implementation Plan 5-1
5.1 Summary and Overview of Subwatershed-Specific Plans 5-1
5.1.1 Non-Structural Activities 5-1
5.1.2 On-Site Structural Activities 5-7
5.1.3 Regional Pilot Projects 5-11
5.1.4 Prioritizing and Phasing Philosophy 5-12

5.2 Arroyo Sequit 5-13
5.3 Nicholas (J4) 5-14
5.3.1 Subwatershed-Specific Description 5-14
5.3.2 Watershed-Specific Plan of Activities 5-14
5.4 Los Alisos 5-16
5.4.1 Watershed-Specific Description 5-16
5.4.2 Watershed-Specific Plan of Activities 5-16
5.5 Encinal 5-18
5.5.1 Watershed-specific description 5-18
5.5.2 Watershed-Specific Plan of Activities 5-18
5.6 Trancas 5-20
5.6.1 Watershed-Specific Description 5-20
5.6.2 Watershed-Specific Plan of Activities 5-29
5.7 Zuma 5-22
5.7.1 Watershed-Specific Description 5-22
5.7.2 Watershed-Specific Plan of Activities 5-22
5.8 Ramirez 5-24
5.8.1 Watershed-Specific Description 5-24
5.8.2 Watershed-Specific Plan of Activities 5-24
5.8.3 Description of Potential Pilot Project 5-26
5.9 Escondido 5-29
5.9.1 Watershed-Specific Description 5-29
5.9.2 Watershed-Specific Plan of Activities 5-29
5.10 Latigo 5-31
5.10.1 Watershed-Specific Description 5-31
5.10.2 Watershed-Specific Plan of Activities 5-31
5.10.3 Description of Potential Pilot Project 5-33
5.11 Solstice 5-35
5.11.1 Watershed-Specific Description 5-35
5.11.2 Watershed-Specific Plan of Activities 5-35
5.12 Corral 5-37
5.12.1 Watershed-Specific Description 5-37
5.12.2 Watershed-Specific Plan of Activities 5-37
5.12.3 Description of Potential Pilot Project 5-39
5.13 Carbon 5-42
5.13.1 Watershed-Specific Description 5-42
5.13.2 Watershed-Specific Plan of Activities 5-42
5.14 Las Flores 5-44
5.14.1 Watershed-Specific Description 5-44
5.14.2 Watershed-Specific Plan of Activities 5-44
5.14.3 Description of Potential Pilot Project 5-46
5.15 Piedra Gorda 5-49
5.15.1 Watershed-Specific Description 5-49
5.15.2 Watershed-Specific Plan of Activities 5-49

5.16 Pena 5-51
5.16.1 Watershed-Specific Description 5-51
5.16.2 Watershed-Specific Plan of Activities 5-51
5.17 Tuna 5-53
5.17.1 Watershed-Specific Description 5-53
5.17.2 Watershed-Specific Plan of Activities 5-53
5.18 Topanga 5-55
5.18.1 Watershed-Specific Description 5-55
5.18.2 Watershed-Specific Plan of Activities 5-55
5.19 Integrated Water Resources Plan Elements 5-57
5.20 Performance Evaluation 5-57
5.21 Target Exceedance Day Reductions 5-64

6. Program Cost and Budget 6-1
6.1 Introduction 6-1
6.1.1 Non-Structural Programs (Commit and Pilot) 6-1
6.1.2 On-Site Structural Solutions (Commit and Pilot) 6-2
6.1.3 Regional and Sub-Regional Structural Solutions (Pilot) 6-2
6.1.4 Monitoring Budgets 6-2
6.2 Total Budget by Year 6-2

7. Conclusions 7-1

8. References 8-1

ES.1. TMDL Summary

The North Santa Monica Bay Jurisdictional Groups 1 and 4 Wet-Weather Bacteria Total Maximum Daily Load (TMDL) Implementation Plan (Implementation Plan) has been prepared in response to Resolution No. 2002-022 of the California Regional Water Quality Control Board—Los Angeles Region (Regional Board) amending the Water Quality Control Plan for the Los Angeles Region to incorporate Implementation Provisions for the Region's Bacteria Objectives and to incorporate a Wet-Weather TMDL for Bacteria at Santa Monica Bay Beaches.

The TMDL features a reference system/anti-degradation approach, utilizing as its reference watershed the Arroyo Sequit subwatershed. The purpose of utilizing this approach is to ensure that bacteriological water quality is at least as good as that of a reference site and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of a reference site.

Jurisdictional Group 1 (J1) area is primarily comprised of the County of Los Angeles (the County), City of Malibu, and California Department of Transportation (Caltrans). Other agencies encompassed by the jurisdictional boundaries include the County of Ventura, the Cities of Calabasas and Los Angeles, and the State of California Department of Parks and Recreation. The County is the primary jurisdictional agency for J1. Jurisdictional Group 4 (J4) includes the City of Malibu (primary jurisdiction), County of Los Angeles, and Caltrans, and consists only of Nicholas subwatershed. Subwatersheds comprising Jurisdictional Groups 1 and 4 (J1/4) are shown in Figure ES.1.

Compliance measures include a number of activities that in combination would result in reducing the number of days in which water quality objectives are exceeded to less than or equal to that of the reference watershed. The TMDL stipulated a threshold number of exceedance days based on daily monitoring activities. In J1 the number of exceedance days is seventeen; in J4, the number of exceedance days is fifteen. It is recognized, however, that while the TMDL (and many of the related analyses) are based on daily criteria, because the Coordinated Shoreline Monitoring Plan (CSMP) describes many locations where weekly monitoring will occur, the number of exceedances will be pro-rated accordingly.

Non exceedance is defined as meeting water quality objectives. These objectives are, for rolling 30-day Geometric Mean Limits[1].

a. Total coliform density < 1,000/100 ml.
b. Fecal coliform density < 200/100 ml.
c. Enterococcus density < 35/100 ml.

1) The calculation of the 30-day geometric mean utilizing weekly sampling will require further discussion, should exceptions to the definitions described in section 1.1.4 be considered. It is assumed that this calculation will be reported as part of the Coordinated Shoreline Monitoring Plan Implementation.

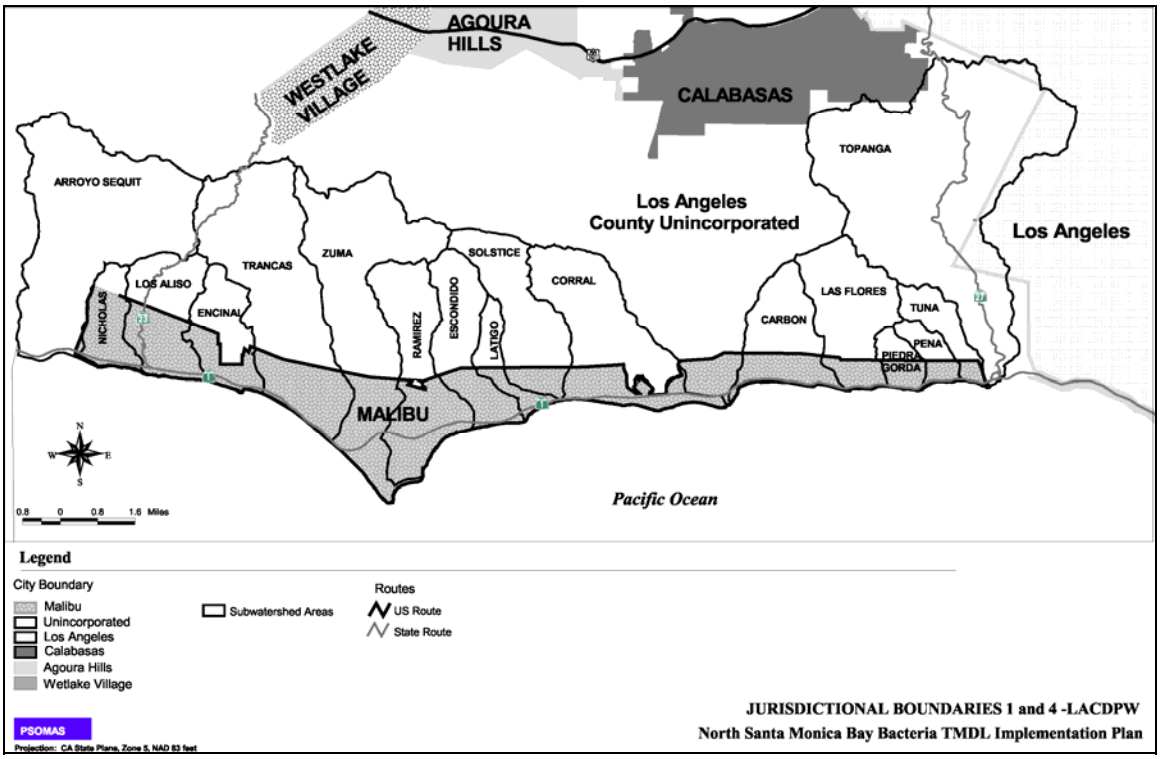


Figure ES.1 Jurisdictional Areas

For Single Sample Limits:

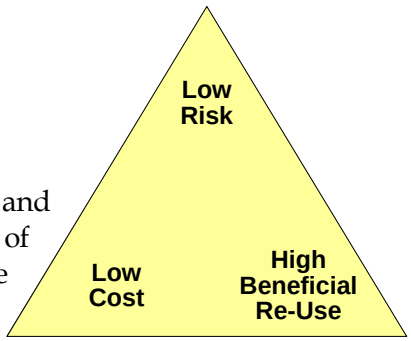
a. Total coliform density < 10,000/100 ml.
b. Fecal coliform density < 400/100 ml.
c. Enterococcus density < 104/100 ml.
d. Total coliform density < 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Given the proposed integrated approach presented in this plan, the schedule and target deadlines for meeting these compliance criteria are:

- Final Implementation Plan July 2005
- Re-evaluation: 2007
- 10% reduction (6 years): 2010
- 25% reduction (10 years): 2013
- 50% reduction (15 years): 2017
- Final targets (18 years): 2021

ES.2. Philosophical Approach

The Implementation Plan presents an iterative, adaptive, and integrated approach. This approach requires consideration of multiple beneficial uses and the targeting of multiple pollutants. Philosophically, an implementation compliance triangle was developed to illustrate the balance of low risk,



"Compliance Triangle"

low cost, and high beneficial reuse to determine site specific implementation.

The following activities were conducted during the development of the Implementation Plan:

- Estimating and Establishing Baseline Conditions
- Developing a Menu of Potential Activities
- Identifying Implementation Considerations
- Selecting and Prioritizing
- Planning and Implementation during the next 18 Years

ES.3. Baseline Conditions

Baseline conditions were established and estimated based on a number of evaluations, which included the following:

ES.3.1 Source Prioritization

This effort consisted of reviewing available monitoring data, land uses, soil conditions, slopes, studies and technical reports in order to target potential activities for this plan. Conclusions of this effort were that:

- There was no "smoking gun," and it is difficult to pinpoint specific sources;
- High loads/exceedances are linked to urbanization and proximity to shoreline, and
- Final subwatershed prioritization should consider beach use.

ES.3.2 Hydrogeology and Aquifers

The objective was to establish infiltration and groundwater recharge potential and the scale at which this was appropriate. Some key findings were:

- A review of geology and aquifers found no groundwater basins for recharge potential
- Soils were generally poorly draining and poorly suited for large scale infiltration
- Groundwater levels in those areas where soils were not poorly draining were high, and
- Opportunities tended to be local (on site) and less feasible on a large, regional scale.

ES.3.3 Surface Water Hydrology

A hydrologic analysis was conducted to support the potential incorporation of structural measures in TMDL implementation[2]. The purpose of the analyses was to estimate, on a macro-scale, preliminary potential volumes of water (within each subwatershed) that

2) The TMDL stipulated a threshold number of exceedance days based on daily monitoring activities. In Jurisdiction 1 the number of days is 17; in Jurisdiction 4, the number of days is 15. It is recognized however, that while the TMDL (and many of the related analyses) are based on daily criteria, because the Coordinated Shoreline Monitoring Plan describes many locations where weekly monitoring will occur, the number of exceedances will be pro-rated accordingly.

would theoretically need to be captured and treated to meet TMDL requirements. This planning-level analysis successfully resolved the discontinuity between exceedance-day TMDL criteria and conventional design-storm analytical techniques using a methodology that examined daily rainfall volumes over the historical period of record. This methodology involved 1) ranking daily rainfall volumes per year, 2) establishing the "critical" rainfall day each year, and 3) establishing a 90th percentile that corresponded to the TMDL criteria based on a review of the period of record. It should be noted that because daily precipitation values were used and because the TMDL stipulated a 17 -day exceedance criteria, the hydrologic analyses considered daily flow rates. For implementation purposes, the actual criteria will need to be adjusted to correspond to compliance monitoring frequencies.

Rainfall data sets were then converted to runoff volume estimates for each subwatershed using precipitation values, zoned land uses (and percentages of the subwatersheds that are impervious), soil types, and runoff coefficients developed by the County. To address the potential range of volumes, the analysis considered reduction factors (established in adjacent watersheds for similar conditions) in estimating ranges of target treatment volumes[3].

ES.3.4 Water Supply, Reuse, and Recreational Opportunities

Water supply and reuse was evaluated on a regional basis. Potential demand was based on land use and likely water consumption activities. Regional groundwater recharge potential was reevaluated, and potential recreational uses were identified. It was established that local measures such as on-site cisterns and on-site infiltration would be more appropriate. Reuse opportunities on recreational land were reviewed by examining open lands, trails, and municipal parks. Proximity to potential reuse sources and slope stability issues related to infiltration potential were also considered.

ES.4. Potential Activities

The suite of potential activities was categorized into non-structural (often called institutional or programmatic) measures and structural (often called treatment) measures.

ES.4.1 Non-Structural

Many of the nonstructural programs built upon existing Municipal Permit programs. In particular, bacteria-specific activities were identified for these efforts and included:

- Public Information and Participation
- Industrial/Commercial
- Development Planning

3) The proposed method is restricted to development of this Plan and reductions will be confirmed and developed further with future studies conducted as part of this Plan.

- Development Construction
- Public Agency Activities

ES.4.2 Structural

Structural measures included on-site and regional solutions. These solutions stipulated bacteria-specific treatment requirements, which often require pretreatment, as well as alternative wastewater treatment.

On-site structural solutions included:

- Residential cisterns
- On-site storage and reuse
- Small scale infiltration
- Porous pavements
- Grass/gravel pavers
- Retention grading
- Bioretention
- On-site wastewater alternatives

Regional (and subregional) solutions all require pre-treatment, and, as such, address multiple pollutants. Structural options included:

- Traditional wastewater treatment for stormwater
- Small packaged system
- Filtration
- Advanced oxidation
- Peracetic Acids
- Subsurface Flow Constructed Wetlands

ES.4.3 Other Implementation Considerations

Other considerations for implementation included site availability and permitting requirements associated with treatment. The ideal candidate sites were determined as publicly owned facilities, particularly given the cost of land in the J1/4 area. Regional solutions require more land for operational storage, especially where natural treatments are proposed.

Regulatory considerations include local regulations such as planning and zoning (including the City of Malibu Local Coastal Program (LCP)), Building Code, Plumbing Codes Fire Prevention, Urban Runoff/Stormwater Management. State and Federal regulations may also be important depending on the facility. These can be location specific (e.g., U.S. Army Corps of Engineers, California Department of Fish and Game, Regional Board permits and certifications), Coastal Zone Requirements (LCP), Resource Protection Agencies (U.S. Fish and Wildlife Service, National Marine Fisheries), National Pollutant Discharge Elimination System (NPDES) Waste Discharge Requirements, Department of Health Services

(particularly for reuse activities) and Ocean Plan/Areas of Special Biological Significance(ASBS) considerations.

ES.5. Selecting and Prioritizing

The general methodology for development, evaluation, and prioritization of activities was developed in response to the following questions:

- Where do we have the most significant problems?
- What is our tolerance for uncertainty and does this tolerance depend on location?
- Where can we leverage solutions to achieve multiple benefits?
- Where do we have a higher probability of success?
- What do we want to do now versus waiting until better information and technologies become available?

In order to balance uncertainty, potential costs, and potential benefits in a manner consistent with an integrated approach, the "compliance triangle" model was developed. This philosophical model is an evaluation tool that helps balance costs, risks, and beneficial reuses. The following table delineates typical activities for non-structural, on-site, and regional options.

Table ES.1 Alternatives Comparison

Alternative	Non-Structural Options	On-Site Options	Regional Options
Low Cost	Implement existing and new programs (commit + pilot)	Pilot-scale implementation of the following: • Cisterns • On-site storage and reuse • Small-scale capture and infiltration	Not included
Low Risk	Implement existing and new programs (commit + pilot)	Not included	Capture, store, treat and discharge
Beneficial Reuse	Implement existing and new programs (commit + pilot)	Full-scale implementation of the following: • Cisterns • On-site storage and reuse • Small-scale capture and infiltration	Capture, store, treat, and beneficially reuse

In order to intelligently implement activities, different levels of commitment were established for this plan. These levels were:

- "commit"—the Agencies commit to this activity
- "pilot"—the Agencies are willing to commit to a pilot study to determine whether the proposed activity the preliminary design parameters are appropriate.
- "consider" – the Agencies will consider this effort, depending on the results of committed activities.

The following table describes the implementation levels of commitment based on ease of implementation and potential effectiveness.

Table ES.2 Commit-Pilot-Consider Model

		Implementation Requirements Rating		
		Difficult	**Moderate**	**Easy**
Potential Effectiveness Rating	**High**	Pilot	Commit	Commit
	Medium	Consider	Commit	Commit
	Low	Consider	Consider	Consider

In order to prioritize subwatersheds, results of the source prioritization effort were combined with monitoring data from the TMDL-defined "critical year".

- High Priority subwatersheds: Latigo, Corral, Las Flores, Piedra Gorda, and Ramirez
- Medium Priority subwatersheds: Carbon, Los Alisos, Topanga, and Escondido
- Low Priority subwatersheds: Nicholas, Encinal, Trancas, Zuma, Solstice, Pena, and Tuna

These priorities, in conjunction with subwatershed specific characteristics and the desired risk-cost-beneficial reuse relationship, contributed to the development of a unique suite of activities for each subwatershed. Watershed priorities are shown below in Figure ES.2.

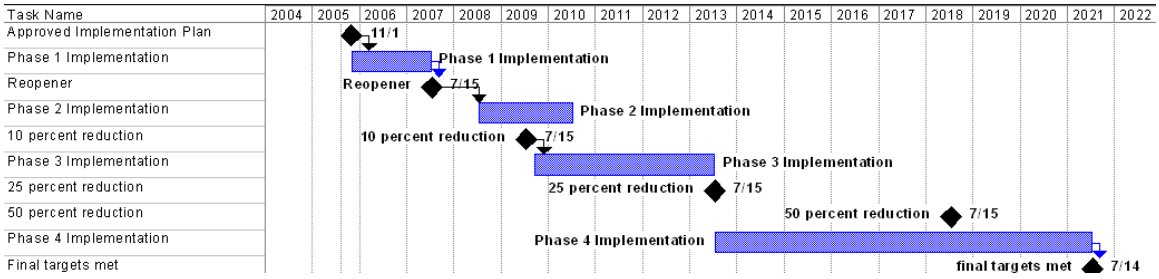
Figure ES.2 Subwatershed Priorities

ES.6. Planning and Implementation

ES.6.1 Schedule

The Implementation Plan was divided into four phases of activities. The activities consisted of implementation activities, as well as monitoring and additional studies that could be used to provide better information for future activities. To provide useful information, the additional studies will require extended development and implementation periods. Upon completion of these studies, it would be desirable to confirm, or adjust if necessary, the direction and requirements of the Implementation Plan. As such, the County and J1/4 Agencies proposed the addition of appropriately timed re-evaluation milestones. Implementation activities, suggested re-openers, and implementation milestones are illustrated below:

Santa Monica Bay Beaches Bacterial TMDL – J1/4
Implementation Plan Phasing



The general intent of what would be accomplished under each of the phases is as follows:

- Phase I – Conduct planning and initiate all committed non-structural activities and implement selected non--structural measures; initiate pre-feasibility studies for sub-regional pilot projects; develop inter-agency agreements for structural projects, initiate planning for on-site measures; initiate monitoring, additional studies, and source identification activities. The 2007 re-opener would follow Phase I. Note that Phase I is assumed to begin in November 2005, which is the basis of the proposed schedule. Should the initiation date change, the remaining implementation deadlines may change accordingly.

- Phase II – Continue implementation of committed non-structural activities; conduct non-structural pilot programs; continue planning for on-site measures; initiate planning and construction of pilot regional structural solutions; and continue and complete monitoring and source identification studies. A programmatic review is proposed to follow Phase II and is intended to leverage results not only from additional studies in these jurisdictional areas, but also advances in the technical, legal, and regulatory body of knowledge.

- Phase III – Refocus and reprioritize efforts as appropriate, and continue implementation of committed non-structural activities; implement successful piloted non-structural

programs; begin implementation of on-site measures; and operate and evaluate pilot regional structural solutions.

- Phase IV – Refocus and reprioritize efforts as appropriate and continue implementation of non-structural solutions; continue or expand on-site measures; and continue, modify and/or initiate regional structural solutions.

ES.6.2 Subwatershed-Specific Activities

Activities were defined for each subwatershed. These activities included the appropriate level of non-structural, on-site structural, and regional structural activities based on subwatershed priorities and characteristics. In many cases, pilot scale implementation was proposed to establish the link of BMPs to water quality improvement, optimize design parameters, assess appropriate siting, and evaluate new technologies. These activities are summarized and presented on a subwatershed-specific basis in Section 5.

ES.6.3 Monitoring

Monitoring is a key element to both the re-evaluation of the Implementation Plan requirements and technologies after two years and for assessing the effectiveness of measures. Compliance monitoring is not, however, addressed in this plan. It is proposed that future monitoring take place during winter low flows, and winter storm flows (most critical). Six stations were proposed for future monitoring. The objective of these monitoring stations was to provide information to support future management decisions such as selection of structural and non-structural BMPs, and was not intended to be compliance-related. As such, proposed stations were not necessarily high priority watersheds, but represented watersheds where potentially useful information could be extracted. With the exception of Topanga Creek at the sandbar, all stations showed high bacteria counts (exceeding water quality standards) during the first storms of 2004-2005. The proposed stations are:

- Trancas Creek (discharges to Area of Special Biological Significance)
- Solstice Creek (potentially similar to Arroyo Sequit land usage and potential alternative reference subwatershed)
- Marie Canyon (high priority subwatershed)
- Sweetwater Creek (potential concentrated equestrian land uses)
- Topanga lagoon (sandbar and bridge)

In addition, effectiveness monitoring of structural measures per U.S. Environmental Protection Agency (EPA)/American Society of Civil Engineers (ASCE) protocols will also be incorporated in the long-term program.

ES.6.4 Additional Studies

Upon completion of the initial two years of monitoring, an evaluation will be made to determine whether microbial source tracking activities are required. Rationale for recommending such studies could include, but not be limited to, the need for further source identification; site specific, objective data development; and potential health risk assessments. This may include an evaluation of the appropriateness of the TMDL indicator constituents of concern.

Studies that would contribute to more cost-effective implementation of the bacteria TMDL, and which could be included in the J1/4 implementation effort include:

- Identification of the Most Relevant Human Health Indicators Study (2007-2009)
- Hydrology vs. Bacteria Loading Study (2005-2010)
- Bacterial Seasonal Variation Study (2005-2008)

ES.6.5 Integrated Plan Elements

The Implementation Plan was developed consistent with an Integrated Water Resources Approach (IWRA) on the basis of a) multiple pollutants removed and b) integrated water resources benefits. Table ES.3 below lists, for each recommended BMP, both the target pollutants and water resources benefits. For discussion purposes, target pollutants are grouped in the following families:

- Bacteria
- Nutrients
- Metals
- Organics
- Pathogens
- Trash

Integrated water resources benefits listed include:

- Conservation
- Reuse/Recycling
- Habitat
- Geomorphology (Hydromodification)
- Hydrology (Stream)
- Flood Control

ES.6.6 Performance Evaluation

Assessing the effectiveness of the management measures is critical to tracking progress toward meeting full TMDL compliance. Two basic approaches are presented in the Final Plan: 1) a Presumptive Compliance Approach and 2) a Targeted Monitoring-Based Approach.

The Presumptive Compliance Approach (PCA) assumes that the implementation of structural and non-structural BMPs will lead directly to reductions of exceedance days and attempts to quantify this relationship. It is recognized that there is significant uncertainty and it is expected that the iterative and adaptive management strategies are employed, both effectiveness will improve and the correlation of activities to water quality compliance will improve. The presumptive approach is confirmed in some cases by the use of information surveys toward targeted audiences.

The focused and targeted monitoring-based approach (TMBA) adopts some measures of presumptive compliance but incorporates monitoring data and attempts to normalize and extrapolate this monitoring data throughout the region. TMB results are presented in Interim Compliance Reports.

Other performance metrics include informational surveys, tracking of volumes of pollutants removed, and a comparison of expenditures relative to full implementation budgets.

Table ES.3 describes, for each recommended BMP, the performance evaluation measure and methods to be implemented to gage progress toward meeting TMDL targets.

ES.6.7 Reporting

An annual Implementation Plan progress report documenting compliance activities will be provided by the J1/4 Agencies. It is not anticipated that this report be exhaustive, but will include a summary of progress, successes and challenges, and requested modifications to the Implementation Plan. This report would reference activities conducted to date, compared to commitments made in this Implementation Plan.

ES.6.8 Program Budgets

Potential program budgets are not provided, but would eventually be considered for preliminary programmatic budgetary planning only. An initial budget analysis did not include those activities that are considered for implementation, but do include activities that are *committed* to or implemented on a *pilot* scale. In addition, specific allocation of costs between jurisdictional agencies was not addressed in this Plan.

Table ES.3
Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

	BMPs and Activities	Water Quality Benefits: Multiple Pollutants	Additional Integrated Water Resources Benefits	Performance Evaluation Measure and Method
Activity Number	TMDL Monitoring and Studies	B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	CONS = water conserve RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	
1	TMDL Monitoring: Trancas	B, N, M, O	N/A	Monitoring Results
2	TMDL Monitoring: Solstice	B, N, M, O	N/A	Monitoring Results
3	TMDL Monitoring: Marie Canyon	B, N, M, O	N/A	Monitoring Results
4	TMDL Monitoring: Sweetwater Creek	B, N, M, O	N/A	Monitoring Results
5	TMDL Monitoring: Topanga Lagoon (sandbar)	B, N, M, O	N/A	Monitoring Results
6	TMDL Monitoring: Topanga Lagoon (bridge)	B, N, M, O	N/A	Monitoring Results
7	Hydrologic Loading Estimates	N/A	HYD, GEO	Study Results
8	Structural BMP Monitoring	B, N, M, O	N/A	Study Results
9	Identification of the Most Relevant Human Health Indicators	B, P	N/A	Study Results
10	Hydrology vs. Bacteria Loading	B	HYD, GEO	Study Results
11	Bacteria Seasonal Variation Study	B	N/A	Study Results
	Non-Structural Measures			
	Public Information Participation Programs			
12	Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact	B, N, P	N/A	Interim Compliance Reports, Information Surveys, PCA
13	Locate areas with corralled animals and educate property owners on bacteria TMDLs	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA
14	Identify horse stables in the region and implement pilot program	B, N, P	GEO	Interim Compliance Reports, TMBA, PCA
15	Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean horse waste.	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA
16	Outreach at trailheads encouraging hikers to use restroom facilities	B, N, P	N/A	Interim Compliance Reports, Information Surveys, TMBA

Table ES.3 (cont.)
Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

	BMPs and Activities	Water Quality Benefits: Multiple Pollutants	Additional Integrated Water Resources Benefits	Performance Evaluation Measure and Method
Activity Number	TMDL Monitoring and Studies	B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	CONS = water conserve RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	
17	Coordinate outreach activities with Pepperdine University	B, N, M, O	CONS, RE	Interim Compliance Reports, TMBA, PCA
18	Increase coordination between agencies and environmental organizations in preparing outreach materials	B, N, M, O, P	CONS, RE,HAB, GEO, HYD, FLD	Interim Compliance Reports, Information Surveys
	Industrial / Commercial Facilities Control Programs			
19	Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA
20	Provide for regular BMP inspections for restaurants	B, N, P	N/A	Information surveys, Interim Compliance Reports, TMBA
21	Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program	B, N, P	N/A	Interim Compliance Reports, Information Surveys, TMBA, PCA
22	Conduct industry-specific workshops	B, N, M, O, P, T	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Information Surveys, PCA
23	Investigate the possibility of increasing frequency of trash collection at restaurants	B, N, M, O, P, T	N/A	Interim Compliance Reports
	Development Planning and Construction Programs			
24	Further emphasize applicable existing BMPs in development planning and construction programs	B, N, M, O, P, T	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports
	Public Agency Activity Control Program			
25	Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities and implement recommendations on Caltrans facilities	B, N, M, O, P, T	N/A	Volume and Expenditure Tracking

Table ES.3 (cont.)
Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

Activity Number	BMPs and Activities TMDL Monitoring and Studies	Water Quality Benefits: Multiple Pollutants B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	Additional Integrated Water Resources Benefits CONS = water conserve RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	Performance Evaluation Measure and Method
	Structural Measures			
	On-Site Options			
26	Caltrans-Malibu Joint Agency Activities	B, N, M, O, P, T	HAB	Interim Compliance Reports, Information Surveys
27	Residential Cisterns	B, N, M, O, P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
28	On-site Storage and Reuse Projects	B, N, M, O, P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
29	Small Scale Infiltration Projects	B, N, M, O, P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
	Pilot Project Treatment Options			
30	Paradise Cove Pretreatment and System Upgrade	B, N, M, P		Monitoring Results
31	Las Flores Canyon Restoration and Water Quality Improvements (Biofiltration and infiltration)	B, N, M, O, P	GEO, HYD, FLD	Monitoring Results, Study Activities
32	Marie Canyon Drain Retrofit / Perocetic Acid/bactericides	B, N only		Monitoring Results
33	Latigo Shores Subsurface Flow Wetlands	B, N, M, O, P	CONS, RE, HAB	Monitoring Results

1. Introduction

1.1 TMDL Summary

The North Santa Monica Bay Jurisdictional Groups 1 and 4 Wet-Weather Bacterial Total Maximum Daily Load (TMDL) Implementation Plan (Implementation Plan) was prepared in response to Resolution No. 2002-022 of the California Regional Water Quality Control Board—Los Angeles Region (Regional Board) amending the Water Quality Control Plan for the Los Angeles Region (Basin Plan) to incorporate Implementation Provisions for the Region's Bacteria Objectives and to Incorporate a Wet-Weather TMDL for Bacteria at Santa Monica Bay Beaches (see Appendix A).

1.1.1 TMDL Development History

The Clean Water Act of 1972 (CWA), enacted into the U.S. Code, required States to develop a list, named the 303(d) List after the relevant section of the CWA, of impaired waters and name the pollutants for which they are impaired. States must then establish a watershed-based, pollutant-specific TMDL to bring impaired water bodies into compliance with the water quality standards necessary for achieving designated beneficial uses of the water body. The Santa Monica Bay beaches are designated as human body contact recreation, also known as REC-1, and are included on the State of California's 1998 303(d) List due to high indicator coliform bacteria exceedance.

The Regional Board released a first draft of the Santa Monica Bay Beaches Bacterial TMDL on November 9, 2001. As development of the TMDL progressed, the Regional Board staff decided to bifurcate the TMDL—one for dry weather and one for wet weather—to allow more time to consider the extensive public comments on the wet weather elements of the TMDL. Both the Dry- and Wet-weather TMDLs were approved by the U.S. Environmental Protection Agency (EPA) in June 2003 and became effective on July 15, 2003.

This Implementation Plan focuses on wet-weather TMDL implementation.

1.1.2 Jurisdictional Groups 1 and 4

The TMDL groups the subject area into seven jurisdictional groups and designates within each group a primary jurisdiction as the responsible agency. The jurisdiction that comprises greater than fifty percent of the land area in the group is selected as the primary jurisdiction. The responsible agency of each jurisdictional group is charged with submitting a TMDL implementation plan and a corresponding schedule to be used by the jurisdictional group.

Jurisdictional Group 1 (J1) area is primarily comprised of the County of Los Angeles (County), City of Malibu, and California Department of Transportation (Caltrans). Other agencies encompassed by the jurisdictional boundaries include the County of Ventura, the Cities of Calabasas and Los Angeles, and the State of California Department of Parks and Recreation. The County is the primary jurisdictional agency for J1, which is comprised of sixteen (16) subwatersheds (including the reference watershed, Arroyo Sequit watershed, which is excluded from the Implementation Plan). Jurisdictional Group 4 (J4) includes the

City of Malibu (primary jurisdiction), County of Los Angeles, and Caltrans, and consists only of Nicholas subwatershed.

Subwatersheds comprising Jurisdictional Groups 1 and 4 (J1/4) are shown in Figure 1.1. It should be noted that these subwatersheds do not include Malibu Creek Watershed.

1.1.3 Compliance Requirements

For this TMDL, the Regional Board implemented bacteria objectives using a reference system/anti-degradation approach. The purpose of utilizing this approach was to ensure that bacteriological water quality is at least as good as that of a reference site and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of a reference site. For the Wet-weather TMDL at Santa Monica Bay beaches, Leo Carrillo Beach and its associated drainage area, Arroyo Sequit Canyon, were selected as the local reference system. Leo Carrillo Beach was selected as the reference beach because it best met the three criteria for selection of a reference system. Specifically, its drainage is the most undeveloped subwatershed in the larger Santa Monica Bay watershed, it has a freshwater outlet (i.e., creek) to the beach, and it has adequate historical shoreline monitoring data.

Compliance Activities

Additional TMDL compliance activities included the following:

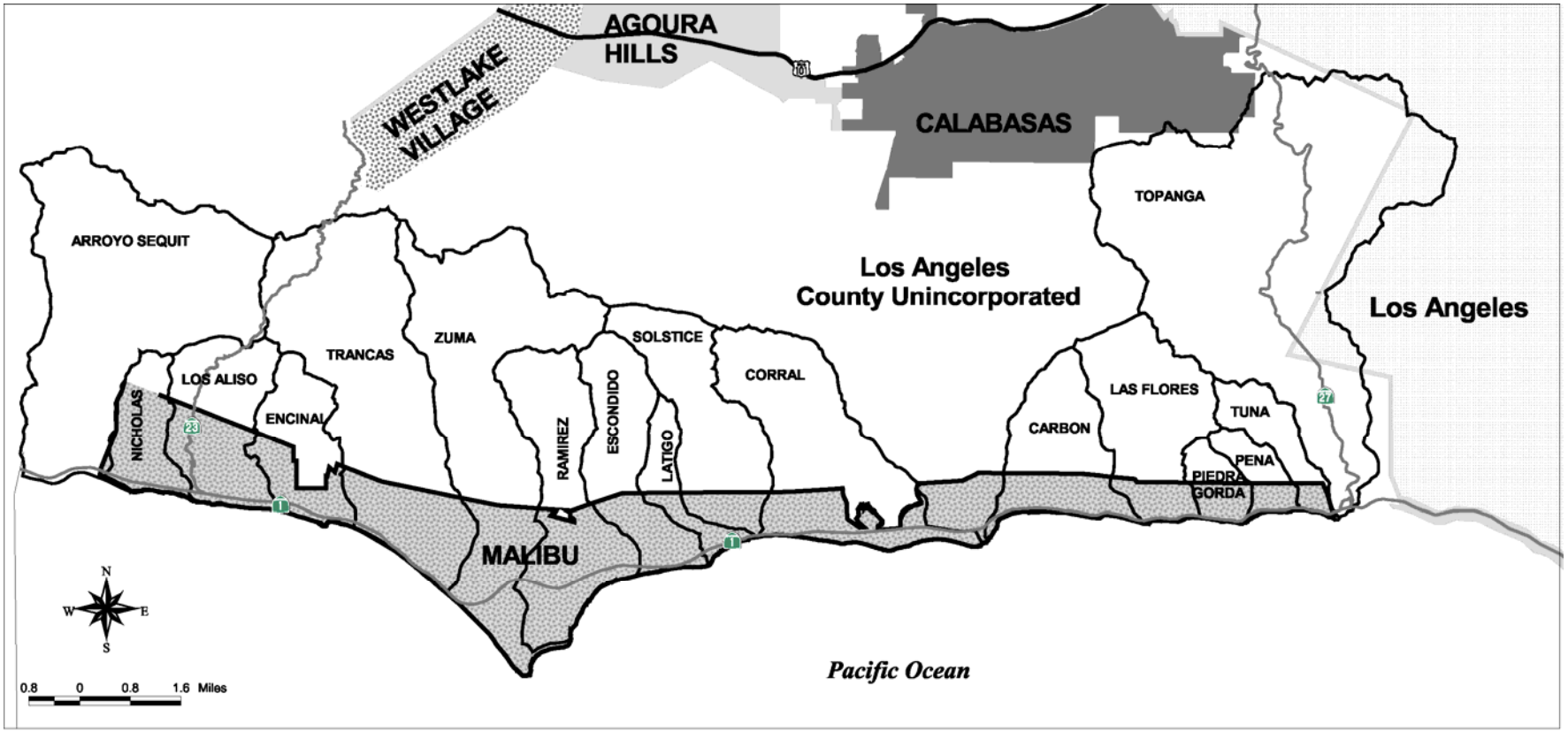
- Responsible agencies were required to submit a Coordinated Shoreline Monitoring Plan (CSMP) within 120 days of the effective date of the TMDLs to be used for compliance monitoring of the TMDLs. This plan was submitted in November 2003, and revised in April 2004.

- Responsible jurisdictions were required to develop an implementation plan for achieving compliance. After considering the Implementation Plan, the Regional Board will amend the TMDL and adopt an individual implementation schedule for each jurisdictional group that is as short as possible taking into account the implementation approach being undertaken.

1.1.4 Compliance Water Quality Objectives

The TMDLs are based on numeric targets for bacteriological water quality objectives for Water Contact Recreation (REC-1) revised by Regional Board Resolution 2001-018 amending its Basin Plan on October 25, 2001. This Basin Plan amendment received final approval from the EPA on September 25, 2002[1]. These water quality objectives are based on four bacterial indicators and include both geometric mean limits and single sample limits:

1) Resolution No. 2002-022, Finding 18.



Legend

City Boundary
- Malibu
- Unincorporated
- Los Angeles
- Calabasas
- Agoura Hills
- Wetlake Village

Subwatershed Areas

Routes
- US Route
- State Route

PSOMAS
Projection: CA State Plane, Zone 5, NAD 83 feet

JURISDICTIONAL BOUNDARIES 1 and 4 -LACDPW
North Santa Monica Bay Bacteria TMDL Implementation Plan

Figure 1.1 J1/4 Jurisdictional Agencies

1. **Rolling 30-day Geometric Mean Limits**
   a. Total coliform density shall not exceed 1,000/100 ml
   b. Fecal coliform density shall not exceed 200/100 ml
   c. Enterococcus density shall not exceed 35/100 ml.

The geometric mean is defined in Webster's Dictionary as "the nth root of the product of n numbers." Thus, the 30-day geometric mean calculation for the TMDL will be calculated as the 30th root of the product of 30 numbers (the most recent 30 day results). For weekly sampling, the 30 numbers are obtained by assigning the weekly test result to the remaining days of the week. If more samples are tested within the same week, each test result will supersede the previous result and be assigned to the remaining days of the week until the next sample is collected. This rolling 30-day geometric mean must be calculated for each day, regardless of whether a weekly or daily schedule is selected. Since zero cannot be used to calculate a geometric mean when bacteria is not detected in a sample, a value equal to half the detection limit will be used for calculation purposes. Development of alternative methods to calculate the 30-day geometric mean based on weekly data is outside the scope of this document.

2. **Single Sample Limits**
   a. Total coliform density shall not exceed 10,000/100 ml
   b. Fecal coliform density shall not exceed 400/100 ml
   c. Enterococcus density shall not exceed 104/100 ml
   d. Total coliform density shall not exceed 1,000/100 ml if the ratio of fecal-to-total coliform exceeds 0.1

The TMDL set allocations based on the maximum number of days within a storm year that sample results under the CSMP may exceed the water quality objectives (targets). Allocations for wet-weather are specific to each monitoring site and have been established based on historical monitoring data and/or comparison with historical monitoring data at the reference beach.

These site-specific allocations are listed below in Table 1.1. The maximum allowable number of exceedance days based on the reference system during year-round wet weather is seventeen (17) exceedance days per year under a daily sampling schedule. If a weekly sampling schedule is employed, the number of allowable exceedance days is scaled back accordingly to three (3) exceedance days per year for year-round wet weather.

Table 1.1 Final Allowable Wet-Weather Exceedance Days by Beach Location

	Estimated Number of Exceedance Days in Critical Year (1993)	Final Allowable Number of Exceedance Days
Leo Carrillo Beach, at 35000 PCH	17	17
Nicholas Beach- 100 feet west of lifeguard tower	14	14
Broad Beach	15	15
Trancas Beach ent., 50 yards east of Trancas Bridge	19	17
Westward Beach, east of Zuma Creek	17	17

	Estimated Number of Exceedance Days in Critical Year (1993)	Final Allowable Number of Exceedance Days
Paradise Cove, adjacent to west side of Pier	23	17
Latigo Canyon Creek entrance	33	17
Corral State Beach	17	17
Las Flores Beach	29	17
Big Rock Beach, at 19900 PCH	30	17
Topanga State Beach	26	17

1.1.5 Compliance Schedule

Based on the TMDLs as currently written, compliance schedules for TMDL compliance are listed below:

- Effective Date: July 15, 2003
- Project Kick-off: July 2004
- Draft Implementation Plan March 2005
- Final Implementation Plan July 2005
- Re-evaluation: 2007
- 10% reduction (6 years): 2009
- 25% reduction (10 years): 2013
- 50% reduction (15 years): 2018
- Final targets (18 years): 2021

Four years after the effective date, based in part on new data collected under the CSMP, the Regional Board will re-consider various provisions of the TMDLs, including:

- Allowable wet weather exceedance days
- Reevaluation of the reference system
- Reevaluation of the reference year
- Clarification or revision of the geometric mean implementation provision
- Reevaluation of proposed implementation plan elements

1.2 Coordinated Shoreline Monitoring Plan

While not part of this Implementation Plan, elements of the CSMP are discussed here. Compliance with the TMDL is to be based on monitoring conducted in accordance with the CSMP which has been submitted jointly by all jurisdictional groups and approved by the Regional Board. Monitoring under this plan began in November 2004. The CSMP was developed by a Technical Steering Committee consisting of representatives from each of the primary jurisdictions as well as additional responsible agencies. The plan was designed to comply with the monitoring requirements of both the dry- and wet-weather TMDLs and to provide data to support the re-evaluations that will be made when specific provisions of the

TMDLs are re-considered. CSMP monitoring sites located within J1/4 are listed Table 1.2 (from the Coordinated Shoreline Monitoring Plan, Revised April 7, 2004).

Table 1.2 J1/4 Coordinated Shoreline Monitoring Station Summary

Station Name	Type	Description (including historical site ID, if any)	Low Flow Diversion	Coordinates		Subwatershed	Sampling Agency
SMB-1-1	Point Zero	Arroyo Sequit Creek at Leo Carrillo State Beach (DHS010)	No	34.04558	-118.93336	Arroyo Sequit	LACDHS
SMB-1-2	Open Beach	El Pescador State Beach	--	TBD	TBD	Los Alisos	EMD
SMB-1-3	Open Beach	El Matador State Beach	--	TBD	TBD	Encinal	EMD
SMB-1-4	Point Zero	Trancas Creek at Broad Beach (DHS008)	No	TBD	TBD	Trancas	LACDHS
SMB-1-5	Point Zero	Zuma Creek at Zuma Beach (DHS007)	No	TBD	TBD	Zuma	LACDHS
SMB-1-6	Point Zero	"Walnut Creek" in Paradise Cove	No	34.01375	-118.79100	Ramirez	EMD
SMB-1-7	Point Zero	Ramirez Canyon at Paradise Cove (DHS006)	No	34.02032	-118.78600	Ramirez	LACDHS
SMB-1-8	Point Zero	Escondido Creek, just east of Escondido State Beach	No	34.02551	-118.76500	Escondido	EMD
SMB-1-9	Point Zero	Latigo Canyon, adjacent to the Tivoli Bay Villa Treatment Plant (DHS007)	No	34.02895	-118.75300	Latigo	LACDHS
SMB-1-10	Point Zero	Solstice Creek at Dan Blocker County Beach	No	34.03297	-118.74100	Solstice	EMD
SMB-1-11	Point Zero	Un-named creek at Puerco Beach (DHS004)	No	34.03328	-118.73300	Corral	LACDHS
SMB-1-12	Point Zero	Marie Canyon storm drain at Puerco Beach	No	34.03072	-118.71000	Corral	EMD
SMB-1-13	Point Zero	Sweetwater Canyon on Carbon Beach	No	34.03811	-118.67300	Carbon	EMD
SMB-1-14	Point Zero	Las Flores Creek at Las Flores State Beach	No	34.03684	-118.63600	Las Flores	EMD
SMB-1-15	Open Beach	Big Rock Beach (DHS001)	--	34.03670	-118.61012	Piedra Gorda	LACDHS
SMB-1-16	Point Zero	Pena Creek at Las Tunas County Beach	No	34.03933	-118.59600	Pena	EMD
SMB-1-17	Point Zero	Tuna Canyon	No	34.03936	-118.58900	Tuna	EMD
SMB-1-18	Point Zero	Topanga Canyon at Topanga State Beach (S2)	No	34.03814	-118.58200	Topanga	EMD

1.3 Implementation Plan Participants

1.3.1 Responsible Agencies

For the purposes of Implementation Plan development, the County has taken the lead for J1 while the City of Malibu has taken the lead for J4. Other affected agencies include Caltrans, and the County of Los Angeles Department of Beaches and Harbors. Other named agencies such as the City of Calabasas and City of Los Angeles have opted out of the Implementation Plan development as the extent of their impacted areas is limited.

It should be noted that Caltrans has reserved the right to proceed independently to address the TMDL goals depending on the specific costs and implementation measures identified during the implementation process.

1.3.2 Stakeholders

Stakeholder participation was primarily accomplished through the North Santa Monica Bay Watersheds Task Force, the members of which were solicited for input prior to the development of a draft plan, and who participated in an Implementation Plan workshop. Environmental groups actively engaged in the process included the Regional Board staff, Heal the Bay and the BayKeepers.

1.3.3 Other Implementation Plans

Concurrent with the development of this plan, Implementation Plans were being developed for the other Santa Monica Bay watershed Jurisdictional Groups, namely Groups 2 and 3 (combined plan) and Groups 5 and 6 (combined plan).

The City of Los Angeles is the lead agency for Jurisdictional Group 2 and is a significant participant in two other Jurisdictional Groups (3 and 7). The City of Santa Monica was designated the lead in Jurisdictional Group 3 and is a participant in Jurisdictional Group 2. Other responsible agencies within Jurisdictional Groups 2 and 3 include the City of El Segundo, the County of Los Angeles, and Caltrans.

Jurisdiction Group 5 is comprised of five responsible agencies: City of Manhattan Beach (primary jurisdiction), City of El Segundo, City of Hermosa Beach, County of Los Angeles and Caltrans. The limits of this area extend from the north boundary of the City of Manhattan Beach to just south of the Hermosa Beach Pier. Jurisdiction 6 is comprised of five responsible agencies: Cities of Hermosa Beach, Redondo Beach (primary jurisdiction) and Torrance, along with the County of Los Angeles and Caltrans. The limits of this area range from the boundary of Jurisdiction 5 just south of the Hermosa Beach Pier and just south of Artesia Boulevard in Redondo Beach, to the southern city limit of Torrance at the coast.

1.4 Objectives of Implementation Plan

There are numerous objectives for this Implementation Plan. First and foremost, the objective is to develop a plan that results in the improvement of water quality to a level such that shoreline waters meet or exceed the requirements of the TMDL and Resolution No. 2002-022. In addition, a significant objective of the Implementation Plan is to commit to strategic cost-effective solutions. It is recognized that cost-effective implementation of TMDL requirements in conjunction with other water resources demands and opportunities, will result in a greater overall benefit than solely focusing on treatment of bacteria in urban runoff. Therefore, this Implementation Plan represents an integrated water resources approach that takes a holistic view of regional water resources management by integrating planning for future wastewater, storm water, recycled water, and potable water needs and systems, and focuses on beneficial re-use of storm water, including groundwater infiltration at multiple points throughout a watershed. In addition, recognizing that bacteria are not the

sole pollutant of concern, this Implementation Plan also addresses multiple pollutants for the Santa Monica Bay.

Because the Regional Board recognized that an integrated water resources approach not only provided water quality benefits to the people of the Los Angeles region, but also potentially served a variety of public purposes, it acknowledged that a longer timeframe is reasonable for an integrated water resources approach because it requires more complicated planning and implementation such as identifying markets for the water and efficiently siting storage and transmission infrastructure within the watershed(s) to realize the multiple benefits of such an approach.

Another objective of the Implementation Plan is, therefore, to include methods for identifying, developing, designing, implementing, purchasing, installing, monitoring, evaluating, and maintaining the most appropriate "source control" and "treatment control" solutions. Given the additional complexity of an integrated water resources approach, the Implementation Plan will be presented to the Regional Board to justify a timeframe of 18 years to comply with the TMDL requirements.

The last critical objective of the Implementation Plan is to provide an adaptive and iterative framework for implementation. Because source prioritization efforts have not yielded conclusive source tracking results, and because technologies, particularly for bacteria treatment are developing, it is recognized that both the objectives of the TMDL and mitigation strategies may require revision and reexamination. This recognition is incorporated in the scheduling and phasing of activities within the Implementation plan.

2. Summary of Technical Analyses

This section summarizes the results of technical analyses that were conducted as part of the development of the Implementation Plan. These analyses are listed in the reference section of this Implementation Plan.

2.1 Existing Conditions

The purpose of the Source Identification and Prioritization, Hydrogeology and Aquifers, and Hydrology analyses were to establish some baseline conditions to help understand the issues and conditions within the J1/4 area.

2.1.1 Source Identification and Prioritization

The purpose and objectives of the source identification and prioritization efforts were to, on a macro-scale, identify and evaluate potential sources of water quality impairment in the affected subwatersheds and to prioritize these sources. Numerous sources of data were evaluated in an attempt to establish some relation between the source loading and water quality impairment. The task involved: a literature search and assessment of historic water quality monitoring; a review of other resource management studies of the watershed areas, as well as personal communications with key stakeholders; resource mapping; and field reconnaissance.

Monitoring data for E. coli, fecal coliform, total fecal coliform and enterococcus have been collected over the past 5 years from the following entities: Heal the Bay, Resource Conservation District of Santa Monica Mountains, County of Los Angeles Department of Health Services, County of Los Angeles Department of Public Works, and the City of Los Angeles. Even though E. coli is not cited in the TMDL, it was included in the data collection since the presence of E. coli in water is a strong indication of recent sewage or animal waste contamination and is particularly relevant to fresh water.

Potential Sources as a Basis for Prioritization

While not directly relevant to the J1/4 study area, the results of a risk assessment prepared by Stone Environmental (2004) show that shallow groundwater in the Malibu Creek study area is significantly influenced by bacteria from sources other than On-Site Wastewater Treatment Systems (OWTS). Stormwater infiltration and direct percolation from the land surface in sandy soil areas are likely to be significant potential sources of contamination. These results provide insight into the potential sources of contamination within J1 and J4.

Given the indication that the OWTSs are probably not a widespread source of bacterial contamination at the beach, the source identification and prioritization effort focused instead on other potential sources including restaurants, horses, urban runoff, etc. An attempt was made to establish a correlation between subwatershed land uses, densities, soil properties, number of storm drains, and exceedance occurrences. Given the limited data, the task of source identification and prioritization was an exercise of deduction or a "process of elimination." The data did not support the identification of one conclusive source (e.g., restaurants, horse ranches, etc.) identified by the source identification and

prioritization effort, but did identify the effects of urbanization, particularly urbanization in proximity to water bodies, as being linked to exceedance of water quality standards. As a result the focus of the prioritization effort shifted from source prioritization to targeted subwatershed prioritization to support an implementation strategy.

Therefore, potential sources or conditions associated with urban runoff, in conjunction with other factors such as proximity to a water body and recreational use of beaches, formed the basis for evaluating and prioritizing subwatersheds. Factors considered in the prioritization of subwatersheds included:

- Monitoring Data

  - Recent monitoring data, in particular, water quality exceedances associated with CSMP, was evaluated on a probability basis. Probabilities were determined by the proportion of single sample exceedance occurrences to total samples collected.

  - Exceedance-day monitoring data that formed the basis of the TMDL. The TMDL listed the number of exceedance days for a number of subwatersheds during the critical year (1993). Those subwatersheds with exceedance days exceeding 50% of the TMDL threshold were designated high priority, and those subwatershed with exceedances within 10% of the threshold were designated low priority.

- Land Use Based Criteria

  - Residential development near shoreline,
  - Commercial development near shoreline,
  - Horse ranch near shoreline,
  - Horse ranches in watershed,
  - Development near streams within watershed
  - Proportion of residential development in the watershed
  - Proportion of other development in the watershed

  Figures 2.1.1-2.1.16 graphically illustrates relative land uses for each subwatershed with the following subcategories: residential and educational; industrial and commercial; managed open space; and natural open space.

- Runoff potential: primarily a function of soil type, vegetation and land use.

- Physical criteria: number of storm drains at the shoreline, and

- Beach usage: relative potential exposure to humans as a function of beach usage assumed to be a function of parking lot spaces at beaches.

Nicholas

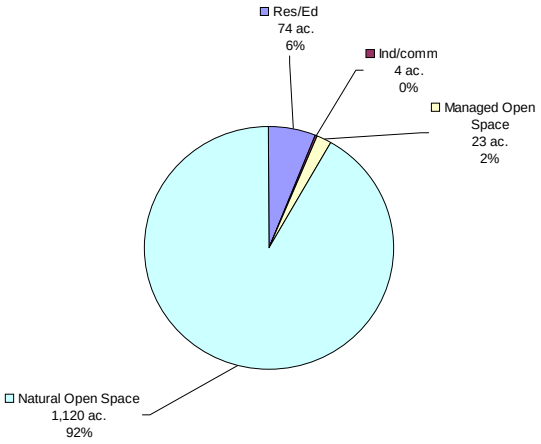


Figure 2.1.1 Nicholas: Breakdown of Land Use

Encinal

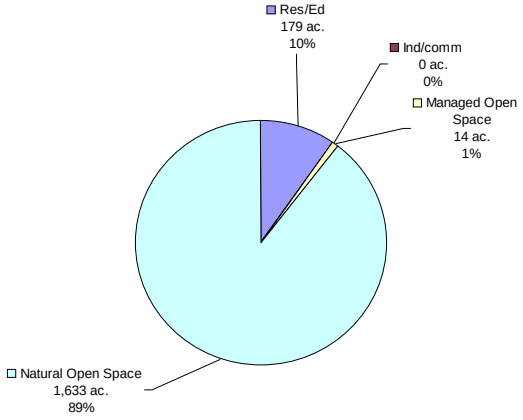


Figure 2.1.2 Encinal: Breakdown of Land Use

Trancas

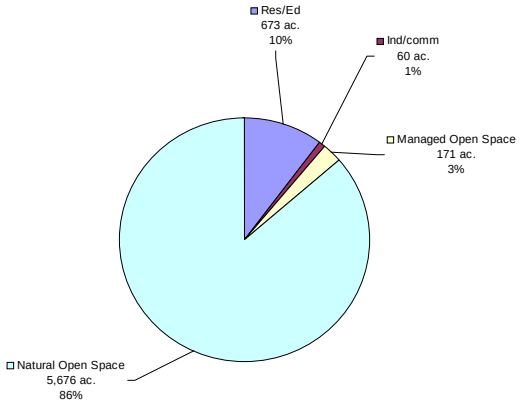


Figure 2.1.3 Trancas: Breakdown of Land Use

Zuma

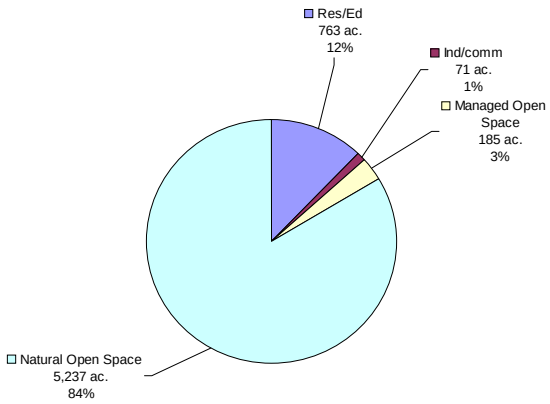


Figure 2.1.4 Zuma: Breakdown of Land Use

Solstice

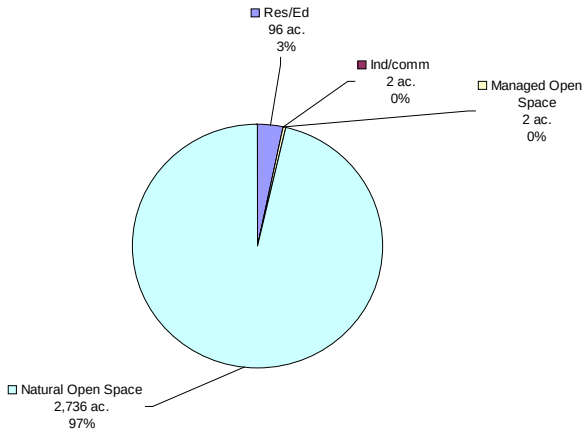


Figure 2.1.5 Solstice: Breakdown of Land Use

Pena

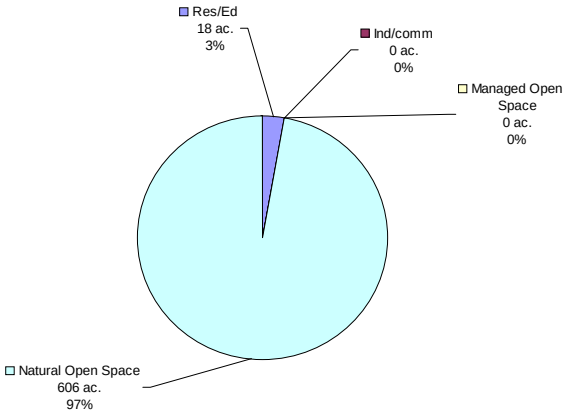


Figure 2.1.6 Pena: Breakdown of Land Use

Tuna

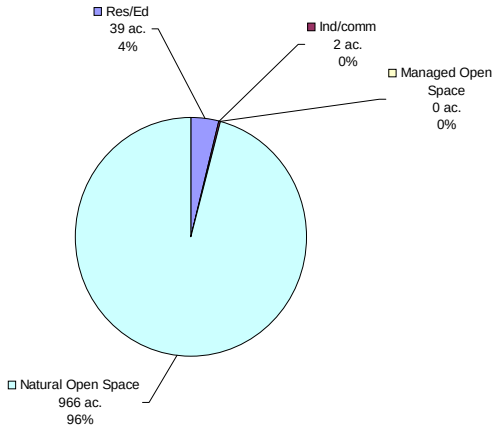


Figure 2.1.7 Tuna: Breakdown of Land Use

Carbon

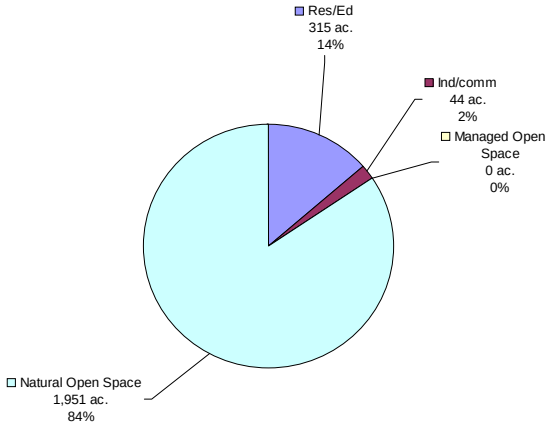


Figure 2.1.8 Carbon: Breakdown of Land Use

Los Alisos

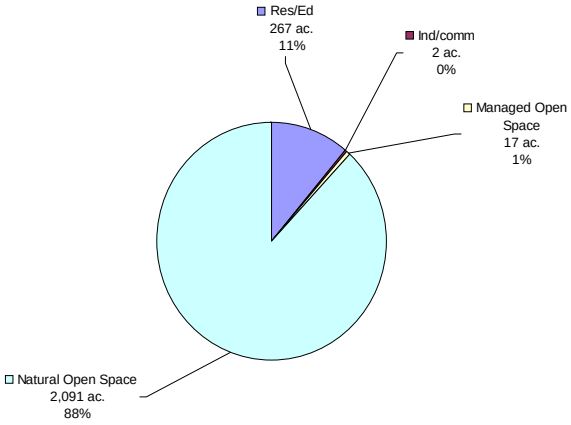


Figure 2.1.9 Los Alisos: Breakdown of Land Use

Topanga

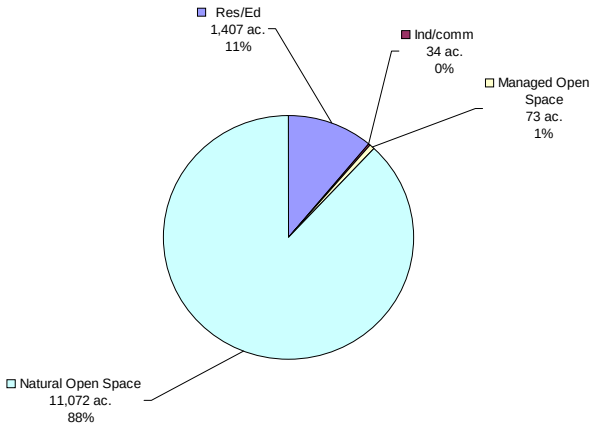


Figure 2.1.10 Topanga: Breakdown of Land Use

Escondido

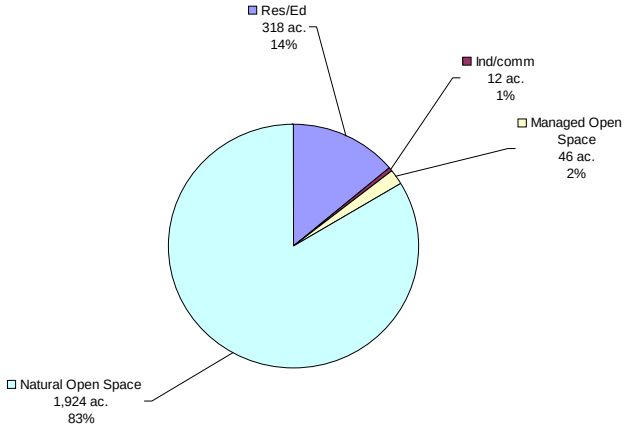


Figure 2.1.11 Escondido: Breakdown of Land Use

Latigo

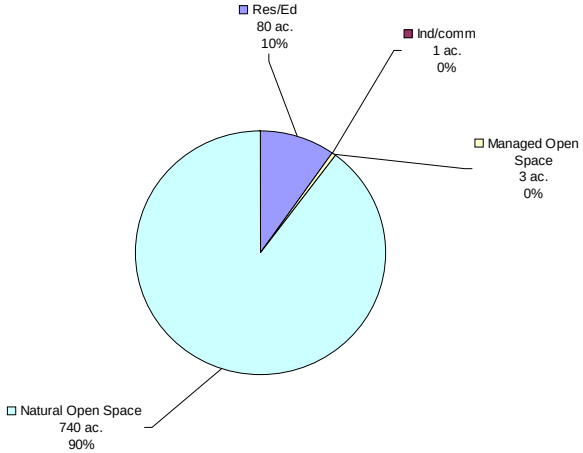


Figure 2.1.12 Latigo: Breakdown of Land Use

Corral

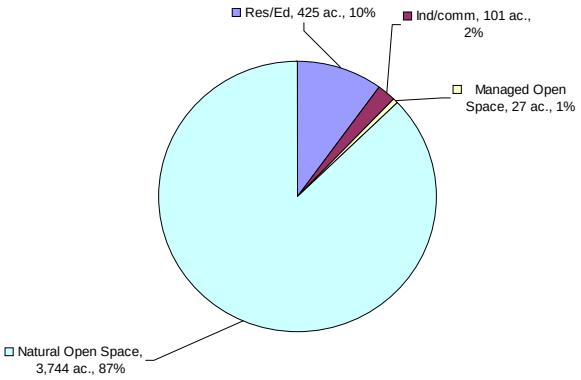


Figure 2.1.13 Corral: Breakdown of Land Use

Las Flores

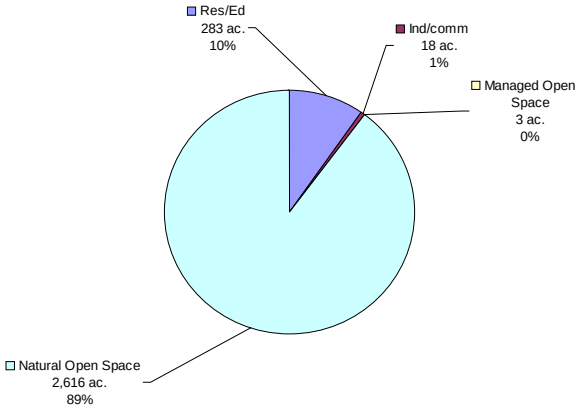


Figure 2.1.14 Las Flores: Breakdown of Land Use

Piedra Gorda

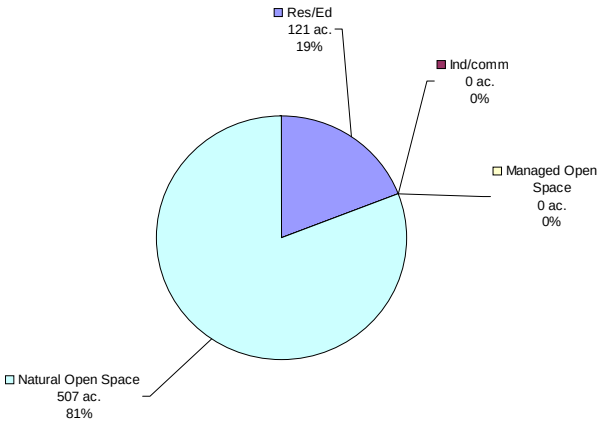


Figure 2.1.15 Piedra Gorda: Breakdown of Land Use

Ramirez

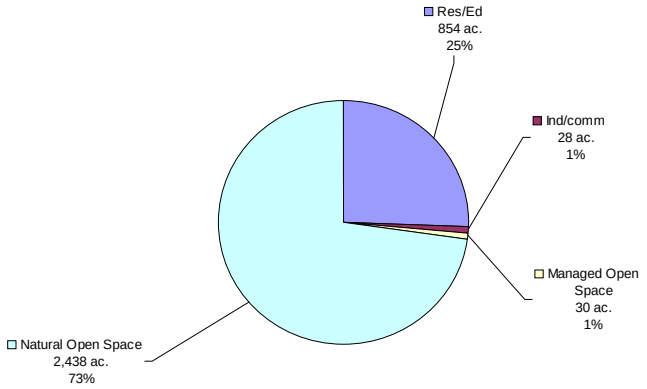


Figure 2.1.16 Ramirez: Breakdown of Land Use

The above factors were considered as a whole and priorities for subwatersheds were established on the basis of the above factors. In addition, those subwatersheds that were identified as high priority per the TMDL were also prioritized. The results of this analysis are illustrated in Figure 2.2. Based on the priority ranking and/or the TMDL exceedance days, it was established that the highest priority watersheds are Ramirez (Paradise Cove), Corral (including Marie Canyon), Latigo, Las Flores, and Piedra Gorda. Figures 2.3.1-2.3.3 present composite land uses for high, medium, and low priority subwatersheds.

2.1.2 Hydrogeology and Aquifers

Hydrogeologic and aquifer characteristics were evaluated on a macro-scale to establish the potential for infiltration as both a water conservation and water quality best management practice. Topography, basin slopes, and drainage patterns were evaluated as potential regional infiltration facilities. Geology of the project area was reviewed, and soils were evaluated based on Natural Resource Conservation Service (NRCS, formerly Soil Conservation Service) Soil Classification (ABCD) and the County soil types and runoff response characteristics.

These analyses concluded that the soils in the project area were, for the most part, poorly drained and not conducive to effective infiltration practices.

Because depths to groundwater are critical design parameters for both infiltration potential and septic system performance, the US Division of Mines and Geology was consulted to estimate general groundwater depths. A review of this data indicated that groundwater depths were generally:

- Less than 5 feet in beach areas
- 5 to 10 feet deep in coastal floodplain areas, and coastal stream canyons
- Approximately 10 feet in the upper reaches, and
- Significantly deeper along ridge lines and mountain peaks.

Figure 2.2 Subwatershed Priorities

Low Priority

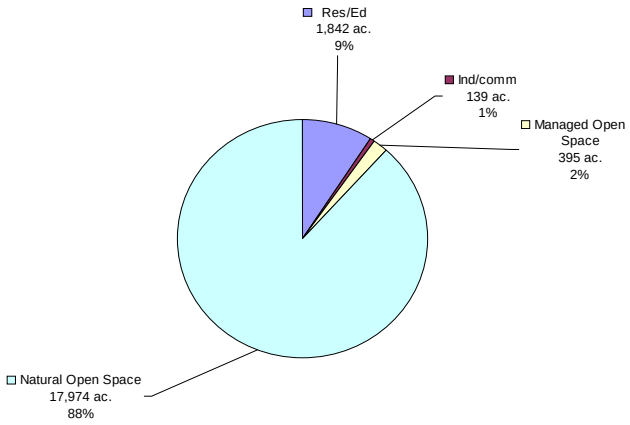


Figure 2.3.1 Low Priority: Breakdown of Land Use
Nicholas, Encinal, Trancas, Zuma, Solstice, Pena, and Tuna

Medium Priority

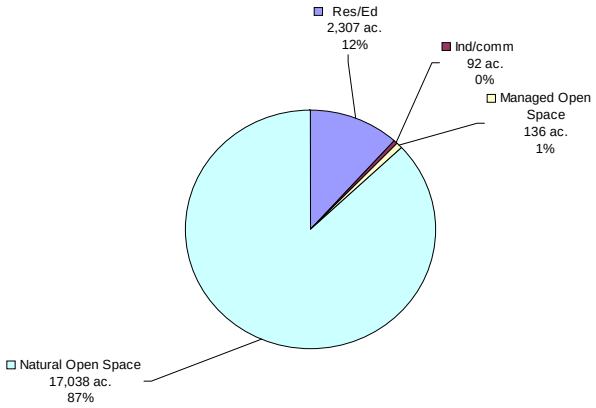


Figure 2.3.2 Medium Priority: Breakdown of Land Use
Carbon, Los Alisos, Topanga, and Escondido

High Priority

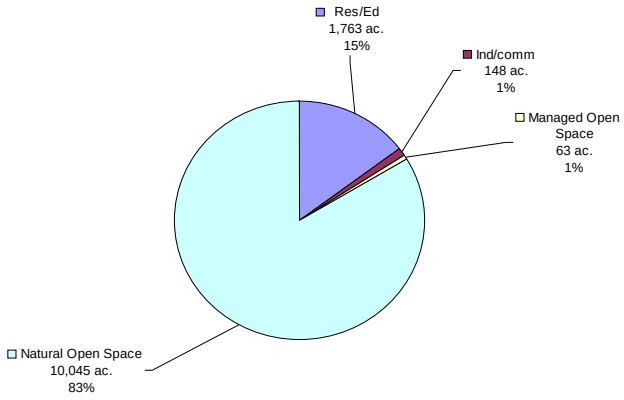


Figure 2.3.3 High Priority: Breakdown of Land Use
Latigo, Corral, Las Flores, Piedra Gorda, and Ramirez

Because most of the residences within J1/4 utilize onsite wastewater treatment systems (septic systems), seepage and impacts to groundwater are of importance, particularly since the level of risk of exposure is closely tied to the vertical separation between the infiltrating surface of the dispersal system and the water table.

Aquifer characteristics were characterized as being limited based on a review of DWR Bulletin 118 for the South Coast Hydrologic Region. The closest basins, Malibu, Thousand Oaks, and Russell Valley, are all outside the J1/4 area.

Therefore, given the local soils, geology, and groundwater conditions, and the need to avoid excessively raising groundwater levels in areas with onsite wastewater systems, the potential for regional groundwater injection and infiltration is limited, and localized infiltration practices are more feasible. It must also be recognized, however, that even local recharge can potentially increase the water table, thereby potentially impacting septic systems. As such, local recharge must be carefully evaluated for its potential to affect septic systems locally.

2.1.3 Surface Water Hydrology

A hydrologic analysis was conducted to support the potential incorporation of structural measures in the TMDL implementation[1]. The purpose of the analyses was to estimate, on a macro-scale, preliminary potential volumes of water (within each subwatershed) that would theoretically need to be captured and treated to meet TMDL requirements. This planning-level analysis successfully resolved the discontinuity between exceedance-day TMDL criteria and conventional design-storm analytical techniques using a methodology that examined daily rainfall volumes over the historical period of record. This methodology involved:

1) Ranking daily rainfall volumes per year. Precipitation analyses were conducted for four County of Los Angeles rain gages located at elevations ranging from 15 feet to 1620 feet, within and adjacent to the J1/4 areas.

2) Establishing the "critical" rainfall day each year—the 18th and 15th largest daily precipitation events each year.

3) Establishing a 90th percentile that corresponded to the TMDL criteria based on a review of the period of record. The volume corresponding to the top 10 percent of rainfall was selected as the critical storm volume. The average 90th percentile 18th largest storm volume was 0.68 inch; the 15th largest storm volume was 0.83 inch on average.

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1) The TMDL stipulated a threshold number of exceedance days based on daily monitoring activities. In Jurisdiction 1 the number of exceedance days is seventeen; in Jurisdiction 4, the number of exceedance days is fifteen. It is recognized however, that while the TMDL (and many of the related analyses) are based on daily criteria, because the Coordinated Shoreline Monitoring Plan describes many locations where weekly monitoring will occur, the number of exceedances will be pro-rated accordingly.

It should be noted that out of necessity, the analysis needed to build upon the 17 exceedance-day criteria. For implementation purposes, the actual criteria will be adjusted to correspond to compliance monitoring frequencies.

Rainfall data sets were then converted to runoff volume estimates for each subwatershed using precipitation values, zoned land uses (and percentages of the subwatersheds that are impervious), soil types, and runoff coefficients developed by the County. To address the potential range of volumes, the analysis considered reduction factors established in adjacent watersheds for similar conditions in estimating ranges of target treatment volumes.

Table 2.1 shows the maximum target precipitation and runoff volume that would need to be managed (captured, treated, reused, diverted, etc.) for each subwatershed based on these rainfall depths.

Table 2.1 Target Precipitation and Storage Volumes

Subwatershed	Precipitation Volume (in.)	Runoff Coefficient	Maximum Target Volume (MG)[a]	Potential Reduced Volume (MG)[b]
Arroyo Sequit	0.68	0.24	34	13
Nicholas	0.83	0.28	8	3
Los Aliso	0.68	0.24	10	4
Encinal	0.68	0.24	8	3
Trancas	0.68	0.29	36	13
Zuma	0.68	0.28	33	12
Ramirez	0.68	0.33	21	8
Escondido	0.68	0.22	9	3
Latigo	0.68	0.26	4	1
Solstice	0.68	0.2	11	4
Corral	0.68	0.44	35	13
Carbon	0.68	0.37	16	6
Las Flores	0.68	0.32	17	6
Piedra Gorda	0.68	0.28	3	1
Pena	0.68	0.28	3	1
Tuna	0.68	0.21	4	1
Topanga	0.76	0.25	65	24
		Totals	**318**	**118**

Notes: a. Based on target precipitation
b. Extrapolated from J2/3 analysis for reduced volume and 5 in 50 year exceedance, and should be considered preliminary and subject to change.

Studies on adjacent watersheds (TMDL Implementation Plans for Jurisdictional Groups 2 and 3) have involved further analyses based on a continuous simulation of 50-years of precipitation record in an attempt to provide further optimization of storage volumes. For a watershed in North Santa Monica Bay (Santa Ynez – runoff coefficient = 0.31), it was estimated that the target volumes could be reduced to 37% of the target volume, calculated in a similar method noted above, and still exceed TMDL requirements only 5 out of 50 years

compared to 1 out of 50 years using the maximum target volume. Areas with lower runoff coefficients showed even greater percentage reductions (Susilo, 2004). In addition, the aforementioned analyses did not consider pollutant concentrations within storms or between a series of storms. Table 2.1 also lists target precipitation and storage volumes, and, assuming an effective percentage reduction similar to that calculated in an adjacent watershed, potential volumes that could be considered for implementation.

The proposed method is limited to the Implementation Plan and reductions will be confirmed and developed further with future studies. In Table 2.1, the "Potential Reduced Volume" column is an assumed volume based on adjustments and reductions developed at local watersheds. It is recognized that this volume is only a preliminary planning estimate, and will change upon the collection and analysis of both hydrologic streamflow and bacteria pollutograph data.

It must be noted that the hydrologic volumes are preliminary and presented for planning purposes. Furthermore, studies (for Jurisdictions 2 and 3) have shown that the target storage volumes in undeveloped subwatersheds may be overestimated by this approach; therefore, the values should be considered conservative. This will be addressed when pre-design parameters developed as part of future studies.

2.2 General Opportunities for Multiple Beneficial Uses

2.2.1 Water Supply and Reuse

This Implementation Plan utilizes an integrated water resources management approach that will identify beneficial use opportunities and treatment management options. The main purpose of this section is to summarize the current and future water supply beneficial uses, water use and reuse scenarios in the J1 and J4 study areas.

The approach used in evaluating beneficial use options involved identifying potential locations at both local and regional levels and estimating the amount of runoff that can be managed by the beneficial use options. The potential for beneficial use was assumed to be related to land uses since certain land uses offer more potential for reuse, such as landscape irrigation for golf courses and parks. Therefore, this analysis involved establishing a spatial distribution of potential areas and assessing the size and potential demand of these areas.

Potential efficiencies of various reuse options, local and regional, are discussed. Local reuse opportunities include on-site capture using cisterns. Regional reuse opportunities include groundwater recharge, reuse for recreation, regional capture and reuse for irrigation or other non-potable supply. In establishing reuse opportunities, a review of the practices of local water agencies was conducted. These agencies included: County of Los Angeles Water Works District 29, Las Virgenes Municipal Water District, West Basin Municipal Water District, and the City of Los Angeles. Estimates of potential demand indicated limited regional potential; the Trancas and Corral watersheds making up 75% of the approximately 1000 acre-feet of total potential demand. Within the Corral subwatershed, Pepperdine University already utilizes imported water from the Malibu Mesas Water Reclamation Plant which can provide 150 acre-feet of recycled water supply.

On this basis, the majority of reuse opportunities in J1/4 will likely be limited to localized on-site solutions. These solutions will be easier to implement.

2.2.2 Recreational Uses

Data sources for the evaluation of recreational water use opportunities included the Santa Monica Mountains Conservancy, the National Parks Service, and Southern California Association of Governments (SCAG). Figure 2.4 shows recreational areas and illustrates the placement of park areas relative to developed land (near the coast).

In addition, slopes and soil types were reviewed for potential applicability for regional and sub-regional water quality facilities. These evaluations indicated that many of the slopes and soil types were not readily suitable for larger scale (particularly land intensive) water quality best management practices.

2.2.3 BMP Location Evaluation

This effort was intended to evaluate potential sites for facilities that would be required to implement the TMDL implementation plan for various runoff management options. Both local (including sub-regional) and regional siting options were considered.

Local sites would allow for the storage and reuse of stormwater, reducing flow volumes and potentially improving water quality. Potential local sites include residential zoned facilities, parks and recreation centers (though state and federal facilities might require additional inter-jurisdiction coordination), government facilities (parking lots, service yards, etc.), schools (again requiring inter-jurisdictional coordination), and parking and urban vacant lots.

Regional treatment sites would require pre-treatment and storage, and possibly transmission pipelines, reuse locations, onsite storage and reuse. Operational storage was assumed to be equivalent to target runoff volumes described in Section 2.1.3. Regional methods of source control and regional treatment facilities could be required in order to maximize potential beneficial uses and reduce wet weather discharges to the beaches.

Criteria for regional sites included proximity to storage facilities, street access, public ownership (preferred), sufficient distance from development, flat terrain, avoidance of environmentally sensitive areas, and sites with public support. A detailed list of facilities is provided on a watershed-by-watershed basis in Section 5.

2.3 Description of Potential Non-Structural activities

This section describes existing non-structural (or institutional and programmatic) activities and recommends bacteria-specific programs to be considered for implementation. These activities build upon the NPDES Municipal Separate Storm Sewer System Permit for the County of Los Angeles, and are divided into five programs: 1) Public Information and Participation, 2) Industrial/Commercial (assumed to include illicit discharge and illicit connections), 3) Development Planning, 4) Development Construction, and 5) Public Agency Activities.

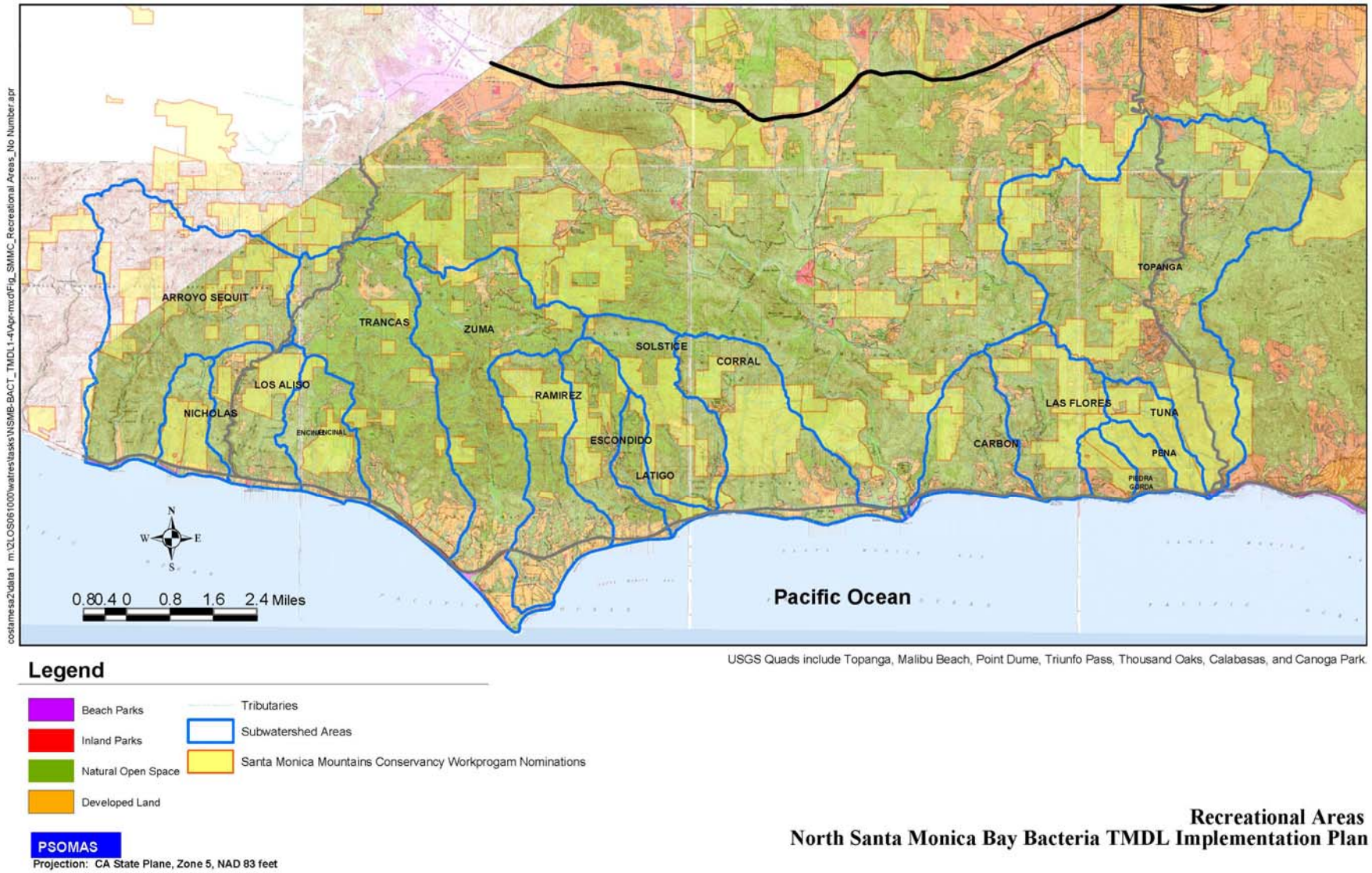


Figure 2.4 Recreational Areas

2.3.1 Public Information and Participation

The purpose of this public information and participation program is to implement nonstructural (source control/institutional) solutions as a critical and cost-effective element of an iterative and adaptive Bacteria TMDL program. This section reviews existing public information and participation programs as well as industrial/commercial facilities control programs and makes recommendations to incorporate bacteria TMDLs into these programs.

A number of Public Information/Public Participation programs were reviewed. Reviews consisted of phone interviews, online reviews, and document reviews. Multiple agencies operating within the jurisdictions were contacted along with environmental organizations and groups operating in the area. The programs described here are not an exhaustive list of all programs, but are rather an overall view of the most applicable and available programs. Not all environmental groups active in the area were contacted nor were all programs of agencies reviewed. Many agencies and environmental organizations co-sponsor programs. Thus, many of the materials are unified and redundant across agencies. Overall, current programs do not directly address bacteria, but rather seek to promote pollution prevention in general. Many current programs could be modified to discuss bacteria and other TMDLs and establish a link between certain activities and bacterial loading of stream and creeks.

Existing Programs included:

City of Malibu Clean Water Program

The Clean Water Program provides a brief introduction of the stormdrain system and BMPs that address water pollution prevention and targets three groups: residents, business team members, and contractors and developers. The Clean Water Team is represented by a dolphin mascot, Bu, that appeals to children and acts as a seal of approval for businesses participating in the Clean Water Program. As part of the program, local businesses and developers and contractors that implement the suggestions in the Clean Water Program receive a sign and a seal of approval sticker for display.

Numerous other handouts produced by the County of Los Angeles, Environmental Protection Agency, the Santa Monica Bay Restoration Project, and the Clean Water Program are also available at the Malibu Public Works counter. Items that are related to bacterial loading include picking up after pets, properly maintaining septic systems, and retaining storm water on site. A few of the brochures explain the link between bacterial loading and animal waste and improperly operating septic systems. The "Living Lightly" booklet – an informational handbook focused on watershed stewardship - is also available at the counter.

There is no municipal sewer system in the Malibu area. Therefore, most residents and business owners are entirely dependent on septic systems. For 2005, Malibu plans to release a septic system and leach field booklet and develop additional stormwater public information materials. The septic system and leach field booklet will be made available at

the city, through the mail, and at real estate brokerages. These booklets are being developed to coincide with a septic system inspection program currently under development in a joint project with the Regional Board. For residential septic systems, the City recently launched a point-of-sale inspection program to identify and inventory septic systems in the area.

County of Los Angeles Stormwater Education Program

The County of Los Angeles Department of Public Works, implements a Stormwater Education Program (SEP) as part of its compliance with its NPDES Permit. The SEP uses a variety of mediums to educate the public and businesses about what people can do to prevent pollution from entering water bodies. A large portion of the area within J1/4 lies within the unincorporated area of the County of Los Angeles. SEP also provides assistance to incorporated cities to promote cohesive pollution prevention efforts throughout the region.

County brochures are directed at general stormwater pollutants except for the Dog Owner Tips which specifically focuses on cleaning up after your pets to reduce bacteria in stormwater. SEP provides online information targeted towards RV owners. This information is designed to educate RV owners regarding proper disposal practices for wastes. List of disposal sites are provided with contact information.

Caltrans' District 7 Programs

Caltrans is responsible for stormwater pollution controls along the State Highways in J1/4, including Pacific Coast Highway (LA-1), Decker Road (LA- 23), and Topanga Canyon Road (LA-27). As part of its storm water management activities, Caltrans uses a variety of methods to educate the public about the importance of managing storm water. The general approach of the Public Education Program is to:

- Inform the public regarding the storm water quality issues that pertain to Caltrans properties, facilities and activities; and
- Encourage public behavior changes regarding the release of potential pollutants (e.g., litter, spilled loads and oil leaks).

Caltrans' storm water outreach program consists of a variety of written materials, monthly and quarterly bulletins, a website, workshops, storm drain stenciling, anti-litter signs, a statewide Adopt-a-Highway Program, along with many local municipality partnerships. "Pathogens in Storm Drain Discharges Brochure" is an example of written materials that is most directly related to bacteria.

In District 7, "No Dumping" and "Litter Fee" signs were installed at selected locations on highways and freeways. Warnings were stenciled at the drain inlets to prohibit discharges into drainage systems in the park-and-ride lots, rest areas, vista points, and other areas with pedestrian traffic."

Other Public Information Programs

Many stakeholder groups have developed their own public information materials. Some of these groups include:

- Malibu Coastal Land Conservancy
- Septic Tank Service Providers' Programs
- Santa Monica Bay Restoration Commission
- Santa Monica Mountains Conservancy
- Santa Monica Mountain Trails Council
- Equestrian Trails, Inc.
- Resource Conservation District of the Santa Monica Mountains
- Pepperdine University

Bacteria-Specific Programs

Many programs are not currently addressing bacteria or informing the public about TMDLs. Most existing programs consist of general efforts to educate individuals, businesses, and industry about pollution prevention, impacts of pollution and good housekeeping. Bacteria-specific information can be incorporated into new and existing programs through the following programs:

- Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact
- Locate areas with corralled animals and educate property owners on bacteria TMDLs
- Identify horse stables in the region and implement pilot program
- Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste
- Outreach at trailheads encouraging hikers to use restroom facilities
- Provide septic system pumpers and customers with septic system guides
- Coordinate outreach activities with Pepperdine University
- Increase coordination between agencies and environmental organizations in preparing outreach materials

2.3.2 Industrial/Commercial

Agencies within the J1/J4 implement an industrial/commercial facilities control program. The goal of this program is to change behaviors through a combination of outreach and site visits. Most existing programs do not specifically target bacteria, but are designed to minimize general pollutants of concern that will tend to assist in reducing bacterial loading. A partial list of elements from existing programs follows:

City of Malibu

Malibu has implemented multiple programs to comply with the NPDES permit requirements for commercial/industrial facilities and to address local concerns. Some outreach programs target both residential and commercial/industrial facilities.

Inspections required under the permits for industrial and commercial facilities are conducted by the City's inspectors and restaurant inspections are contracted to the County of Los Angeles Department of Health Services (DHS) inspectors. Industrial and commercial facilities are given educational materials specific to the type of business during an inspection. These inspections are not specifically designed to target bacteria, but rather general pollutant BMPs. Additionally, all retail gasoline and automotive dealerships are required to meet the BMP requirements as specified by the Stormwater Quality Task Force Best Management Practice Guide for Retail Gasoline and Automotive Dealerships. To ensure that these commercial establishments are in compliance, the City has implemented a rigorous commercial business inspection program.

Enforcement actions include, but are not limited to, warnings, notices of violations, administrative civil liability actions, and monetary fines. Enforcement actions occur when continued violations are discovered. All inspection data is tracked in an inventory database of all commercial/industrial facilities. The City has indicated in its individual annual report to the Regional Board that commercial/industrial facilities generally do not follow up with training of their employees in BMPs without constant inquiries from inspectors and that most facilities do not keep up with all BMPs.

Representatives with the City of Malibu are concerned with bacteria loading from restaurant operations. Restaurant waste, in both solid form (packaging, paper products, cans, food products, etc..) and liquid form (i.e., cooking oil, grease, animal fats, food products, etc.), can collect in areas that come in contact with stormwater runoff and provide an ideal habitat for specific forms of bacteria that may enter stormwater drains. Prior to food service inspections, food service providers are mailed a BMP fact sheet for reducing pollution.

County of Los Angeles Department of Public Works

The Department of Public Works is responsible for ensuring compliance control programs for commercial and industrial businesses within unincorporated areas. The County of Los Angeles maintains an inventory of its commercial/industrial facilities along with inspection data. These inspections target pollutants of general concern and not specifically bacteria. Inspections are designed to be educational and informative for commercial/industrial

facilities in conjunctions with confirming BMPs are properly implemented as required by law. BMPs can take the form of schedules of activities, prohibitions of actions, maintenance procedures, treatment requirements, and structural controls. When additional BMPs are needed, the inspector recommends non-structural BMPs. BMP handouts created for specific industries within Los Angeles the County include:

- General commercial/industrial facilities
- Equestrian and stable facilities
- Food and related products facilities
- Potential New Programs

As a means to reduce bacterial loading associated and/or linked to commercial/industrial facilities, modifications to existing programs and new programs are recommended. Effectiveness of these new programs can be measured via numerous methodologies including compliance, participation levels, and ultimately sampling. Existing commercial/industrial facility control programs are not directly addressing bacteria, other TMDLs, or informing commercial and industrial businesses about bacteria TMDLs. With regards to commercial horse stables and equestrian facilities, an anecdotal link has been established associating animal wastes with bacteria loading. Some of the bacteria-specific recommendations include:

- Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers

- Provide for regular BMP inspections for restaurants

- Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program

- Conduct industry specific workshops

- Investigate the possibility of increasing frequency of trash collection at restaurants

2.3.3 Development Planning

Two land use plans affect development in the subwatershed areas. One plan is the City of Malibu's Local Coastal Program (LCP), certified by the California Coastal Commission in September 2002. The second plan is the County of Los Angeles' Malibu Land Use Plan, which guides development in the unincorporated portions of the Santa Monica Mountains Coastal Zone and was certified by the California Coastal Commission in 1986. The subwatershed areas lie almost completely within the state-designated Coastal Zone. Any development within the Coastal Zone must be conducted in a manner that protects coastal resources.

As of this writing, the City's LCP is the subject of litigation and has not yet been implemented. If fully implemented as certified, the City's LCP will regulate both land uses and development standards within the City of Malibu. The County's Malibu Land Use Plan, a component of the County of Los Angeles General Plan, guides land uses but does

not contain comprehensive development standards. Under the Land Use Plan, most development in the unincorporated Coastal Zone must undergo an additional level of environmental review prior to approval. The County is currently working on updating the Land Use Plan, which is primarily a policy document, and adding a local implementation program. The local implementation program will contain the standards that ensure coastal resources are protected from development. Together, the new Land Use Plan and the local implementation program—once certified by the California Coastal Commission—will constitute the County's LCP for the unincorporated portions of the Santa Monica Mountains Coastal Zone.

The City's LCP and the County's Malibu Land Use Plan are intended to be basic planning tools used by the local government, in partnership with the California Coastal Commission, to guide development in the coastal zone and contain the ground rules for future development and protection of coastal resources. The LCP and Land Use Plan specify appropriate location, type, and scale of new or changed uses of land and water. These programs govern decisions that determine the short- and long-term conservation and use of coastal resources. Chapter 17 of the City LCP's Local Implementation Plan details the Water Quality Protection Ordinance. This includes requiring development to evaluate potential adverse impacts to water quality and consider site design, source control and treatment control BMPs. This section also discusses designing to prevent the introduction of pollutants that may result in water quality impacts.

Many non-structural solutions that can be incorporated into an Implementation Plan for an effective bacteria control program can be implemented within the overall framework of the existing NPDES permit. The County of Los Angeles and the City of Malibu must implement a Development Planning Program, which identifies various controls to minimize water quality impacts of stormwater runoff generated from all Planning Priority Development and Redevelopment projects. Through the use of project planning and permit approval process and CEQA, Permittees are required to assure that appropriate post-construction BMPs are included in Priority Planning Development and Redevelopment Project plans and designs to:

- Minimize impacts from stormwater and urban runoff on the biological integrity of Natural Drainage Systems and water bodies
- Maximize the percentage of pervious surfaces to allow percolation of stormwater into the ground;
- Minimize the quantity of stormwater directed to impervious surfaces and the MS4;
- Properly designed and maintain Treatment Control BMPs in a manner that does not promote the breeding of vectors; and
- Provide appropriate permanent measures to reduce stormwater pollutant loads in stormwater from the development sites.

In addition to controlling peak flows, each Permittee is required to develop and implement a Standard Urban Storm Water Mitigation Plan (SUSMP). In terms of treating stormwater

runoff from the development site, the SUSMP includes Numerical Design Criteria for Treatment Control BMPs. The two most common methods are a volumetric treatment control or a flow based treatment control. Bacteria-specific measures include further emphasizing applicable existing BMPs in development planning and construction programs

California Environmental Quality Act

The California Environmental Quality Act (CEQA), Public Resources Code, Section 21000 et seq., requires environmental assessments of projects in California. As a part of CEQA, a proposed project is evaluated to determine whether the project may have an adverse impact upon the environment. If an initial study indicates that significant adverse environmental impact may occur as a result of a proposed project then the environmental impact(s) must be mitigated. Either a Mitigated Negative Declaration, or for more substantial projects, an Environmental Impact Report comparing various project alternatives and identifying the impacts and mitigation measures must be prepared and adopted.

The Storm Water Quality Management Plan (SQMP) requires the assessment of a development project's impacts upon hydrology and water quality. Current guidance is contained within the Development Planning Model Program for the preparation and review of local CEQA documents. The guidance relies on a general approach to assessment. Revisions to these guidelines may be necessary to ensure that CEQA documents adequately address bacteria and other impairments for which TMDLs have been prepared when evaluating a project's water quality impacts.

The CEQA process can assist in the evaluation of appropriate BMPs to reduce pollutants. Addressing wet weather TMDLs during the CEQA process will require modification of existing hydrology and water quality evaluation criteria. Seven criteria designed to supplement the existing standard Initial Study checklist incorporated into the CEQA Guidelines along with any changes agencies may have made to incorporate stormwater quality issues into the CEQA review process are listed below

1. Potential impact of project construction on stormwater runoff

2. Potential impact of project post-construction activity on stormwater runoff

3. Potential for discharge of stormwater runoff

4. Potential for discharge of stormwater pollutants from material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas

5. Potential for discharge of stormwater to impair the beneficial uses of the receiving waters or areas that provide water quality benefit

6. Potential for the discharge of stormwater to cause significant harm on the biological integrity of waterways and water bodies

7. Potential for significant increases in erosion of the project site or surrounding areas.

When considering TMDL requirements in the CEQA process, the lead agency and project proponent should determine the potential for the project to increase bacterial loading based on the change in proposed land use and impervious surface, and evaluate the project characteristics that would minimize the impact of increased loading. These should be identified in the project SUSMP for permanent, post-construction BMPs. For larger projects (for example those in categories that require preparation of a SUSMP), a quantitative analysis may be required. The analysis would need to demonstrate that post-project bacteria loads, with application of BMPs, would be equal to or less than pre-project conditions. Alternatively, the analysis could demonstrate that through project BMP design, the project could manage a proportionately equivalent volume on-site to the target volume established in the TMDL for the watershed.

Any unique construction phase BMPs should be identified in the CEQA documentation and subsequently incorporated in the project Stormwater Pollution Prevention Plan (SWPPP) which would be prepared prior to construction. CEQA mitigation monitoring plans can identify these available mechanisms as the primary enforcement methods.

The criteria can be further refined to evaluate the project's ability to meet TMDL implementation requirements as an overall component of stormwater quality. The following plan of action is recommended for incorporating the review of TMDLs into the CEQA process:

1. Identify the TMDL required issues not currently addressed by CEQA
2. Address required TMDL issues within standard conditions of approval.
3. Modify CEQA review process.

2.3.4 Development Construction

As part of the existing NPDES Permit, requirements exist for construction activities that disturb equal to or greater than one acre of land or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs one or more acres. As adopted by the State Board, the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ), referred to as the General Permit, includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The General Permit has the following provisions:

- Develop and implement a SWPPP which specifies BMPs that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off site into receiving waters.

- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation.

- Perform inspections of all BMPs.

Though many of the construction related BMPs are not specifically targeted at reducing or eliminating bacteria from runoff, implementation of the construction BMPs can effectively reduce bacteria in the receiving waters and storm drain systems. In general, there are two areas of focus for construction site BMPs that will assist in bacteria reduction: 1) enhanced sediment control, as sediment can contain bacteria, and 2) control/elimination of non-stormwater discharges from construction sites, as this becomes dry weather runoff which contributes to bacteria transport off-site. Therefore, by managing these two areas on construction sites, bacteria levels can be reduced in some cases. These categories already exist under SWPPPs, but additional emphasis could be given in contractor education and compliance inspection activities.

Examples of existing required BMPs that can be further emphasized include:

- Proper handling of temporary toilets (sanitary/septic waste management), and containment and cleanup of spills surrounding temporary toilets (sanitary/septic waste management)

- Proper management of lunch truck and food disposal (solid waste management), and

- Reduction of runoff from exiting site will result in less runoff to pick up bacteria from off site en route to the ocean (e.g. water conservation practices, illicit connection/discharge, potable water/irrigation, vehicle and equipment cleaning, liquid waste management)

2.3.5 Public Agency Activities

This task describes both current and recommended public agency activities for the three primary agencies: City of Malibu, County of Los Angeles, and Caltrans.

City of Malibu

In February 2002, the City of Malibu, along with the County, began implementing programs under a new NPDES permit cycle. City funds have also been allocated to record activity at all priority drains over the next few years. Drains that are suspected of contributing to degraded water quality will be a priority for video monitoring. Suspicious discharges will be sampled and tested, and the City will take enforcement actions if necessary.

Information on drainage system operation and maintenance (cleaning) activities was obtained from Melanie Irwin, former Public Education Coordinator for the City of Malibu.

Street sweeping reduces the amount of trash and debris in stormwater, which can potentially reduce bacteria levels. As part of the City's roadway operation and maintenance activities, all streets in the Malibu area are swept on a regular basis.

Raw sewage spills, leaks, and overflows from septic systems are a potential threat to both human health and the quality of receiving waters if the bacteria pollutants enter the storm drain system. Therefore, the City gives high priority to septic system complaints and

reports of septic system failures, including overflows. To respond to septic overflows, the City has developed a spill response program that is implemented any time there is a septic spill.

The City does not maintain any corporate yards to support its maintenance activities, but City employees inspect the offsite yard to ensure that the pollution prevention plan is in place and that yard workers have a clear understanding of applicable BMPs including illicit discharge controls, good housekeeping practices, material storage controls, and vehicle leaks and spill controls.

County of Los Angeles

The County of Los Angeles has developed a Public Agency Activities Model Program for agencies to use in developing their own programs. The model provides specific guidance in the following areas:

- Sewage Systems Operations
- Public Construction Activities Management
- Vehicle Maintenance/Material Storage Facilities Management
- Landscape and Recreational Facilities Management
- Storm Drain Operation and Management
- Streets and Roads Maintenance
- Parking Facilities Management
- Public Industrial Activities Management
- Emergency Procedures
- Treatment Feasibility Study

Recent results of the Program, published in the 2004 annual program report, include a variety of measures to comply with the MS4 permit, including storm system maintenance and catch basin cleaning (trash and litter are potential carriers of bacteria).

The County also visually monitors open channel storm drains and other drainage structures for debris at least annually. Those sites experiencing frequent illicit discharges have been identified and prioritized for regular inspection by the County. The County has also designated stormwater coordinators to work with residents to prevent illegal dumping into storm drains, coordinate stormwater stenciling and facilitate work on clogged drains. Residents can call an environmental hotline (1-888-CLEANLA) to report illegal dumping into the County's storm drain system.

The County maintains a number of vehicle maintenance facilities, material storage facilities, and corporation yards which each have pollution prevention plans.

Caltrans District 7

Caltrans operates under a statewide NPDES permit which governs management of its storm water activities. As part of its storm water activities, Caltrans has developed an approved Storm Water Management Plan (SWMP) which addresses storm water pollution control related to planning, design, construction, maintenance and operation of all

transportation facilities as an ongoing part of Caltrans normal business practices. An important component of the SWMP is the Project Planning and Design Guide (PPDG) which provides specific design guidance for incorporating BMPs into projects during the planning and design phases of a project. These include Treatment BMPs, Design Pollution Prevention BMPs, and critical Construction Site BMPs. Other components of the SWMP include research and development of BMPs, monitoring of storm water activity through regional work plans and annual reporting, and continual funding of storm water research and public education.

New Public Agency Activities

Through a combination of revising existing public agency activities and implementing new public agency activities, the agencies in Jurisdictions 1 and 4 can further focus activities to optimize reduction in bacteria and other TMDL constituents. Most existing agency activities do not specifically target bacteria TMDLs. Therefore, the following activity was offered for consideration.

- Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities

2.4 Description of Structural BMPs

Structural Best Management Practices can be potentially implemented on a local, sub-regional, or regional scale. The watershed specific elements of the Implementation Plan will include specific recommended combinations of structural and non-structural measures to be implemented as appropriate within each jurisdiction or combination of jurisdictions that can quantitatively be predicted to have some success of achieving the reduction in exceedance days required by the TMDL. The purpose of this analysis is to identify these structural measures. This effort identified potential treatment requirements, technologies, and management options for specific areas of the watersheds that are to be treated for either discharge or reuse/recharge.

2.4.1 On-Site (structural source control) Options

These options include cisterns, on-site storage/reuse, onsite capture and infiltration, and septic-related BMPs; the stormwater BMPs are intended to reduce the total volume and flow rate of runoff leaving properties and entering the storm drain system, including any bacteria that might be picked up in the runoff on-site. Some limited pre-treatment might be required for a larger system to minimize operational problems. It should be recognized that on-site options, like non-structural options, may not fully mitigate the impacts of pollutant loading, but their implementation could contribute to integrated water quality solutions, and could contribute to the reduction of the magnitude and extent of downstream (regional) options.

Residential Cisterns

Cisterns are low-cost water conservation devices that could be used to reduce runoff volume and, for smaller storm events, delay and reduce the peak runoff flow

rates. They store and divert runoff from impervious roof areas on residential properties. This stored runoff could provide a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts.

On-Site Storage and Reuse Projects

This option involves capturing runoff from areas other than, or in addition to, rooftops and storing it for subsequent reuse on-site. These other areas include driveways, parking lots, and paved sports areas. This option could also include some treatment (such as chlorination) and would require careful management, and consideration of water distribution systems.

The potential sites for this type of system would be public parks, government facilities, or schools at which the runoff could be reused for irrigation without meeting full Title 22 treatment Standards (requiring filtration and disinfection). They would be installed underground since they would need to be big enough to storage large volumes of runoff. The landscape maintenance could involve a controlled subsurface distribution system (i.e., no sprinkler system) so that direct public contact is essentially eliminated. The opportunities for these types of projects would have to be identified and developed on a case-by-case basis.

Small Scale Infiltration Projects

Many on-site options have been identified that capture storm water and allow it to infiltrate into the ground at rates that would provide water quality treatment and reduce the downstream flow. The options include porous pavement, retention grading, infiltration pit, bioretention, and infiltration culverts are discussed. As with any infiltration option, the pre-design considerations include the following:

- Soil types and groundwater depths
- Presence of contaminated groundwater/subsurface soils, and the potential impacts of introducing pollutants into the subsurface system.
- Proximity to potentially impacted structures
- Maintenance to prevent long-term clogging

Porous Pavements

These on-site options include various pavement and paver options, including

- Porous Concrete:

- Grass Pavers:
- Gravel Pavers:
- Interlocking Paving Blocks:
- Pervious Crushed Stone:

Retention Grading

Residential landscape area retention grading is a concept whereby a site is graded to create a "sunken garden" that holds runoff and rainwater until it can be absorbed into the ground. This type of grading works best in highly permeable soils.

Infiltration Pits and Culverts

Infiltration pits are a common means of storm water management in many areas of the United States. They involve adding a grate with a rock pit below at the lowest end of paved areas such as driveways and parking lots.

Bioretention Areas

Bioretention areas are local landscape depressions that function as retention basins.

Analysis of Capture and Infiltration

Infiltrating runoff requires that the soils be permeable enough to allow percolation into the groundwater basin. Preliminary studies indicate that it is unlikely that there is opportunity for groundwater recharge through on-site infiltration projects on a large scale. There is the potential, however, for some runoff to infiltrate into the top layers of soil, where it will reduce the overall runoff volume leaving the site, recognizing potential risks due to slope stability. In addition to the need for permeable soils, an infiltration system requires that the soil be uncontaminated to avoid degradation of the underlying aquifer. One additional concern about the use of infiltration pits is that unmaintained or unmonitored installations could be a risk to groundwater quality (e.g. from illegal dumping). As with all the options maintenance of these installations is important to provide consistent treatment.

On-Site Wastewater Alternatives

While on-site wastewater alternatives are not typically a stormwater treatment option, given the potential for septic-related pollutant loads, and embracing an integrated, holistic approach to water resources management, potential alternative on-site wastewater options discussed here may be considered.

Reference is made here to a trademarked on-site wastewater treatment system called Living Machines™: integrated, multi-benefit, natural systems approaches to treating wastewater.

The Living Machines™ are site-specific biological solutions that re-route waste streams into resources. The technology is reportedly simple to operate, and more cost effective to build and run than conventional treatment.

2.4.2 Regional and Sub-Regional Structural Options

The following are potential regional (and sub-regional) options:

- Capture, store, treat and discharge
- Capture, store and beneficially reuse for irrigation or similar non-potable uses
- Capture, store, treat and inject

It should be recognized that the structural storm water BMPs presented here focus on bacteria-specific structural BMPs, and that in most cases, pre-treatment BMPs are required. These BMPs could include some combination of biofilters, extended detention basins, filters, and/or proprietary BMPs. These pre-treatment BMPs are not discussed in detail in this but the cumulative effect of pre-treatment as part of a treatment train is summarized in the table at the end of this section.

This section discusses traditional as well as candidate treatment technologies that could potentially be utilized for treatment of bacteria, where discharges are released. Traditional treatment methods would probably be most applicable with high wet weather runoff flowrates. The candidate treatments technologies have not been proved for this application but could possibly provide treatment on small-scale in localized drainage areas. The treatment technologies examined consist of the following:

- Traditional treatment
- Storm water Filtration Units
- Advanced Oxidation
- Peracetic Acid (PAA) and Other Bactericides
- Subsurface Constructed Wetlands

It should be noted that many of the information related to new and proprietary technologies were provided by vendors and manufacturers, and implementation should be carefully monitored and considered in the context of adaptive management practices.

Table 2.2 summarizes the BMP approaches described above. It should be noted that different BMPs have different pre-treatment options (which can provide removal of multiple pollutants) and different integrated uses. In general, pre-treatment will consist of a) gross-solids removal (e.g., utilizing screens or nets), and b) detention, which allows for deposition of sediments and particulate pollutants while providing transient storage for bacteria treatment.

Table 2.2 Structural BMP summary

Structural BMPs	Treatment Effectiveness							Integrated Resources		
	Bacteria	Nutrients	Metals	Organics	Trash	Sediment	Oil & Grease	Reuse	Conservation	Recharge
On-Site Options										
a) Cisterns	U	U	U	U	U	U	U	X	X	
b) Storage and Reuse	3	3	3	3	3	3	3	X	X	
c) Small Scale Infiltration	3	3	3	3	3	3	3	X	X	X
d) On-site Wastewater	3	U	U	U	U	U	U			
Regional Solutions										
Capture, Store, Treat, and Discharge	3	3*	3*	3*	3*	3*	3*			
Capture, Store, Treat, and Reuse	3	3*	3*	3*	3*	3*	3*	X	X	
Treatment options (subgroup)										
- Traditional Treatment/Small Package	3	U	U	U	1	1	1	N/A	N/A	N/A
- Storm Water Filtration	U/2 exp	2	3	3	3	3	3	N/A	N/A	N/A
- Advanced Oxidation	U/3 exp	U	U	U	1	1	1	N/A	N/A	N/A
- Peracetic Acid/bactericides	U/3exp	U	U	U	1	1	1	N/A	N/A	N/A
- SSF Wetlands	3	3	3	U	1	1	1	N/A	N/A	N/A

Notes: * required pretreatment is included in overall treatment train and will remove many of the other constituent pollutants
1 = low effectiveness, 2 = medium effectiveness, 3 = high effectiveness, U = unknown, exp = expected performance

Table 2.2 highlights the potential benefits of different structural options. These benefits include treatment effectiveness, and integrated water resources – both of which are critical to the integrated approach of this Implementation Plan.

2.5 Regulatory and Permitting Considerations

This section identifies specific local regulations including planning, public works and zoning codes, as well as state and federal regulations which cover the planning, siting and development of regional facilities which are under consideration.

In general, the regulatory issues associated with the options in Table 2.2 for the management of the urban wet weather runoff and attainment of the TMDL are related to:

- Permitting the construction and operation of regional facilities;
- Permitting effluent, whether for beneficial reuse or for discharge; and
- Permitting the construction of on-site treatment systems.

2.5.1 Local Considerations

Local permitting and regulatory considerations are summarized below, and require consultation should structural projects be considered for implementation.

County and City Code Citations

County/City	Planning/ Zoning Code	Building Code	Plumbing Code	Environmental Protection	Other
County of Los Angeles	Title 22 Planning and Zoning Oak Tree Permit	Title 26 Building Code	Title 28 Plumbing Code	Title 12 Environmental Protection, Chapter 12.80 Stormwater and Runoff Pollution Control Title 20 Utilities	Title 32 Fire Code DHS permit for corralled animals
City of Malibu	Title 17 Malibu Zoning Ordinance	Title 15 Buildings and Construction, Chapter 15.04 Building Code	Title 15 Buildings and Construction, Chapter 15.12 Plumbing Code	Title 13 Public Services, Chapter 13.04 Stormwater Management and Discharge Control Title 13 Public Services, Chapter 13.12 Underground Utility Districts	Title 8 Fire Code Local Coastal Program (LCP)

Local Regulations that Govern Implementation Options for SMBB Bacteria TMDL

Implementation Options	Local Regulations/Permits					
	Building Codes	Plumbing Codes	Planning and Zoning	Public Works	Environmental Protection	Other
Cisterns/On-Site Storage and Reuse	Building Permit, Grading Permit	Plumbing Permit	Planning Approval	If using public right of way	N/A	N/A
Porous Pavement	Building Permit, Grading Permit	N/A	Planning Approval	If using public right of way	N/A	N/A
Retention Grading	Building Permit, Grading Permit	N/A	Planning Approval	If using public right of way	N/A	N/A
Infiltration Trenches	Building Permit, Grading Permit	N/A	Planning Approval	If using public right of way	N/A	N/A
On-site Wastewater Treatment	Building Permit, Grading Permit	Onsite Wastewater Treatment Operating Permit	Planning Approval	If using public right of way	N/A	N/A
Treatment, Reuse and Discharge Facility	Building Permit, Grading Permit	Plumbing Permit	Planning Approval	If using public right of way	N/A	N/A

2.5.2 State and Federal Considerations

State and Federal considerations are tabulated and described below.

State/Federal Environmental Regulations that Govern Implementation Options for SMB Bacteria TMDL

	NPDES Permit	Coastal Zone	Dept. of Health Services	Fish and Game	Corps of Engineers	Fish and Wildlife	NFMS
On Site BMPs							
Cisterns	Already approved in Phase I MS4 permit	Already approved in LCP	N/A	N/A	N/A	N/A	N/A

	NPDES Permit	Coastal Zone	Dept. of Health Services	Fish and Game	Corps of Engineers	Fish and Wildlife	NFMS
Porous Pavement	Already approved in Phase I MS4 permit	Already approved in LCP	N/A	N/A	N/A	N/A	N/A
Infiltration Trenches	Already approved in Phase I MS4 permit	Already approved in LCP, but permit needed if landslide hazard	If considered groundwater replenishment	N/A	N/A	N/A	N/A
OSWT	N/A	Must meet LCP standards	N/A	N/A	N/A	N/A	N/A
Regional Solutions							
Treatment and Discharge Facility	Already approved in Phase I MS4—use of chemicals may require new permit; if new Ocean discharge, may need permit and antideg analysis	If in Coastal Zone – a Public Works Plan and Coastal Development Permit	N/A	Depends on location and discharge; if a new discharge would need approval	Depends on location of treatment and discharge	Depends on location of treatment / discharge; if new discharge would need approval	Depends on location of treatment/discharge; if new Ocean discharge would need approval
Treatment and Direct Reuse	New permit	If in Coastal Zone – a Public Works Plan and CDP	Permit Required and may meet Title 22	Depends on location	Depends on location	Depends on location	Depends on location

2.5.3 Permit Requirements for Direct Discharge to Waters

Treatment and Discharge Solutions

Capturing, treating and discharging stormwater flow could be considered consistent with the stormwater permit. This level of treatment could be considered a BMP and thus the existing permit would be sufficient.

Permitting for Discharge of Stormwater into Deeper Ocean Waters

The California Ocean Plan regulates discharges into the Pacific Ocean within three miles of territorial waters. Beyond three miles, the national Clean Water Act applies, mandating that the EPA to issue the permit. In most cases, the EPA has asked the state to jointly issue permits for US waters outside the three-mile zone.

The Ocean Plan has four specific requirements for point source discharges: 1) the same bacteria standards apply as those along the shore in waters less than 30 feet deep and bounded by a distance of 1,000 feet from the shoreline; 2) the discharge will not violate the physical characteristics of the ocean, such as discoloration, floatables and reduction of light; 3) the chemical characteristics of the ocean will not be violated; 4) the discharge must comply with water quality objectives of the Ocean Plan. When determining compliance,

actual initial dilution and background concentration are considered. There are other aspects of the Ocean Plan that state that a discharge may not harm the biological characteristics of the Ocean. Table A of the Ocean Plan applies to effluent discharges only.

The Ocean Plan contains specific implementation requirements for permitting discharges. Stormwater can be discharged into the Ocean if, with dilution, it can meet the water quality standards as contained in Ocean Plan Table B and the implementation requirements contained in other parts of the Plan. In addition, if the stormwater discharge were located a distance from the shoreline, an anti-degration analysis may be necessary, as this would be considered a "new discharge." Because this would be an intermittent and occasional discharge that occurs only in wet weather, it may be possible to negotiate with the Regional Board to allow the existing stormwater permit to be applicable for ocean discharge.

The Ocean Plan also designates Areas of Special Biological Significance (ASBS). ASBS are "areas designated by the State Board as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable." A portion of the J1/4 area north of Pt. Dume is located within the ASBS No.24 – Mugu Lagoon to Latigo Point (see Figure 2.5). It should be noted that the SWRCB is currently considering amendments to the Ocean Plan. The Ocean Plan prohibits discharges to ASBS and specifies that discharges shall be located a sufficient distance from ASBS-designated areas. However, the State Board does have the authority to grant exceptions to the prohibition on ASBS discharges, provided that the exception will not compromise protection of ocean waters for beneficial uses. The State Board has authorized four discharges under this exception authority. It is assumed that effective implementation of the Bacterial TMDL Implementation Plan will provide a basis for the State Board to allow for stormwater discharges to the Ocean.

One of the amendments that is moving forward on the Ocean Plan concerns bacterial standards. The State Board plans to a) add an enterococcus standard to the Ocean Plan; b) delete the single sample standards currently in the Ocean Plan and change to a trigger for additional monitoring; c) require monitoring for total coliform at offshore stations; d) require total and fecal coliform and enterococcus monitoring at all shoreline stations, and at all stations determined by the Regional Boards to be used for water-contact recreation; and e) amend the Bacterial Assessment and Remedial Action Requirements.

Figure 2.5 Areas of Special Biological Significance No. 24

In addition to the standards contained in the Ocean Plan, ocean discharges must comply with AB 411. AB 411 required the Department of Health Services to establish minimum standards for the sanitation of public beaches. DHS's implementing regulations were adopted in 1999 and require testing of waters adjacent to all public beaches for total coliform, fecal coliform, and enterococci; compliance with standards for total coliform, fecal coliform, and enterococci; use of DHS sampling protocols; and weekly bacterial testing between April 1 and October 31 for any beach visited annually by more than 50,000 people which also has a storm drain outlet that flows in the summer.

2.5.4 Treatment and Reuse Solutions

Beneficial reuse can take the form of irrigation as well as industrial use and other non-potable uses. To assure protection of public health where water reuse is involved, the California Department of Health Services (DHS) has been statutorily directed to establish statewide reclamation criteria for the various uses of reclaimed water (Water Code Section 13521). DHS has promulgated regulatory criteria which are currently set forth in the California Code of Regulations, Title 22, Division 4, Chapter 3, 60301 et seq. DHS's regulatory criteria include numerical limitations and requirements, treatment method requirements, and provisions and requirements related to sampling and analysis, engineering reports, design, operation, and maintenance.

The Regional Board must also approve the application for beneficial reuse of wastewater. No person may either reclaim water or use reclaimed water until the Regional Board has either issued reclamation requirements or waived the necessity for such requirements (Water Code Section 13524). In the process of issuing reclamation requirements, the Regional Board must consult with and consider recommendations of DHS (Water Code Section 13523). Title 22 officially only applies to recycled wastewater (of sewage origin). Formal application of Title 22 Regulations normally is triggered when a wastewater or water agency is proposing, often in conjunction with a water agency, or with direct users, to deliver treated wastewater. That type of reuse must be permitted by the Regional Board through WDR's, which might be added to an existing NPDES/WDR permit or as a stand-alone Water Reclamation WDR.

If an agency is contemplating stormwater reuse, the permitting process is not as clear. If the stormwater project is just treatment and discharge back to the channel or storm drain, it is assumed that the Regional Board would view that as a BMP, not a new discharge. If the reuse project is going to look like a traditional reuse project, where the producing agency (e.g. the MS4 agency) is delivering water to others for unrestricted irrigation use, it is a safe assumption that it would need to be free of potential pathogens that might have been in the source water (runoff). It is possible that this quality might be achieved with a slightly less stringent treatment train than typical Title 22 treatment.

2.5.5 Issues Regarding Implementation of Options Consistent With the State and Federal Regulations

On-site BMPs are already permitted under state and federal regulations. Only in an extreme situation in which the on-site solution would have the potential to damage a natural

resource protected by a state or federal resource agency, (e.g. a wetland) would it be considered necessary to go beyond the existing permits.

However, for the regional solutions which involve treatment, discharge, or reuse, the state and federal regulations would be applicable if:

- The location of the regional facility impacts the natural aquatic, terrestrial or avian resources protected by the state and federal resource protection agencies.

- The location of the facility is in the Coastal Zone, thereby requiring a Coastal Development Permit, local planning and zoning approval, and a Public Works Plan for the Coastal Commission.

- The location of the facility requires construction in a wetland or Waters of the U.S., requiring dredging and filling of a wetland or Waters of the U.S., which would involve the Corps and the state and federal water quality and resource protection agencies.

- A new surface water discharge is developed for the product (effluent) of the regional facility requiring a new NPDES permit, and potentially an anti-degradation analysis.

- The product or effluent of the regional facility is reused as a non-potable water supply either directly or after storage in an aquifer where it is injected. This would require the Regional Board and DHS to permit the reuse and the groundwater replenishment.

2.6 Monitoring Considerations

The goal of the Implementation Plan monitoring program is to establish procedures to analyze and track water quality status and trends, assist in identifying pollutants of concern, point source tracking, and to evaluate reductions achieved by Best Management Practices (BMPs). It is intended to supplement the Coordinated Shoreline Monitoring Program by providing upstream tributary monitoring information, which would also assist in further identifying potential sources. It is also intended to provide information that could assist with the re-opener 2007, so that future generations of the Implementation Plan resources can be better focused.

A number of candidate monitoring stations have been identified to assist with further identifying potential sources and evaluating non-structural BMPs. Samples from the first storm of the wet season (in October 2004) were also taken at these stations.

The objective of these monitoring stations is to provide information to support future management decisions, such as selection of structural and non-structural BMPs, and is not intended to be compliance-related. As such, proposed stations were not necessarily high priority watersheds, but represented watersheds where potentially useful information could be extracted. With the exception of Topanga Creek at the sandbar, all stations showed high bacteria counts (exceeding water quality standards) during the first storms of 2004-2005. The proposed stations are:

- Trancas Creek (discharges to Area of Special Biological Significance)
- Marie Canyon (high priority subwatershed)
- Sweetwater Creek (potential concentrated equestrian land uses)
- Topanga lagoon (sandbar and bridge)
- Solstice Creek (potentially similar to Arroyo Sequit land usage and potential alternative reference subwatershed)

Sampling results indicated significant exceedances in the areas of interest. Of the sampling conducted, pre-event and storm event sampling indicated high levels of bacteria in most areas, and with the exception of some locations in Topanga Creek all samples exceeded water quality standards. October stormflow conditions showed significantly higher values than the August dry conditions. In August, only 1 of 6 Topanga Creek samples exceeded compliance limits while in October, 16 of 18 samples exceeded the limits (including all Enterococci results). These data indicate the importance of the winter high flow runoff in determining total bacterial loads from the watershed to the beaches.

These monitoring data are only used to indicate the potential for contributions to exceedances in the immediate vicinity of the watershed outflows to the bay. Shorezone dilution, dispersion, and degradation were not quantified as part of this study. It is not known if surfzone exceedances occurred in the immediate vicinity of the lower watershed at the time of the streamborne exceedances.

Another significant source of data was the Topanga Creek Watershed Water Quality Study, Final Report for the period October 2003 – 2004 was issued in December 2004 (Dagit, et al. 2004). The report summarizes water quality and exceedances for Topanga Creek and recommends BMPs for the watershed as part of ongoing work by the Resource Conservation District of the Santa Monica Mountains (RCDSMM). This study summarized percent exceedances for wet weather. In a reduced data set, Solstice showed no exceedances (only two samples). For other subwatersheds, exceedances were significantly higher. Arroyo Sequit, Nicholas, Zuma, and Topanga all showed exceedances between 24 and 30 percent. Los Alisos, Trancas, Ramirez, Latigo, and Piedra Gorda showed exceedances between 30 and 50 percent. Escondido and Corral had exceedances above 50 percent. Data were not available for the other subwatersheds.

3. Plan Development and Evaluation

3.1 Methodology

The general methodology for alternative development, evaluation, and prioritization of activities was developed in response to the following questions.

- Where do we have the most significant problems?
- What is our tolerance for uncertainty and does this tolerance depend on location?
- Where can we leverage solutions to achieve multiple benefits?
- Where do we have a higher probability of success?
- What do we want to do now versus waiting until better information and technologies become available?

In response to these questions, the methodology described below was developed. Each of these components and the implications therein are described in the following sections:

- To balance uncertainty between potential costs and potential benefits, consistent with an integrated approach, a "compliance triangle" model was applied to compare different broad approaches. This model balances costs, risks, and beneficial reuses.

- To address the allocation of resources, results of the watershed prioritization effort were used to tailor plan elements to watershed priorities.

- To systematically implement activities in a phased adaptive manner, a "commit-pilot-consider" approach was adopted.

3.2 The Compliance Triangle

Three different broad, thematic alternative approaches were developed and evaluated. The results of the evaluation formed the basis for the Implementation Plan. The result was the development of subwatershed-specific integrated solutions that would each meet the objectives of the TMDL while combining several runoff management options. The three over-arching concept alternatives are defined below:

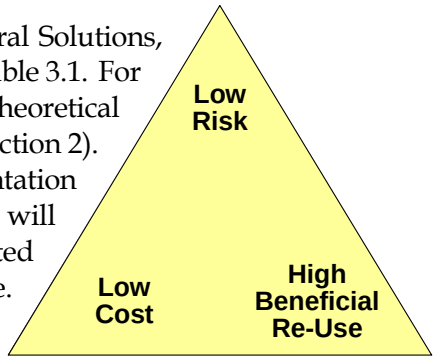
- **Low Cost –** includes options that meet the minimum regulatory requirements with the least capital and maintenance costs. This alternative would not include a high amount of beneficial use of runoff and may pose a higher risk of non-compliance with the TMDL.

- **Low Risk –** includes options that minimize the risk of non-compliance with the TMDL without regard to cost or optimizing the beneficial use of runoff.

- **Maximum Beneficial Reuse –** includes options that maximize the amount of runoff for beneficial use. This alternative assumes the same risk of non-compliance with the TMDL as the low risk alternative.

The "Compliance Triangle"

Each alternative includes components from Non-Structural Solutions, Local Solutions, and Regional Solutions, as shown in Table 3.1. For each structural alternative there is an upper limit, or theoretical goal, of runoff volume to be managed (as discussed in Section 2). For each thematic alternative, proposed implementation options are presented. The performance of these options will be evaluated and the implementation plan will be adjusted to address the findings at each re-evaluation phase. Regional solutions will be considered and may be included as part of the modification of the Implementation Plan.



"Compliance Triangle"

Table 3.1 Alternatives Comparison

Alternative	Non-Structural Options	On-Site Options	Regional Options
Low Cost	Implement existing and new programs (commit + pilot)	Pilot-scale implementation of the following: • Cisterns • On-site storage and reuse • Small-scale capture and infiltration	Not included
Low Risk	Implement existing and new programs (commit + pilot)	Not included	Capture, store, treat and discharge
Beneficial Reuse	Implement existing and new programs (commit + pilot)	Full-scale implementation of the following: • Cisterns • On-site storage and reuse • Small-scale capture and infiltration	Capture, store, treat, and beneficially reuse

3.2.1 Low Cost Alternative

The low-cost thematic, by definition, is the alternative configured to have the lowest capital and O&M costs. This alternative assumes a higher level of risk of compliance with the TMDL than the other alternatives by focusing on non-structural options and avoiding significant local or regional structural solutions. Thus, it has the lowest runoff management goal. The following runoff management options are included in the low cost alternative: 1) institutional (non-structural) options, 2) local options, and 3) regional options.

Non-Structural Options

Non-structural solutions are programmatic activities that provide source control measures intended to prevent or reduce the levels of bacteria, or bacteria sources (e.g., trash and pet waste) from initially being picked up by runoff whether onsite, in the street, or in the storm

drain system. In general, institutional solutions do not substantially reduce the volume of wet weather runoff to be managed. Due to the ubiquitous nature of indicator bacteria, and limited correlation with human pathogen sources such as trash and fecal material, institutional solutions may have limited effectiveness in reducing indicator bacteria concentrations at the beaches. Human pathogen sources, however, such as human and animal fecal material, may be more significantly reduced by these measures and therefore reduce human health risk in beach waters.

On-Site Local Options

Local, or on-site, solutions provide an important step in managing wet weather runoff. Three options have been identified as potentially feasible for providing local source control for J1/4: 1) residential cisterns, 2) on-site storage and reuse, and 3) capture and infiltration. Pilot scale implementation of these local options will be included in the low cost option. With implementation of these options runoff is retained locally and discharge of runoff and associated bacteria is avoided.

Regional Options

The low cost solution will not include regional options because of the very high cost and major implementation requirements associated with management of runoff at the regional level.

3.2.2 Low Risk Alternative

The intent of the low risk thematic alternative is to manage the highest theoretical target runoff goal, and will include options that will minimize the compliance risk with the TMDL without regard to the cost or optimal beneficial use of runoff. The target runoff management goal for the low risk alternative is described in Section 2.1.4. The low risk alternative includes the same non-structural options as the low cost alternative. This alternative also includes regional storage and treatment options. However, the low risk alternative is designed to manage more runoff volume than the low cost alternative.

Non-Structural Options

The low risk alternative will include the same recommended institutional options as that of the low cost alternative.

On-Site Local Options

Local solutions are not included in the low risk alternative because, given the emphasis on Regional solutions, their implementation will not substantially reduce the need to manage runoff regionally to ensure the lowest level of risk.

Regional Options

For this option, runoff would be captured and initially stored in operational facilities. Treatment would depend on target constituents (in this case, primarily bacteria). Trash and suspended solids would be present in wet weather flow, and pretreatment of flows would,

therefore, be required to remove these constituents before treatment to remove bacteria is implemented. Regional capture, storage, treatment, and discharge will require construction of storage and treatment facilities in each subwatershed designed to meet the AB411 beach standards. The effluent would then be discharged to the ocean, typically through storm drain outfalls. Preliminary target volumes by watershed could be as high as that described in Section 2.

3.2.3 Maximum Beneficial Reuse Alternative

The maximum beneficial reuse alternative includes options that maximize the amount of runoff that can be beneficially reused. The maximum beneficial reuse alternative shares the same non-structural options as the low cost and low risk alternatives, but includes additional options to beneficially reuse a portion of the runoff. Unlike the low cost alternative, this option recommends full scale implementation of cisterns, on-site storage and reuse, and small-scale capture and infiltration.

Non-Structural Options

The maximum beneficial reuse alternative will include the same recommended institutional options as that of the low cost alternative, which consist of new and expanded programs.

Local Options

The maximum beneficial reuse alternative incorporates all of the following local options: 1) residential cisterns, 2) public on-site storage and reuse projects, and 3) small-scale capture and infiltration projects. The maximum beneficial reuse option includes full scale implementation of each local option discussed in this section, whereas the low cost option only included pilot studies. It should be noted that full scale implementation implies implementation at publicly owned and proactive privately-owned facilities to the maximum extent practicable, and does not imply retrofitting of private residences or mandatory retrofitting programs.

Regional Options

Given the inventory of opportunities, this option does not appear to have significant immediate potential. The option is intended to divert wet-weather runoff to beneficial use with appropriate treatment for the intended use. It involves the capture, storage (operational storage facilities), diversion of runoff to facilities for treatment (to be determined but may be similar to Title 22 standards) for unrestricted outdoor water use, seasonal storage, and distribution to sites for reuse. Capturing and storing runoff eliminates discharge of the quantity of water downstream to the beach, thereby potentially reducing the number of exceedance days, especially at lower flows. This option involves use of some of the same capture, operational storage, and base treatment facilities as the treat and discharge option, but at a much smaller scale. In this case, a portion of the runoff that would have otherwise been discharged is beneficially reused as an irrigation supply to the extent that there is demand and it is economically feasible. To minimize capacity of treatment and/or off-stream diversion pumping to storage, short-term operational storage will likely

be required to balance the hydrograph, and longer-term storage may be required to balance water availability with seasonal demand.

3.3 Alternatives Comparison for Area-Wide Implementation

Criteria for evaluation were developed to look at relative need (priority), costs, and benefits. The semi-quantitative comparison assumed full implementation throughout the jurisdictional areas. The subject criteria were:

- Volume of runoff managed
- Volume of runoff beneficially used
- Relative Cost
- Regulatory compliance
- Design complexity and constructability
- Facilities siting difficulty
- Reliability and Performance
- Compatibility with a phased approach

After evaluating each of the three alternatives, it appears that no one approach is clearly the single best watershed-wide solution for obtaining bacteria TMDL compliance. Instead, various options from the alternatives should be applied on a subwatershed by subwatershed basis. A summary of approaches selected for each subwatershed that takes into account the unique characteristics of that watershed is presented in the following section.

3.4 Subwatershed Focusing

As discussed in Section 2, watershed priorities were established. The results of this analysis are summarized in Figure 3.1. Using the results of the broad alternative evaluation the following general approach was used to develop implementation measures adapted to the watershed priorities:

- **Low priority watersheds –** generally low cost approach (non-structural measures)
- **Medium priority watersheds –** generally low cost and some beneficial use (generally on-site solutions)
- **High priority watersheds –** partial low risk and/or maximum beneficial use approach

3.5 Commit-Pilot-Consider Model

Prioritization of BMP options based on relevance to known contamination sources requires strong evidence relating water quality problems to specific sources of bacteria, such as septic systems, equestrian facilities, dog waste, restaurants, litter, or wildlife. Ideally, BMPs that address the most significant sources of bacteria should be given the highest priority. Based on analyses conducted as part of this Implementation Plan, the storm runoff from urban environments, in general, was identified as the highest priority contributor to bacterial contamination in Santa Monica Bay.

Figure 3.1 Subwatershed Priorities

Thus, activities associated with urban development appear to be the most prevalent sources of bacteria. However, in the absence of more detailed source identification, the data was not sufficient to specifically pinpoint which sources were contributing most significantly to water quality impairment problems. Therefore, in the absence of conclusive evidence prioritizing specific sources of contamination within urban runoff, the logical approach is to implement a broad range of BMPs that target activities near the coast associated with urban land use.

3.5.1 Implementation Requirements and Potential Effectiveness

A commit-pilot-consider model was developed to evaluate the ***implementation requirements*** and ***potential effectiveness*** associated with each BMP. The approach was most directly applied to non-structural BMPs, but can be applied to structural approaches as well. BMPs are assigned a subjective rating of easy/moderate/difficult for implementation requirements and low/medium/high for potential effectiveness.

The implementation requirements rating is based on several factors including the relative cost, level of effort required to implement the BMP, permitting issues, regulatory constraints, and political issues.

The potential effectiveness rating is based on several factors including the potential to educate the public and/or business community, ability to change habits and behaviors, and geographic extent and coverage, and other factors that would presumably result in improved water quality.

3.5.2 Commit-Pilot-Consider

Three levels of implementation are proposed in this Implementation Plan.

- **Commit**: Agencies commit to engaging in the activities so designated within the indicated time frame

- **Pilot**: Agencies commit to limited scale implementation to establish the effectiveness of the measure (structural and non-structural) and to help identify the severity of the potentially targeted source (for non-structural solution)

- **Consider**: If the perceived need for this BMP, based on preliminary studies, is not apparent, or if the subject technology is potentially costly or unproven, these activities will be considered in future phases of implementation.

The basis for determining the appropriate level of implementation is illustrated in Table 3.2. BMPs at the "commit" level of the model are high priority BMPs, while BMPs at the "consider" level of the model are of lower priority. Pilot studies are recommended prior to full-scale implementation for BMPs at the "pilot" level of the model.

Table 3.2 Commit-Pilot-Consider Model

		Implementation Requirements Rating		
		Difficult	**Moderate**	**Easy**
Potential Effectiveness Rating	**High**	Pilot	Commit	Commit
	Medium	Consider	Commit	Commit
	Low	Consider	Consider	Consider

If the pilot study BMPs prove to be effective in reducing water quality impairment problems, in conjunction with continued evaluation of monitoring data to establish the relative bacteria contributions of various sources, consideration can then be given to widespread implementation.

3.6 Assessment of Effectiveness.

The Regional Board requests additional detail on specifics for assessing effectiveness. Two basic approaches are presented in the Final Plan: 1) a presumptive approach and 2) a targeted monitoring-based approach.

3.6.1 Presumptive Approach

The presumptive approach assumes that the implementation of structural and non-structural BMPs will lead directly to reductions of exceedance days and attempts to quantify this relationship. It is recognized that there is significant uncertainty, and it is expected that the iterative and adaptive management strategies are employed, both effectiveness will improve and the correlation of activities to water quality compliance will improve.

A presumptive approach is needed because of the high sensitivity of compliance to hydrology (exceedance days), and that as a result an ineffective could still yield short-term compliant results, while a plan that is beginning to show effectiveness could still show non-compliance. In addition, there is high sensitivity to other hydrologic factors such as the Malibu Creek drainage. There are potential contributions from other sources outside the sphere of influence of this plan (Onsite Wastewater Systems), and monitoring in the wave wash further could add additional variability which would make direct tracking of effectiveness difficult.

The California Association of Stormwater Quality Agencies (CASQA) has initiated efforts to quantify effectiveness, and the County of Los Angeles conducted (and will be updating) segmentation studies to establish behavioral changes tracked by public information efforts. None of these approaches, however, have presented definitive measures for quantifying water quality improvement due to the inherent difficult of this type of analysis.

Therefore, the first proposed measure of effectiveness is a presumptive approach tied to effort with presumed performance, which would be updated and revisited at the reopener phase in 2007.

Parameters assumed for this presumptive gage include:

- Population:
  - Permanent Residential Population: 18,000 (based on 2000 census values for Malibu and Topanga)
  - Assumed Non-Residential Population (workforce, visitors, students): 10,000
  - Total Target Population for all measures: 28,000
  - Approximate Population distribution (assumed based on total residential developed land use fraction)
    - High Priority Subwatersheds: 30%
    - Medium Priority Subwatersheds 40%
    - Low Priority Subwatersheds: 30%
  - Distribution/readership of local information outlets (Malibu Times): Circulation = 12,000, readership estimated 36,000. Malibu times Magazine circulation 25,000; readership estimated at 75,000 (source: personal communication with Malibu Times staff August 9, 2005)
- Commercial (from smartpages.com)
  - Equestrian-Related Businesses (stables, breeders, suppliers): 10
  - Pet Related Businesses (retail, suppliers, grooming): 50
  - Restaurants in J1/4 Areas: 50
  - Septic/Plumbing Services (not necessarily in Malibu Area): 30
  - Approximate distribution of commercial/industrial activity (assumed based on total land use areas)
    - High Priority Subwatershed: 40%
    - Medium Priority Subwatershed: 25%
    - Low Priority Subwatershed: 35%
- On Site Opportunities
  - Public Land Opportunities (within J1/4 agencies): 23 (see Attachment 1)
  - Public Land Opportunities (outside of J1/4 agencies)

  - Schools/Universities: 5
- State/Federal Parklands (excluding Malibu Creek/Lagoon and Leo Carillo): 5 - El Pescador, La Piedra, El Matador, Point Dume, Robert H. Meyer.

- Behavioral change (change of activities contributing to pollutant loading and exceedances)*

  - Assumed average number of annual impressions required for 10% reduction in pollutant generating activities (reference segmentation study): 3/year (note that this could be 3 impressions for 100% of the population, or 7 impressions for 20% of the population and 2 impressions for 80% of the population)

  - Assumed number of annual impressions required for 25% reduction in pollutant generating activities: 4/year (potentially 7 impressions for 40% of the population, and 2 impressions for 60%)

  - Assumed number of impressions required for 50% reduction in pollutant generating activities: 6/year (potentially 8 impressions for 60% of the population and 3 impressions for 40%; or 7 impressions for 80% and 2 impressions for 20%)

- Assumed reductions based on incentive-based activities as a function of allocated budget*

  - 10% cost – 10% target reduction
  - 25% cost – 25% target reduction
  - 50% cost – 50% target reduction
  - 100% cost – 100% target reduction

  *Note: All parameters to be revisited upon additional information. Target reductions assumed to be composite number of allowable exceedances for all areas.

3.6.2 Targeted Monitoring-Based Approach

The Targeted Monitoring-Based Approach(TMBA) adopts some measures of presumptive compliance but incorporates monitoring data and attempts to normalize and extrapolate this monitoring data throughout the region.

The TMBA assumes the development of Annual Interim Compliance Reports that consider a number parameters, and present analyses and discussions of each parameter in order to estimate a reduction in pollutant loadings. These parameters consider:

- Coordinated in-stream monitoring. These data include water quality and flow data, with the first two years being primarily baseline information.

- Extrapolation of source control implementation effectiveness. This involves developing an algorithm, and applying it to extrapolate the effectiveness of activities within a targeted subwatershed that has isolated expected pollutant sources (typically not a high

priority watershed), and applying these reductions to other subwatersheds that have similar expected sources.

- Extrapolation of small storm effectiveness. This involves developing and applying an algorithm that recognizes hydrologic variability and normalizes pollutant and hydrologic data for comparison with the benchmark (90th percentile) standard year.

- Hydrologic conditions and variable accountability. This involves better understanding hydrologic responses to better define targeted reductions in exceedances.

- Pilot projects. When on line, Pilot Projects will have raw data which can be analyzed and interpreted using the extrapolation algorithms described above.

- Assessment of progress toward full implementation

The TMBA, while also presumptive in many respects, will provide more results-oriented data by which to make more effective management decisions, to support progress toward compliance and potential adaptive and iterative modifications to the Plan. It is, however, anticipated that the TMB approach may not yield readily significant results until at least the 3rd year of implementation.

3.7 Implementation Plan Framework

Based on the focused approach for each subwatershed, and using the commit-pilot-consider model, an overall implementation plan framework was developed for the entire J1/4 watershed area. The plan summarizes the options and BMPs that would form the program within each subwatershed, the level of commitment, and potential phasing. This framework is presented and the plan described in detail in Section 4.

4. Implementation Plan Commitments

4.1 General Approach

This section presents an overview of the Implementation Plan commitments. It describes the general approach to implementation, the implementation phases and overall schedule, and the methods for plan assessment, monitoring and reporting. Detailed descriptions of specific activities, programs and projects and the specific plan commitments on a subwatershed basis are described in Section 5.

As outlined in Section 3, the Implementation Plan consists of combinations of non-structural activities, local on-site structural measures and regional structural solutions selected for each subwatershed. The elements contained in the plan for each watershed include those that are committed either for implementation or pilot programs/projects. Other measures may be considered at some point in the future depending upon the effectiveness of the committed and pilot programs or in response to specific opportunities that may be presented but are not part of the initial commitments. A summary of the plan is shown in Table 4.1.

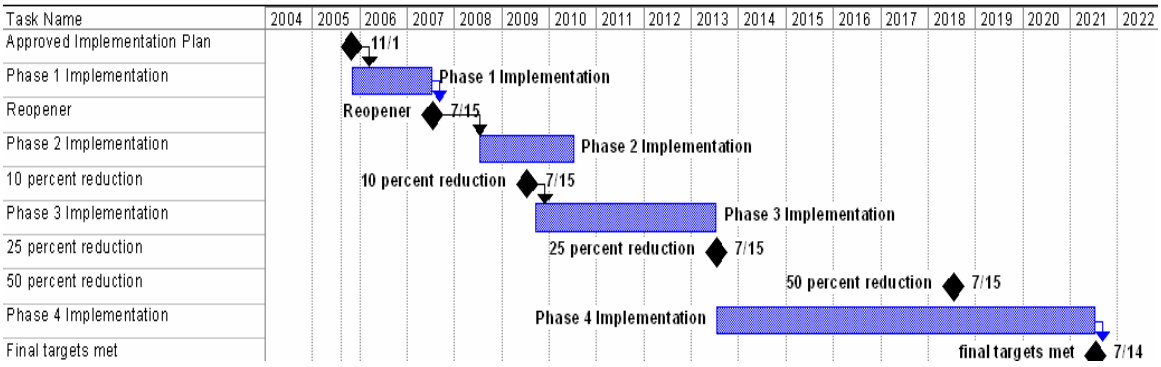
Table 4.1 Summary of Watershed Activities

Sub watershed	Watershed Priority	Non-Structural Measures				Structural Measures	
		Public Information and Participation Programs	Industrial/ Commercial Facilities Control Programs	Development Planning and Construction Program	Public Agency Activity Control Program	On-Site Options	Regional Solutions
Nicholas	Low	Commit, Pilot & Consider	Consider only	Commit	Commit & Consider	Consider only	N/A
Los Alisos	Low (Low-Med)	Commit & Consider	N/A	Commit	Commit & Consider	Consider only	N/A
Encinal	Low	Commit & Consider	N/A	Commit	Commit & Consider	Consider only	N/A
Trancas	Low	Commit, Pilot & Consider	Commit, Pilot & Consider	Commit	Commit & Consider	Consider only	Consider only
Zuma	Low	Commit, Pilot & Consider	Commit, Pilot & Consider	Commit	Commit & Consider	Consider only	N/A
Ramirez	High	Commit, Pilot & Consider	Commit, Pilot & Consider	Commit	Commit & Consider	Commit & Consider	Pilot Project
Escondido	Med (Med-High)	Commit, Pilot & Consider	Consider only	Commit	Commit & Consider	Pilot & Consider	N/A
Latigo	High	Commit, Pilot & Consider	Consider only	Commit	Commit & Consider	Commit & Consider	Pilot Project
Solstice	Low	Commit, Pilot & Consider	Consider only	Commit	Consider only	Consider only	N/A
Corral	High	Commit & Consider	Commit & Pilot	Commit	Commit & Consider	Commit, Pilot & Consider	Pilot Project
Carbon	Low (Low-Med)	Commit & Consider	Commit & Pilot	Commit	Commit & Consider	Consider only	N/A

Sub watershed	Watershed Priority	Non-Structural Measures				Structural Measures	
		Public Information and Participation Programs	Industrial/ Commercial Facilities Control Programs	Development Planning and Construction Program	Public Agency Activity Control Program	On-Site Options	Regional Solutions
Las Flores	High	Commit, Pilot & Consider	Commit, Pilot & Consider	Commit	Commit & Consider	Commit & Consider	Pilot Project
Piedra Gorda	High	Commit & Consider	N/A	Commit	Commit & Consider	Commit & Consider	N/A
Pena	Low	Commit & Consider	N/A	Commit	Commit & Consider	Consider only	N/A
Tuna	Low	Commit & Consider	Commit & Pilot	Commit	Commit & Consider	Consider only	N/A
Topanga	Medium	Commit, Pilot & Consider	Commit, Pilot & Consider	Commit	Commit & Consider	Commit & Consider	Consider only

The Implementation Plan was divided into four phases of activities. The activities consisted of implementation activities, as well monitoring and additional studies that could be used to provide better information for future activities. To provide useful information, the additional studies will require extended development and implementation periods. Upon completion of these studies, it would be desirable to confirm, or adjust if necessary, the direction and requirements of the Implementation Plan. As such, the County and J1/4 Agencies proposed the addition of appropriately timed re-evaluation milestones (re-openers). Implementation activities, suggested re-openers, and implementation milestones are illustrated below:

Santa Monica Bay Beaches Bacterial TMDL
Jurisdictional Groups 1 and 4
Implementation Plan Phasing



The general intent of what would be accomplished under each of the phases is as follows:

- Phase I – Conduct planning and initiate all committed non-structural activities and implement selected non--structural measures; initiate pre-feasibility studies for sub-regional pilot projects; develop inter-agency agreements for structural projects, initiate planning for on-site measures; initiate monitoring, additional studies, and source identification activities. The 2007 re-opener would follow Phase I. Note that Phase I is assumed to begin in November 2005, which is the basis of the proposed schedule.

Should the initiation date change, the remaining implementation deadlines may change accordingly.

- Phase II – Continue implementation of committed non-structural activities; conduct non-structural pilot programs; continue planning for on-site measures; initiate planning and construction of pilot regional structural solutions; and continue and complete monitoring and source identification studies. A programmatic review is proposed to follow Phase II and is intended to leverage results not only from additional studies in these jurisdictional areas, but also from advances in the technical, legal, and regulatory body of knowledge.

- Phase III – Refocus and reprioritize efforts as appropriate, and continue implementation of committed non-structural activities; implement successful piloted non-structural programs; begin implementation of on-site measures; and operate and evaluate pilot regional structural solutions.

- Phase IV – Refocus and reprioritize efforts as appropriate and continue implementation of non-structural solutions; continue or expand on-site measures; and continue, modify and/or initiate regional structural solutions.

While these provide the general commitment to the timing and execution of activities, under the iterative approach the actual implementation of specific programs and projects will depend upon what is learned during each succeeding phase from the initial implementation of measures, the results of monitoring, and revisions that may be made to the TMDL at re-openers.

Tentative project schedules are presented in Appendix B to detail the general order and timing of committed activities within this Implementation Plan. The start and end dates of most projects have been approximated for budgetary and overall management purposes. These dates are not intended to be used as firm compliance dates, as several factors could cause projects to be expedited, delayed, or extended. It is the intention of the responsible agencies to programmatically follow this schedule; however, many factors, such as environmental permitting, land acquisitions, and ordinance change, are outside their direct control. Any significant changes to project schedules will be outlined within the annual progress reports.

4.2 Plan Execution

An analysis of wet weather runoff events and bacterial exceedances hypothesizes that if wet weather flow reaches the beach, then bacterial exceedance is highly likely. Therefore, the initial strategy for reducing exceedances is tied to a combination of reducing bacteria at the source through non-structural and on-site measures, and reducing the amount of runoff that reaches the receiving water, rather than focusing exclusively on treating the flow collected in the storm drain system for bacteria reduction. This strategy emphasizes the beneficial use of wet weather runoff and the installation of local solutions where possible to reduce downstream flows. It also focuses on local source control to reduce the level of bacteria and other pollutants discharged into the storm drains. Water quality improvements in the receiving waters would be realized from water quantity (flow) management

practices, including local structural BMPs, as well as source control. Utilizing large-scale, end-of-pipe, regional solutions minimizes the risk of noncompliance, it also carries with it larger costs and potential impacts to the local, densely urbanized beach communities. Therefore, regional solutions are proposed to be limited to pilot scale implementation, and only after appropriate feasibility studies are conducted.

The Implementation Plan assumes an iterative, phased approach to implementation. Non-structural and on-site options will be implemented initially and the results of these efforts monitored to determine the subsequent course of action. In parallel, shoreline monitoring at the point of discharge from the storm drain to the surf zone ("zero point") as well as continued research on BMP effectiveness and pathogen indicators will be ongoing.

At the TMDL re-opener scheduled for July 2007, only very limited, short-term information and data will be available to assess the effectiveness of these measures for achieving water quality improvements in the Santa Monica Bay beaches. In addition, the numeric target, load allocation, and pathogen indicators for this TMDL may be revisited at this re-opener; however, the basis for compliance will likely not be fully reconsidered as sufficient research may not have been conducted and results [may not] have been evaluated for applicability to this TMDL by this time. Therefore, it is recommended that periodic re-evaluations, supported by annual reporting, be planned to more adequately incorporate the results of monitoring and special studies (see Section 4.3.2) as well as BMP performance in reviewing the TMDL approach. Potential time frames for additional re-openers are suggested in Section 4.1.

4.3 Monitoring

The monitoring proposed in this Implementation Plan is intended to support cost-effective implementation of control measures. It is not intended to replace reference beach study efforts (conducted by the Southern California Coastal Water Research Project), regulatory compliance monitoring (under the Coordinated Shoreline Monitoring Plan) or currently required Municipal Separate Storm Sewer monitoring efforts. In addition, monitoring is limited to wet-weather activities, as dry weather TMDLs are addressed in a separate implementation plan.

4.3.1 Water Quality Monitoring Recommendations

Sampling conducted to date provides a widespread snapshot of water quality conditions and that can be used as a record of baseline information on watershed contributions of bacteria to Santa Monica Bay beaches during wet weather periods. It is important to begin such programs recording status and trends as a basis for monitoring the effectiveness of storm water management BMPs. Multiple winter storm events should be collected from all lower watersheds as a means of assigning relative bacterial loading to the bay. Similarly, multiple stormflow samples of source areas and above and below BMPs will be needed to assess the design and effectiveness of watershed-based controls.

The variety of weekly, monthly, and storm-event based samples collected from SMB watersheds to date may be used as initial indicators of areas for BMP focus. They all are designed to measure point concentrations, and in some cases point loads. However, none of

these sampling programs can be used to effectively gauge relative contributions from watersheds nor the relative value of various BMP designs without incorporating cumulative load, either monthly, seasonally, or storm event-based, as part of their results. Comparative loads will be needed to judge the cumulative effects on surfzone bacterial concentrations from individual watersheds. Similar to any TMDL, the challenge will be to back up from surfzone concentration limits to cumulative loads supporting compliance. Ocean and watershed flow and dilution modeling coupled with watershed flow measurements will be required to complete that link. Flow/stage height relationships may be available or can be created for lower watershed bridge crossings for the monitored watersheds. Upper watershed locations (such as Topanga Canyon locations) may be flow monitored using hand held meters or through the installation of gauged crossings or weirs.

Six stations were proposed for future monitoring. The objective of these monitoring stations was to provide information to support future management decisions such as selection of structural and non-structural BMPs, and was not intended to be compliance-related. As such, proposed stations were not necessarily high priority watersheds, but represented watersheds where potentially useful information could be extracted. With the exception of Topanga Creek at the sandbar, all stations showed high bacteria counts (exceeding water quality standards) during the first storms of 2004-2005. The proposed stations are:

- Trancas Creek (discharges to Area of Special Biological Significance)
- Solstice Creek (potentially similar to Arroyo Sequit land usage and potential alternative reference subwatershed)
- Marie Canyon (high priority subwatershed)
- Sweetwater Creek (potential concentrated equestrian land uses)
- Topanga lagoon (sandbar and bridge)

Winter Low Flow

As feasible, monthly monitoring at each of the 6 stations from periods between storms (at least a week after the last storm) to characterize the common, winter low flow periods (7 samples, November 2005 through April period of 2006 (and 2006- 2007)). This monitoring may reveal high concentration point sources suitable for BMPs and will help describe the pattern of seasonal loading by watersheds. This effort is not intended to be conducted throughout the entirety of the implementation period, rather, it will be initiated and ended as necessary.

Winter Storm Flows (most important)

As feasible, four storms from each of the 6 stations, at least 3 samples per storm per station for the same basic period as winter low-flow samples. Winter storm flows dominate the loading for all constituents and it is important to get a record of changing concentrations and flows during the course of individual storms in order to reconstruct total loads by storm and for the season-total estimate.

In addition to the stream site samples, opportunistic storm drain flows should be sampled from winter storms. Drains and potentially leaky sewer systems were documented in the Source Identification effort. Up to 3 drains per watershed per storm even could be sampled, as available, as part of the winter stormflow monitoring. All parameters, including flow, should be assessed from the drains as a means of pinpointing potential sources of load to the bay. The need for this additional effort would be established after the re-opener.

Simultaneous Surfzone Monitoring

Surfzone bacteria should be sampled at the same time as the stream sampling. Samples should be collected immediately up and downcoast from either the closed berm (which transmits water with some constituents, potentially including bacteria) or open stream channel. These results provide the final, important evidence documenting the relative contribution of the watershed to the surfzone contamination (the purpose of the TMDL). This effort will be completed as safety provisions will allow and as long as this data is deemed necessary for implementation purposes.

4.3.2 Hydrologic Loading Estimates

It is critical that the concentration data generated from the monitoring program be combined with simple hydrologic loading estimates from each watershed to produce estimates of seasonal and annual loads. Precipitation records and runoff models must be constructed for each watershed to relate to the point measurements of flow taken for each monitoring event. The modeling provides a cost-effective alternative to continuous flow records from gauging stations (the preferred alternative). Regardless, seasonal (monthly) and storm-event flow estimates from each subbasin will provide the information needed for source assessment and control. It is recommended that stream gages be provided in Topanga Canyon and in one of the smaller adjacent watersheds so that the Topanga precipitation gages can be utilized for calibration studies.

4.3.3 Structural BMP Monitoring

Because the integrated approach incorporates removal of multiple pollutants, structural BMPs will be monitored for effectiveness. One potential methodology for this effort is outlined in the *Urban Stormwater BMP Performance Monitoring A Guidance Manual for Meeting the National Stormwater BMP Database Requirements Prepared by GeoSyntec Consultants, Urban Drainage and Flood Control District and Urban Water Resources Research Council (UWRRC) of ASCE In cooperation with Office of Water (4303T) U.S. Environmental Protection Agency, Washington, DC 20460 April 2002 EPA-821-B-02-001* which includes provisions for sampling suites (recommended constituents) and detection limits. In addition, E. Coli should be incorporated as a constituent of concern to be added to the bacteria suite.

4.4 Additional Future Detailed Studies Needed

Due to the significant uncertainties associated with the initial development of the bacterial TMDL, there are a number of special studies that should be conducted either within J1/4 area or elsewhere in the Santa Monica Bay watersheds. In addition, a number of efforts and studies are continuing in other regions of California and the rest of the country on similar

issues such as appropriate human health indicators. The following studies are suggested as highly relevant to both the J1/4 area and all of the Santa Monica Bay area. The results of such studies, as well as the experience gained during the early phases of implementation and monitoring, should support the need for additional permit re-openers as discussed in Section 4.1. The J1/4 agencies will partner with other jurisdictional groups (the Regional Board, SCCWRP and other parties) by conducting, contributing to, or tracking the results of such studies.

4.4.1 Identification of the Most Relevant Human Health Indicators Study

This study has potential implications throughout Santa Monica Bay and Southern California and is related to the previous proposed study. The purpose of this study would be to evaluate the effectiveness of existing bacteriological indicators as a gauge to evaluate potential risks to human health and, if appropriate, to recommend alternative indicators. This study would be of benefit during a first or potentially second, re-opener and as an implementation optimization tool.

The presence of three bacteria indicators (total coliform, fecal coliform, and enterococcus) in surface waters is used as an indirect measurement for human health risk. The scientific link between these indicators and actual risk is subject to debate, and it is generally agreed that additional scientifically defensible data would be beneficial. Because these indicators are used nationally and any effort to reassess their effectiveness must be scientifically sound and substantially founded, this effort is outside of the expertise of the J1/J4 agencies and should be completed with the help of the scientific, and potentially the regulatory community.

It is important to use indicators that would predict public health and beneficial uses of the Bay. It is also recognized that since the goal of this study is based on scientific discovery, the results nor its acceptance cannot be predicted or guaranteed, and the study would be costly.

The proposed time frame for this effort would be in Phase 2 of the Implementation Plan if work by other agencies cannot be leveraged.

4.4.2 Hydrology vs. Bacteria Loading

This study would potentially have applications throughout the Santa Monica Bay, but should be conducted in J1/4 areas because of the area's rural character. It is also recognized that this effort may have some overlap with current research (e.g., by the Southern California Coastal Water Research Project) and prior to initiation and development of a work plan, a more comprehensive investigation of this research is warranted. The study would monitor pollutant loads using a continuous sampler at runoff gage locations to determine pollutographs for several storm events. Monitoring data would be used to attempt to establish relationships between rainfall, runoff, and pollutant loading. Perhaps most critically, the effort would develop design hydrology for TMDL studies in the North Santa Monica Bay area and use the design hydrology and pollutant/runoff relationships. The County also would seek to use this study to determine if a peak flow exemption should be considered. This study would be of benefit during a re-opener and as an implementation tool.

Flow rate gaging stations are necessary to accurately measure storm flows, determine pollutant concentrations for grab samples, and calibrate rainfall-runoff models for design hydrology. Currently, there are no gaging stations located near drainage outlets in the North Santa Monica Bay watersheds. For this reason, calculating storm flows and subsequent pollutant loading cannot be performed with high levels of confidence. This makes the design of structural BMPs difficult. However, Topanga Creek (F34C-R), Malibu Creek (F130-R), and Ballona Creek (F38C-R) are existing runoff stations that can be modified for pollutant monitoring.

Determining the rainfall/runoff/pollutant load relationship should provide insight into costs associated with treatment of different runoff events. Exclusion of peak flow treatment may be possible if pollutants are diluted by large flow volumes.

The effort can be divided into two phases: monitoring bacteria levels/loading and development of design hydrology. For both phases, gaging stations must be constructed. The runoff data is necessary to determine pollutant loadings, determine runoff relationships, and calibrate a rainfall-runoff model.

For the monitoring portion, water quality samples from storm flows will be collected and combined with flow rate data generated from the gaging stations and/or model to determine pollutant loadings. This information will be analyzed to establish a link between storm intensity/duration and bacteria loading.

The design hydrology development will explore the relationships between rainfall, runoff, and pollutant loads. After establishing the relationships, a method of determining pollution loads will be established for ungaged watersheds in the North Santa Monica Bay area. A method for determining the amount of runoff that requires treatment will be established that is consistent with Public Works methodology.

The study could conclude that higher flows can be excluded from treatment processes without increasing a risk to human health. This could potentially reduce the cost to comply with the TMDL. New gaging stations and design hydrology could provide a more accurate account of storm flow rates making structural BMP design more efficient.

The processes to design and construct new gaging stations could be costly and lengthy, especially if right-of-way needs to be purchased or if construction is in a coastal zone – which is almost guaranteed. It may be possible to install gaging stations at existing bridge or channel facilities to reduce these costs and avoid construction in the coastal zones. The potential timeframe for this effort is July 2005-July 2010.

Assuming right-of-way will not need to be acquired, design and construction of stream gaging stations would take about two years with an additional year to develop and calibrate a model. Three to five years of monitoring data would be necessary to draw conclusions regarding bacteria loadings. Since a rainfall-runoff model can be applied retrospectively, these tasks can be performed concurrently. This study should be completed in three to five years of its starting date.

4.4.3 Bacteria Seasonal Variation Study

The results from this study can be applied to all of Santa Monica Bay, however due to the larger rural areas in NSMB, monitoring in J1/J4 is preferred. This effort could be conducted in concert with other monitoring efforts.

The purpose of the proposed study is to analyze how seasonal variations in tide, ocean currents, temperature, sunlight, red tide, aquatic life migration, and other natural phenomenon affect bacteria levels. This study would be of benefit during a re-opener and as an implementation tool.

The study would consist primarily of a literature review, and while it may assist in the understanding of bacteriological variances and spikes, it might be inconclusive or could result in additional uncertainty resulting in increased beach closures. This study could be completed within 3 years.

4.5 Reporting

Annual Implementation Plan progress reporting documenting compliance activities will be provided by the J1/4 Agencies. It is not anticipated that this report be exhaustive, but a summary of progress, successes and challenges, and requested modifications to the Implementation Plan. It is proposed that no additional reporting of monitoring results be required, but that monitoring results would be provided in an annual summary report of Implementation Plan Progress. This report would reference activities conducted to date, compared to commitments made in this Implementation Plan.

5. Subwatershed-Specific Implementation Plan

Section 5.1 describes in some detail, the proposed efforts and responsible agencies. Sections 5.2 through 5.18 describe activities specific to each subwatershed. These activities were based on priority and subwatershed-specific activities (based on land uses within subwatersheds).

5.1 Summary and Overview of Subwatershed-Specific Plans

This section describes specific activities for implementation. These activities are based on the previously-described source and watershed prioritization efforts, and include non-structural and structural measures. The subwatershed-specific matrices indicate a level of commitment for each activity ("commit-pilot-consider") and the time frame in which the activity would be implemented. The plans include non-structural, as well as on-site regional structural activities.

5.1.1 Non-Structural Activities

The following is a summary of non-structural measures that were identified for consideration, commitment to implement, or commitment to initiate pilot studies or programs.

Public Information and Participation Program

- ***Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact.*** The objective of this recommendation is to target pet owners with information about pet waste and its impact on the bay. Pet waste is typically associated with development as the concentration of pets is generally higher in higher density areas. Environmental literature currently does not draw the connection between pet waste and bacterial contamination in the bay. Animal feces can be washed into the bay through grass, landscaping, streets, and sidewalks which eventually lead to a storm drain. Even if the source is miles from the coast, pet owners would be more likely to pick up after their pets both at home and in public areas if they were aware that dog feces contains fecal Coliform and enterococci bacteria, which determine beach closures, and may contain pathogens such as Giardia and Salmonella that can make swimmers ill.

  This activity will be both planned and implemented during Phase 1 of TMDL implementation.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Locate areas with corralled animals and educate property owners on bacteria TMDLs.*** Horse stables and other animal corrals generate a preventable source of indicator bacteria. These studies identified 210 horse ranches within the J1/4 boundaries. It is assumed that there are higher incidences of corralled animals than horse ranches.

Properties with corralled animals could readily be determined by utilizing zoning maps and aerial photos thus narrowing down the zones that permit such uses. The impact of this effort would be dependent on the amount of land in the J1/4 area used for corralling animals, and it's potential to be improved by BMPs.

This program will educate the owners of corralled animals about bacteria TMDLs and steps they can take to decrease negative impacts on the environment. A network of volunteers from environmental organizations could be trained in this area. It should be also noted that all future development allowing corralled animals or horses within the City of Malibu will be regulated under the requirements of the Local Coastal Program Land Use Plan. Thus, these new developments will be required as a condition of approval to implement numerous BMPs that seek to reduce bacterial loading.

Lead Agencies: County of Los Angeles and City of Malibu

- ***Identify horse stables in the region and implement Pilot program.*** A pilot program can be established within a horse stable area to test and illustrate the effectiveness of BMPs in reducing bacteria. This program is designed for non-commercial stable owners and is applicable to corralled animals in general. Stable owners will be more likely to adopt a BMP they can see in action with real results. A potential site for this program is the City of Malibu owned Malibu Equestrian Center. Other potential areas for implementation of this program are those areas zoned for horse ranches that are within areas with little or no development such as Nicholas subwatersheds. Suitable BMPs are included in the City of LA's pamphlet on Stormwater Best Management Practices for Horse Owners & Equine Industry.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Post signs at City and County-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste.*** Parking areas at trailheads tend to be graded dirt lots that increase runoff at a greater rate in comparison with trails. On trails, horse waste is filtered by vegetation before entering waterways which may or may not be the case within trailhead parking lots. Posting signs in parking lots would reduce potential bacteria loading from horse manure.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Outreach at trailheads encouraging hikers to use restroom facilities.*** People may not realize the implications of urinating or defecating in natural areas such as local, state, and national parks. Posting signs at trailheads to remind hikers to use the restroom before a hike will both increase awareness and prevent improper waste disposal.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Provide septic system (OWTS) pumpers and customers with septic system guides.*** The goal of this suggestion is to provide septic system owners with information pertaining to their septic system and how to prevent pollution using proper maintenance

procedures. The Stormwater Manager's Resource Center has compiled a pollution prevention fact sheet on septic system controls. This sheet indicates that resource system failures occur for a number of reasons, including improper siting, inadequate installation or system operation. A similar handout could be developed for homeowners and business owners who operate septic systems in Jurisdictions 1 and 4. The handout could be distributed to septic system pumping businesses throughout the Malibu area. Septic system pumpers would be motivated to distribute the handouts during pump out visits to generate new business from requests for additional services.

Lead Agencies: County of Los Angeles and City of Malibu

- ***Coordinate outreach activities with Pepperdine University.*** The goal of this program is to provide applicable outreach materials to Pepperdine University. Pepperdine University is located within the Corral Subwatershed. The campus consists of approximately 181 acres relatively in close proximity to the shore. It was established that the subwatershed where the University is located has had exceedances for total coliform, fecal coliform, and enterococcus. Activities would consist of distributing new materials to new dormitory residents at the beginning of each year, providing outreach materials for posting around campus and in dormitories; conducting workshops with Pepperdine staff (maintenance personnel, cafeteria staff) and presenting information to student organizations regarding the use of BMPs on campus. In addition, a communication link could be established with the university's science departments.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Increase coordination between agencies and environmental organizations in preparing outreach materials.*** Numerous efforts are continually put forth to produce outreach materials, but production is not always coordinated between organizations and agencies, resulting in similar duplicate materials being prepared, increasing overall costs or messages that are not consistent. Agencies and organizations within J1/4 should make it a high priority to coordinate activities between agencies and with various organizations operating in the area. The following list includes some ideas that may help to increase communication between agencies:

  Compile and distribute contact information from all the agencies and organizations in the J1/4 area.

  - Encourage organizations and agencies to post outreach materials on their websites so it can be easily reviewed.

  - Implement an email list or public listserv to discuss outreach materials and post new material before it is produced.

  - Fund a website that provides links to all agencies and organizations in the J1/4 area and their outreach materials.

- Provide additional funding and resources to augment and expand existing programs that specifically address bacterial pollution.

- This BMP could be adapted to provide an integrated approach. In order to do this, the agencies and organizations should work together to ensure that outreach materials address multiple, if not all the stormwater pollutants.

This activity will be both planned and implemented during Phase 1 of TMDL implementation.

Lead Agencies: County of Los Angeles, City of Malibu, and Caltrans.

Industrial/Commercial Facilities Control Programs

- ***Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers.*** Distribute previously produced pamphlets dealing with specific BMPs and educate owners regarding the bacteria TMDL and the need for BMPs. Develop this into a targeted industry sector-specific workshop, e.g. "Horse Lovers for the Environment Day." A locally-targeted sector workshop of this nature will draw from the local base of outdoor enthusiasts, and permit the equestrian commercial sector to respond to commonly-held suspicions that these activities are harmful to the environment. Businesses participating in these workshops and interested in implementing BMPs could use this as a selling point to prospective clients they may only want to keep their horses at facilities that are environmentally correct. These facilities in turn could pass on applicable knowledge from the workshops to clients such as that they should pick up after their horses while on trails. Participation by local businesses is expected to be high for a locally-oriented environmental protection program, and to generate sector-wide camaraderie in resisting the public image of these establishments as detrimental to the environment. It should be noted at the workshops that the Malibu Local Program Land Use Plan recently approved has stringent requirements for future confined animal facilities and existing facilities should implement those BMPs that will be required for future facilities.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Provide for regular BMP inspections for restaurants.*** Restaurants are potential sources of bacteria loading in urban runoff entering storm drains. Restaurants throughout Los Angeles County are inspected for food safety by the County of Los Angeles Department of Health Services (DHS). Health inspectors use their inspection results to award each restaurant a "grade" of A through C (or a numerical score for facilities receiving less than a C grade) which conveys to the public the performance of the restaurant in matters related to cleanliness and food safety. While it may not be possible to continue utilization of DHS staff for inspections, additional inspections either by trained water quality personnel or by DHS inspectors should be continued on a regular basis. Should DHS inspectors be utilized, they should be trained to assess compliance with storm water pollution control requirements for restaurants, and should report to the County

each restaurant's performance regarding stormwater compliance and BMP implementation. If feasible, this would make use of an existing mechanism, thereby avoiding some of the additional cost and training requirements associated with implementing a new program. At this point it is not clear whether DHS-coordinated inspections can be continued and expensed.

This activity will be both planned and implemented during Phase 1 of TMDL implementation.

Lead Agency: County of Los Angeles, potentially the City of Malibu.

- ***Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program.*** Restaurants are a potential source of urban bacteria loading. This pilot study would provide public recognition on a recurring basis for restaurants that qualify for a water quality protection award. Restaurants that implement stormwater quality measures including bacteria pollutant control measures can apply for the certification on a quarterly basis, and if they are found to have succeeded, are rewarded with recognition by the Malibu community. Recognition could include a framed certificate, recognition by the governing agency, and/or a newspaper advertisement for all qualifying restaurants. An additional qualification for the certification should be attendance by at least one current employee (in a decision-making capacity) to at least one of the annual "Malibu Restaurants for the Environment Day" BMP workshops.

  Once informed about restaurant BMPs, the restaurant-goers can report improper housekeeping practices such as the cleaning of mats outside and disposal of mop bucket water outside. With implementation of this program, improper housekeeping processes may be curtailed thus reducing a potential source of urban bacteria loading.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Conduct industry specific workshops.*** The agencies should conduct industry specific workshops for the bacteria TMDL in the Malibu area, particularly for those industries such as restaurants and equestrian facilities which may contribute to bacteria loading in runoff. These workshops should be locally-based and held on an annual or biannual basis. Repeating the workshops on a regular schedule would allow the TMDL agencies to provide new information to restaurant operators and equestrian facility owners as it becomes available (i.e. revised BMPs and updates on progress of the TMDL toward clean water) to keep the issue in the forefront of attention. In addition, outreach through scheduled workshops will help to address new restaurant operators and equestrian facility owners as they begin business within the region.

  This activity will be both planned and implemented during Phase 1 of TMDL implementation.

  Lead Agencies: County of Los Angeles and City of Malibu

- ***Investigate the possibility of increasing frequency of trash collection at restaurants.*** This pilot program would require restaurants to have refuse picked up more often with the cost borne by the restaurant. The recommendation should be initiated by inspecting a sample of restaurants and food processing facilities to identify existing practices, and evaluate the degree of accumulation of trash at the typical facility. Trash and associated food waste from restaurants is a potential urban source of bacteria and provides a medium for growth. During storm events trash not contained within covered receptacles has the potential to be washed into storm drains. This program may be incorporated into current inspection programs or into a revised program utilizing health inspectors as previously discussed. This recommendation might be assessed in conjunction with the enhanced implementation of BMPs, to determine whether trash management on-site is an effective substitute for increased frequency of trash collection, and which of the two is the lower-cost option for the agencies and for the businesses. A continuing discussion of this recommendation might be instituted at the annual or biennial sector-specific BMP workshops.

  Lead Agency: County of Los Angeles

Development Planning and Construction Program

- ***Further emphasize applicable existing BMPs in development planning and construction programs.*** Emphasizing existing BMPs for bacteria can be accomplished by providing information to construction site planners and site inspectors. If BMPs are not implemented, construction sites can contribute a substantial volume of runoff to storm drains since the sites are generally stripped of vegetation during construction. Construction sites can be potential sources of bacteria or at least provide runoff to serve as a medium to transport bacteria into storm drains. In handouts a link should be made between these BMPs and potential bacteria loading. During inspections inspectors should remind developers of the BMPs and ensure that they are properly implemented on a continuous basis.

  Lead Agencies: County of Los Angeles and City of Malibu

Public Agency Activity Program

- ***Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities.*** Agencies within J1/4 should review cleaning cycles for drainage facilities relative to what is required by the NPDES permit and develop guidelines for an optimum program. Studies supporting this plan identified stormwater drains in urban areas as the sources of bacteria loading. This BMP could potentially require more equipment and labor to optimize current methods and timing of cleaning cycles. Optimized cleaning cycles could be implemented in coastal areas with higher densities. As a part of this BMP, pre and post-sampling of drains would be required to determine its effectiveness before it is implemented on a larger scale.

  This activity will be both planned and implemented during Phase 1 of TMDL implementation.

In Caltrans roadway facilities, recommendations with respect to increasing cleaning frequencies will be coordinated with the City of Malibu and implemented on a limited basis. These efforts are subject to approval through the normal processes with both agencies.

Lead Agencies: Caltrans, City of Malibu, and County of Los Angeles

Caltrans-Malibu Joint Agency Activities. City of Malibu and Caltrans will work together toward possible joint efforts to implement trash reduction measures on Pacific Coast Highway, State Route 1, that is heavily used by beach visitors. These measures could include increasing frequencies of street sweeping and trash pickup by entering into a delegated maintenance agreement, instituting Adopt-A-Highway Program for trash pickup by volunteers, and posting litter prohibition signs and special information signs at selected locations.

Lead Agencies: City of Malibu and Caltrans

5.1.2 On-Site Structural Activities

On-site solutions provide an important step in managing wet weather runoff. Three options have been identified as potentially feasible for providing local source control for J1/4: 1) residential cisterns, 2) on-site storage and reuse, and 3) capture and infiltration. With implementation of these options runoff is retained locally and discharge of runoff and associated bacteria is avoided.

It should be recognized that local solutions, like institutional solutions, may not fully mitigate the impacts of pollutant loading. For the low cost alternative, pilot studies will be conducted to evaluate effectiveness prior to implementation of the alternatives described below.

The lead agencies for local options will primarily be the County of Los Angeles and City of Malibu.

Residential Cisterns

Cisterns collect diverted runoff from impervious roof areas on-site, and are typically above-ground, storage reservoirs ranging from 60 to 10,000 gallons in volume. Cisterns can reduce the volume of runoff from a site, and for smaller storm events, delay and reduce the peak runoff flow rates. The runoff stored in the cistern provides a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts. Individual cisterns could be located beneath each downspout, or the desired storage volume could be provided in one large, common cistern that collects rainwater from several sources.

For this alternative, cisterns will be implemented in a portion of the watershed to reduce runoff volume and, for smaller storm events, delay and reduce the peak runoff rates. In conjunction with other new and enhanced programmatic solutions, education and incentive programs will be implemented with the goal of achieving installation of cisterns at 5 to

10 percent of single-family and multi-family residences. It was assumed that 1,000 gallon cisterns would be installed at single-family residences and 10,000 gallon cisterns would be installed at multi-family residences.

It is estimated that a 5 to 10 percent level of installation would be able to manage approximately 36 to 72 acre-feet of wet weather runoff annually in the Jurisdiction 1 and 4 subwatersheds. One of the advantages of cisterns is that they may be proportionally more effective for managing runoff from small storms than from larger storms.

On-Site Storage and Reuse

On-site storage/reuse involves capturing runoff from rooftops and other hardscaped areas, performing limited treatment, and storing it for subsequent reuse on-site in a much larger (on the order of 100,000 gallons) underground-type of storage. Reuse would require careful management and consideration of water distribution systems.

Potential sites for this option are public parks, urban vacant lots, government facilities, commercial facilities, and schools; at which the runoff could be reused for irrigation under specific, controlled conditions without needing to meet full Title 22 treatment standards (requiring filtration and disinfection).

Small-Scale Capture and Infiltration

Small-scale capture and infiltration involves capturing runoff from hardscaped areas and infiltrating into the soil. Various methods for on-site infiltration include, but are not limited to, porous pavement, retention grading, dry wells, and bioretention. The majority of soils within Jurisdictions 1 and 4 are categorized as having very poor infiltration rates. Of the soils with high infiltration rates, much of this area is along the coastal sands or in the steep, mountainous terrains. The steep, mountainous terrain is not appropriate for on-site infiltration projects because there is no development or urban land use that generates runoff; and these areas are too far upstream of the desired runoff concentration points. Slope stability is also a significant concern. Smaller scale BMPs such as infiltration trenches, swales, French drains, and porous pavement should be considered on an individual parcel basis, particularly in rural residential areas.

Table 5.1 Potential Locations for On-Site Facilities

Site	Site Type	Subwatershed	Address	Jurisdiction	Approx. Area (acre)	Commitment
Malibu Lagoon County Beach (Surfrider)	Public Parking Lot	Carbon	23000 PCH, Malibu	LACDBH	0.68	Pilot
Las Flores Creek Park	Public Recreation Area	Las Flores	3755 Las Flores Canyon Road, Malibu	City of Malibu	4	Commit
Las Flores Maintenance Station (Caltrans)	Maintenance Station	Las Flores	3503 Las Flores Canyon Rd, Malibu	Caltrans		Pilot
Charmlee Nature Center	Public Recreation Area	Los Aliso	2577 South Encinal Canyon Road, Malibu	City of Malibu	547	Consider
Nicholas Canyon County Beach	Public Parking Lot	Nicholas	33850 PCH, Malibu	LACDBH	1.18	Consider
Topanga County Beach (East Lot)	Public Parking Lot	Topanga	18700 PCH, Malibu	LACDBH	0.97	Pilot
Topanga County Beach (West Lot, unpaved)	Public Parking Lot	Topanga	18700 PCH, Malibu	LACDBH	0.96	Pilot
Zuma County Beach (Lot #1)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	2.21	Consider
Zuma County Beach (Lot #2)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	1.72	Consider
Zuma County Beach (Lot #3)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	0.61	Consider
Zuma County Beach (Lot #4)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	0.67	Consider
Zuma County Beach (Lot #5)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	1.15	Consider
Zuma County Beach (Lot #6)	Public Parking Lot	Zuma	30050 PCH, Malibu	LACDBH	0.91	Consider
Zuma County Beach (Lot #7)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	1.37	Consider
Zuma County Beach (Lot #8)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	2.19	Consider
Zuma County Beach (Lot #9)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	0.64	Consider
Zuma County Beach (Lot #10)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	0.29	Consider
Zuma County Beach (Lot #11)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	0.56	Consider
Zuma County Beach (Lot #12)	Public Parking Lot	Trancas	30050 PCH, Malibu	LACDBH	2.04	Consider
Trancas Canyon Park	Public Recreation Area	Trancas	between 6120 & 5942 Trancas Canyon Rd,	City of Malibu	15	Commit
Zuma Beach Maintenance Yard	Maintenance Facility	Zuma	30100 PCH, Malibu	LACDBH	0.53	Consider
Point Dume County Beach	Public Parking Lot	Zuma	7103 Westward Beach Rd., Malibu	LACDBH	2.45	Consider

Table 5.1 lists J1/4 Agency-owned candidate locations and levels of commitment for on-site measures within the J1/4 areas. These areas are somewhat limited and in some subwatersheds where on-site structural measures are committed, piloted, or considered, it may not be feasible to implement on-site structural measures within J1/4 Agency right of way. In this event other publicly-owned properties should be contemplated and

commercial development opportunities considered, before attempting to implement on private residential properties. It should be noted that while some of the listed facilities are sewer treatment plants, the functional use of these plants is not considered for storm water treatment. That is, the sewer treatment plants would not be used to treat runoff, but are facilities that are candidates for on-site treatment of local runoff.

5.1.3 Regional Pilot Projects

Regional structural solutions are recommended for evaluation as pilot projects for selected high-priority subwatersheds. These regional structural pilot projects should be considered candidate pilot projects that are subject to change and modification upon additional, more detailed study. Implementation of these pilot projects will be subject to confirmation of engineering feasibility and technologies that may change the treatment approach. These activities will initiate in Phase 1. The treatment volumes for pilot projects are generally below full target treatment volumes to better establish and understand the relationships between exceedances, storm volumes, and pollutant levels within storms, as well as to improve potential for optimal cost-effectiveness.

The following additional considerations should be made with respect to pilot projects:

- All projects require an administrative pre-feasibility evaluation.
- All projects require feasibility-study level analysis and conceptual designs.
- Proposed treatment concepts are subject to change.
- All parametric estimates (watershed area, treatment volume, etc.) are preliminary.
- Any budgetary estimates are preliminary and subject to change.
- All projects are subject to permitting and right-of-way resolution.
- Should a pilot project be found infeasible, replacement projects will be investigated.
- It is assumed that pilot projects will be operational throughout the implementation period, and that any decommissioning would occur after the implementation plan duration.
- All projects will require review of environmentally sensitive areas and establishment of jurisdictional delineations as appropriate. Project flow rates and treatment levels will depend on available right-of-way and project engineering, and are subject to modification.

5.1.4 Prioritizing and Phasing Philosophy

Activities stipulated for each subwatershed are determined by its priority rating. Priorities range from "low," which would require primarily non-structural BMPs only, to "high" which would include more rigorous implementation of both non-structural and structural BMPs. The requirements for a "medium" priority watershed would fall between those of the low and high priority watersheds.

As previously stated, implementation categories for BMPs are "commit," "pilot," and "consider." There are four phases in which these BMPs could be scheduled to begin planning and implementation. These phases are referenced in the summary tables in the following section. The summary tables include columns labeled "Initiate Planning" and "Initiate Implementation."

"Commit" activities are the highest priority, and are generally scheduled to begin planning in Phase 1 with the following exceptions: a) "Further emphasize applicable existing BMPs in development planning and construction programs" though committed BMPS, are scheduled to initiate planning in Phase 2, and b) subwatersheds with committed structural BMP measures may not have a clearly defined initiated planning date, reflecting potential uncertainties, and instead may reference "Phase 1 or 2." These watersheds include Ramirez, Latigo, Corral, Las Flores, Piedra Gorda, and Topanga.

BMPs that are to be piloted and considered would begin the planning phase no earlier than Phase 2 and implementation no later than phase 3. Items marked with an asterisk are those pilot or consider items that will be implemented only if necessary upon completion of the planning phase.

It should be noted that the medium priority subwatersheds of Los Alisos Canyon and Carbon do not include significantly different activities than their low priority counterparts. They, however, have accelerated schedules for the consideration of structural BMPs; with planning and implementation initiated in Phases of 2 and 3, respectively. It should also be noted that subwatersheds with potential for beneficial reuses (such as Trancas) would warrant consideration of additional BMP activities.

5.2 Arroyo Sequit

Because Arroyo Sequit is the reference subwatershed and basis for the Santa Monica Bay Beaches Bacterial TMDL, it is excluded from the Implementation Plan. Arroyo Sequit Subwatershed is virtually undeveloped (less than 2.5 percent is developed); therefore, anthropogenic sources of bacteria are sparse. It is for this reason that the CSMP (2004) identified the monitoring station at this subwatershed as a reference site for implementing the TMDL. Bacteria are still present in sampling, although at low levels and likely principally associated with wildlife, horses, and dogs. Much of the open space within the subwatershed is within parcels belonging to the Santa Monica Mountain Conservancy. Therefore, these lands have added protections.

5.3 Nicholas (J4)

5.3.1 Subwatershed-Specific Description

General Description

Nicholas Canyon is the sole Jurisdiction 4 area. It is a 1220-acre subwatershed that is bounded by Arroyo Sequit to the northwest and Los Alisos to the southeast. More than half of the Nicholas Subwatershed is within lands proposed for acquisition by the SMMC, and except for a small area of medium to high density and low density residential development along the shoreline, the subwatershed can generally be characterized as predominately natural open space. There is a 2-acre parcel in the subwatershed that is designated as a wildlife preserve or sanctuary. Just east of PCH is a horse ranch. Nicholas County Canyon Beach is a moderately popular beach that provides parking for 151 vehicles. The beach also provides fishing, picnicking, restrooms, showers, surfing, swimming, and in the summer months, there is a food truck.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 8 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 3 million gallons.

Specific/Historical Concerns

Nicholas Canyon is considered a low priority subwatershed. Monitoring in the critical TMDL year did not show excessive exceedance days, and the source prioritization effort did not conclude that it was a high priority subwatershed.

5.3.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Nicholas (J4) Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Identify horse stables in the region and implement pilot program		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*
d) On-Site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.4 Los Alisos

5.4.1 Watershed-Specific Description

General Description

Los Alisos Canyon is a 2380-acre subwatershed that is bounded by Nicholas Canyon to the northwest and Encinal to the southeast. Per SCAG (2000) land use data, it has 267 acres of residential development. In the upper region of the subwatershed around Decker Canyon there is a scattering of rural residential development and a small area designated as open space and recreation. In the area of La Vienta Creek and along the shoreline the area is mostly low density residential with a small area of medium to high density residential development (also along the shoreline). There are two inland parks west of PCH in the area of La Vienta Creek. Only 5 acres of non-pastoral or livestock agricultural land (nursery, vineyards) are found within the subwatershed. Most of the upper half of the subwatershed is protected by the Santa Monica Mountain Conservancy.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 10 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 4 million gallons.

Specific/Historical Concerns

Los Alisos Canyon is considered a medium priority subwatershed based on the source prioritization effort described previously

5.4.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Los Alisos Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 2	Phase 3*
b) Storage and Reuse			X	Phase 2	Phase 3*
c) Small Scale Infiltration			X	Phase 2	Phase 3*
d) On-Site Wastewater			X	Phase 2	Phase 3*

*if necessary

5.5 Encinal

5.5.1 Watershed-specific description

General Description

Encinal Canyon is an 1830-acre subwatershed that is bounded by Los Alisos to the northwest and Trancas Canyon to the southeast. Per SCAG (2000) land use data, it has 179 acres of residential development. Scattered rural residential development is found beyond the incorporated boundaries of Malibu, and is located primarily along streams. Medium to high density development dominates the shoreline with some intermingling of low density development. Two small agricultural (non-pastoral or livestock) parcels comprising a total of about 14 acres are located relatively close to the shoreline. Approximately one-third of the land area within this subwatershed is proposed for acquisition by the SMMC.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 8 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 3 million gallons.

Specific/Historical Concerns

Encinal Canyon is considered a low priority subwatershed based on the source prioritization effort described previously. Encinal has no zoned horse ranch or commercial land uses.

5.5.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Encinal Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*
d) On-Site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.6 Trancas

5.6.1 Watershed-Specific Description

General Description

Trancas Canyon is a 6580-acre subwatershed that is bounded by Encinal Canyon to the northwest and Zuma to the southeast. Per SCAG (2000) land use data, it has 635 acres of residential development. Nearly 15 percent of the Trancas subwatershed is comprised of developed land uses. A mixture of land uses, including medium to high and low density residential, mixed urban, educational, commercial, and rural residential, is found in the western portion of the subwatershed. The middle region of the subwatershed is virtually undeveloped, whereas the upper portion has a scattering of land uses, including rural residential, golf course, governmental, and agricultural. Approximately 26 acres of land within the northeastern section of the subwatershed is classified as cropland and pasture. There are 3 mapped horse ranches within the subwatershed, with one of the ranches located relatively close to the shoreline. Nearly half of the shoreline is comprised of a beach park. Relatively small-sized parcels owned by the proposed for ownership by the SMMC are scattered throughout the subwatershed. Trancas has some land uses indicating a potential reuse opportunity, but the location of these potential opportunities did not appear to be feasible for this activity.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 36 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 13 million gallons. For a subwatershed of this size, additional hydrologic studies are recommended prior to feasibility-level designs.

Specific/Historical Concerns

Trancas Canyon is considered a low priority subwatershed. Monitoring in the critical TMDL year did not show excessive exceedance days, and the source prioritization effort did not conclude that it was a high priority subwatershed.

5.6.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Trancas Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*
d) On-Site Wastewater			X	Phase 3	Phase 4*
Regional Solutions					
- Capture, Store, Treat, and Discharge			X	Phase 3	Phase 4*
- Capture, Store, Treat, and Reuse			X	Phase 3	Phase 4*
Treatment Options					
- Traditional Treatment/Small Package			X	Phase 3	Phase 4*
- SSF Wetlands			X	Phase 3	Phase 4*

*if necessary

5.7 Zuma

5.7.1 Watershed-Specific Description

General Description

Zuma Canyon is a 6290-acre subwatershed that is bounded by Trancas Canyon to the northwest and Ramirez to the southeast. It has 796 acres of residential development (13 percent of the total subwatershed). Developed land (including commercial, and mixed urban) comprises about 18 percent of the Zuma subwatershed, making Zuma subwatershed the third most developed subwatershed within the project area. It has the second highest proportion of commercial development. Low density residential development scattered with commercial, agricultural, horse ranch, and medium to high density residential development comprises the western portion of the subwatershed. Development is also found in the far upper portion of the subwatershed and is mostly characterized by rural residential and agricultural land uses. There are seven mapped horse ranches in this subwatershed, with two of the ranches located relatively close to the shoreline. A few, small parcels proposed for ownership by the SMMC are found in the mid- to upper regions of the subwatershed. A large proportion of the shoreline is comprised of a beach park (Zuma Beach). Based on the October 2004 field reconnaissance of the CSMP monitoring site, there are a number of restaurants and food facilities adjacent to and directly on Zuma Beach. In addition, several public restrooms were identified on Zuma Beach.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 33 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 12 million gallons. For a subwatershed of this size, additional hydrologic studies are recommended prior to feasibility-level designs.

Specific/Historical Concerns

Zuma Canyon is considered a low priority subwatershed. Monitoring in the critical TMDL year did not show excessive exceedance days, and the source prioritization effort did not conclude that it was a high priority subwatershed.

5.7.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Zuma Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Identify horse stables in the region and implement pilot program		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*
d) On-Site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.8 Ramirez

5.8.1 Watershed-Specific Description

General Description

Ramirez Canyon is a 3350-acre subwatershed that is bounded by Zuma Canyon to the north and Escondido to the southeast. It has 318 acres of residential development, making Ramirez the most developed subwatershed within the project area, with about 27 percent of its land area characterized by non-open space uses. Nearly all of the development is within the lower portion of the subwatershed. Numerous land uses are represented in the developed portion of the subwatershed. Low density residential development comprises the greatest proportion of the developed land uses. Commercial land is located away from the shoreline. There is a 6-acre horse ranch located fairly close to the shoreline. The eastern portion of the subwatershed is planned for ownership by the SMMC.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 21 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds, this volume could be reduced to 8 million gallons. For a subwatershed of this size, additional hydrologic studies are recommended prior to feasibility-level designs.

Specific/Historical Concerns

Ramirez Canyon is considered a high priority subwatershed. Monitoring in the critical TMDL year showed excessive exceedance days, and the source prioritization effort confirmed that it was a high priority subwatershed.

5.8.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Ramirez Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns	X			Phase 1 or 2	Phase 3
b) Storage and Reuse	X			Phase 1 or 2	Phase 3
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-Site Wastewater			X	Phase 3	Phase 4*
Regional Solutions					
- Capture, Store, Treat, and Discharge		X		Phase 1	Phase 3
Treatment Options					
- Traditional Treatment/Small Package			X	Phase 3	Phase 4*
- Storm Water Filtration			X	Phase 3	Phase 4*
- Advanced Oxidation			X	Phase 3	Phase 4*

Ramirez Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
- Peracetic Acid/bactericides			X	Phase 3	Phase 4*
- SSF Wetlands			X	Phase 3	Phase 4*

*if necessary

5.8.3 Description of Potential Pilot Project

The following table describes a potential pilot project for this subwatershed. It includes a project target location, treatment measure, and preliminary budget estimate. As previously stated it is expected that features related to this pilot project may change.

Project Name	Paradise Cove Pretreatment and System Upgrade
Jurisdictional Lead	City of Malibu/County of Los Angeles
Project Description/Benefit	Provide pre-treatment pollutant removal and storage capacity to increase the functional capacity of existing bacteria treatment system and evaluate the potential for system upgrade. Potential significant improvements in treatment performance
Regional, Sub-Regional, or On-Site	Sub-Regional
Subwatershed and basis for selection	Ramirez Subwatershed High Priority based on Source Prioritization and TMDL exceedance days in critical year
Integrated Project Element	Multiple Pollutants
Candidate Locations	Storage facilities adjacent to or upstream of existing Clear Creek System. Approximate land required (note storage can be covered at additional expense): 1 to 2 acres
Candidate Target Volume	Drainage is 60% of total watershed (estimated) and utilizing lower volume estimate, and Potential treatment of 50% of volume Required operational storage is 2.4 MG (approx 7.4 acre-feet).

Permitting/ Environmental Issues	Potential private land ownership issues. This stipulation makes the feasibility of the proposed pilot project somewhat in question. Therefore the pilot project should be considered "conditional" of resolution of right-of-way issues. Large operational storage required
Budgetary Estimates	To be determined
Photo/Map: 	 Copyright © 2002-2004 Kenneth & Gabrielle Adelman, California Coastal Records Project, www.californiacoastline.org
Photo: Existing Channel	

Photo: Existing Outlet Structure	
Photo: Existing Parking Structure	

5.9 Escondido

5.9.1 Watershed-Specific Description

General Description

Escondido Canyon is a 2300-acre subwatershed that is bounded by Ramirez Canyon to the northwest and Latigo to the southeast. It has 318 acres of residential development. Rural residential development is found scattered throughout the subwatershed. Medium to high density residential development is found along the shoreline and low density residential development is found just east of the shoreline. About a third of the land area is within SMMC lands. About 43 acres of mapped horse ranches (representing about 2 percent of the subwatershed) are found fairly close to the shoreline. The proportion of horse ranches in this subwatershed is the highest within the project area. There is no coastal, public access from the Pacific Coast Highway (Route 1) to Escondido Beach; access is only via private properties and through two blocked gates.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 9 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 3 million gallons.

Specific/Historical Concerns

Escondido Canyon is considered a medium to high priority subwatershed. There was no monitoring in the critical TMDL year, but the source prioritization effort concluded that it was medium to high priority.

5.9.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Escondido Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse		X		Phase 2	Phase 3
c) Small Scale Infiltration		X		Phase 2	Phase 3
d) On-site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.10 Latigo

5.10.1 Watershed-Specific Description

General Description

Latigo Canyon is the second smallest subwatershed in the J1/4 area, and is an 824-acre subwatershed that is bounded by Escondido Canyon to the northwest and Solstice to the southeast. Latigo has 80 acres of residential development, a substantial portion near the shoreline. Developed land within the Latigo subwatershed is characterized mostly by rural residential development in the central area of the subwatershed along the rim of Latigo Canyon and low and medium to high density residential development near the shoreline. Managed lands of the SMMC are found along the eastern border of the subwatershed.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 4 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 1 million gallons.

Specific/Historical Concerns

Latigo Canyon is considered a high priority subwatershed based on monitoring of exceedance days in the critical TMDL year.

5.10.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

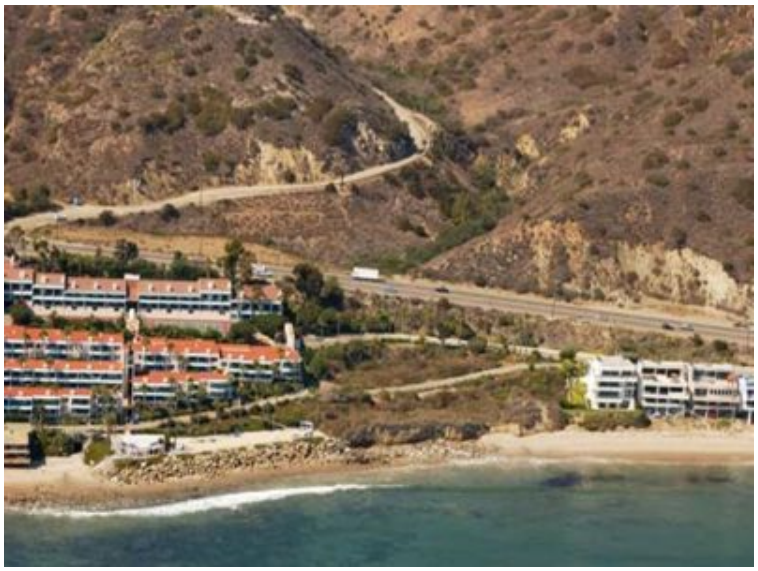
Latigo Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns	X			Phase 1 or 2	Phase 3
b) Storage and Reuse	X			Phase 1 or 2	Phase 3
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-site Wastewater			X	Phase 3	Phase 4*
Regional Solutions					
- Capture, Store, Treat, and Discharge		X		Phase 1	Phase 3
Treatment Options					
- Traditional Treatment/Small Package			X	Phase 3	Phase 4*
- Storm Water Filtration			X	Phase 3	Phase 4*
- Advanced Oxidation			X	Phase 3	Phase 4*
- Peracetic Acid/bactericides			X	Phase 3	Phase 4*
- SSF Wetlands			X	Phase 3	Phase 4*

*if necessary

5.10.3 Description of Potential Pilot Project

The following table describes a potential pilot project for this subwatershed. It includes a project target location, treatment measure, and preliminary budget estimate. As previously stated it is expected that features related to this pilot project may change.

Project Name	Latigo Shores Subsurface Flow Wetland
Jurisdictional Lead	County of Los Angeles
Project Description/Benefit	Utilize vacant County Beaches and Harbors land, east of Tivoli Condominiums and south of PCH, for treatment of creek flows through subsurface flow wetland system. Project requires pretreatment screens for gross solids removal. Diversion of flows and temporary storage. Assume wetland system can be fed during dry season with nuisance flows from creek or treated septic leach sources. System to be encase in concrete box to mitigate slope stability issues.
Regional, Sub-Regional, or On-Site	Subregional
Subwatershed and basis for selection	Latigo High Priority based on TMDL exceedance days in critical year
Integrated Project Element	Multiple Pollutants and potential integrated water resources (treated septic leach source)
Candidate Locations	Adjacent to outlet in vacant parcel. Alternative site may be privately owned land north of PCH and west of creek. Approximate land required (note storage can be covered at additional expense): 1 acre
Candidate Target Volume	90% of area (estimated) 50% of reduced volume assumed, or Operational storage = 0.45 MGD
Permitting/ Environmental Issues	Groundwater/septic leach water usage Potential private land ownership issues for access: This stipulation makes the feasibility of the proposed pilot project somewhat in question. Therefore the pilot project should be considered "conditional" of resolution of right-of-way issues. Engineering issue: Potential slope stability issues must be addressed and investigated as part of preliminary design process.

Budgetary Estimates	To be determined
Photo/Map: 	 Copyright © 2002-2004 Kenneth & Gabrielle Adelman, California Coastal Records Project, www.californiacoastline.org
Photo: Candidate Site	

5.11 Solstice

5.11.1 Watershed-Specific Description

General Description

Solstice Canyon is a 2840-acre subwatershed that is bounded by Latigo Canyon to the northwest and Corral Canyon to the southeast. Development within Solstice subwatershed is limited to rural residential and horse ranch uses and a small commercial area near the coastline. Much of this subwatershed is proposed for ownership by SMMC. A field reconnaissance conducted in October 2004 noted that the commercial area on the east side of Pacific Coast Highway at Solstice Canyon Road is comprised of restaurants and a gas station.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 35 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 13 million gallons.

Specific/Historical Concerns

Solstice Canyon is considered a low priority subwatershed based on the source prioritization effort described previously

5.11.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Solstice Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.			X	Phase 2	Phase 3*
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Structural Measures					
On-Site Options					
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*

*if necessary

5.12 Corral

5.12.1 Watershed-Specific Description

General Description

Corral Canyon is a 4,300-acre subwatershed that is bounded by Solstice Canyon to the northwest and Malibu Creek to the southeast. It includes 244 acres of residential development. Corral subwatershed hosts the approximate 180-acre campus of Pepperdine University which is located in the southwestern area of the subwatershed fairly close to the shoreline. Except for a concentrated area of rural residential development in the east, most of the developed area in the subwatershed is near the shoreline and surrounding the university. Most of the residential development near the shoreline is medium to high density. This subwatershed has the third highest proportion of commercial development within the project area, and by far the highest proportion of land designated as mixed urban/construction. There is a golf course located just east of Malibu Colony near the shoreline.

A significant drain within Corral is Marie Creek, which is located in the eastern portion of the subwatershed. Within yards of Marie Creek is an accessible creek that opens directly to the ocean. In the vicinity of this creek is a residential area with homes along the beach.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 35 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 13 million gallons. For a subwatershed of this size, additional hydrologic studies are recommended prior to feasibility-level designs.

Specific/Historical Concerns

Corral Canyon is considered a high priority subwatershed based on the source prioritization effort. While it also has a theoretical demand for some water reuse, there appears to be sufficient supply.

5.12.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1.

Corral Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Coordinate outreach activities with Pepperdine University:	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse		X		Phase 2	Phase 3*
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-site Wastewater			X	Phase 3	Phase 4*
Regional Solutions					
- Capture, Store, Treat, and Discharge			X	Phase 3	Phase 4*
- Capture, Store, Treat, and Reuse		X		Phase 1	Phase 3*
Treatment Options					
- Traditional Treatment/Small Package			X	Phase 3	Phase 4*
- Storm Water Filtration			X	Phase 3	Phase 4*
- Advanced Oxidation			X	Phase 3	Phase 4*
- Peracetic Acid/bactericides			X	Phase 3	Phase 4*

*if necessary

5.12.3 Description of Potential Pilot Project

The following table describes a potential pilot project for this subwatershed. It includes a project target location, treatment measure, and preliminary budget estimate. As previously stated it is expected that features related to this pilot project may change.

Project Name	Marie Canyon Drain Retrofit
Jurisdictional Lead	County of Los Angeles DPW
Project Description/Benefit	Provide upstream storage and diversion, with peracetic acid treatment and discharge back in to Marie Canyon Drain
Regional, Sub-Regional, or On-Site	Sub-Regional
Subwatershed and basis for selection	Corral High Priority based on Source Prioritization
Integrated Project Element	Multiple Pollutant removal
Candidate Locations	Potential reduced storage upstream of PCH
Candidate Target Volume	Assume Marie Canyon is 15% of Corral Drainage, Treat 50% of lowered target volume; Estimated required operational storage = 1 MG Approximate land required (note storage may be covered at additional expense): up to 1 acre
Permitting/ Environmental Issues	NPDES permitting with biocide addition Right of way Potential land acquisition upstream of PCH
Budgetary Estimates	To be determined

Photo/Map: 	 Copyright © 2002-2004 Kenneth & Gabrielle Adelman, California Coastal Records Project, www.californiacoastline.org
Photo: Upstream of Culvert	

Photo: Discharge Point	

5.13 Carbon

5.13.1 Watershed-Specific Description

General Description

Carbon Canyon is a 2310-acre subwatershed that is bounded by Malibu Creek to the northwest and Las Flores to the southeast. It has 315 acres of residential development (14 percent of the total area). This subwatershed has the highest proportion of commercial development (35 acres) of any of the J1/4 subwatersheds, and all of this development is near the shoreline along the east side of the Pacific Coast Highway. Rural residential development is found scattered within the eastern and western portions of the subwatershed. Medium to high density residential development is located on the west side of PCH, and low density residential development is found just east of PCH. A small beach park is found along the western shoreline. Carbon subwatershed is one of the most developed subwatersheds within the project area. Residential development is found near the CSMP monitoring station located in the Sweetwater Canyon area.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 16 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 6 million gallons.

Specific/Historical Concerns

Carbon Canyon is considered a medium priority subwatershed based on the source prioritization effort described previously

5.13.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Carbon Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 2	Phase 3*
b) Storage and Reuse			X	Phase 2	Phase 3*
c) Small Scale Infiltration			X	Phase 2	Phase 3*
d) On-site Wastewater			X	Phase 2	Phase 3*

*if necessary

5.14 Las Flores

5.14.1 Watershed-Specific Description

General Description

Las Flores Canyon is a 2921-acre subwatershed that is bounded by Carbon Canyon to the northwest and Piedra Gorda to the southeast. It has 282 acres of residential development. Within this subwatershed, medium to high density development flanks the shoreline along with commercial development. High density development is also found along the lower eastern and western boundaries of the subwatershed. Scattered low density development is found within the lower subwatershed; whereas, rural residential development is found scattered within the central and eastern areas of the subwatershed. A large proportion of the land is comprised of SMMC lands.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 17 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 6 million gallons.

Specific/Historical Concerns

The City of Malibu is currently engaged in restorations on the creek. These efforts have the potential to not only benefit riparian habitat and fluvial geomorphologic conditions, but also water quality.

Las Flores Canyon is considered a high priority subwatershed based on the critical year exceedances listed in the TMDL.

5.14.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1.

Las Flores Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns	X			Phase 1 or 2	Phase 3
b) Storage and Reuse	X			Phase 1 or 2	Phase 3
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-site Wastewater			X	Phase 3	Phase 4*
Regional Solutions					
- Capture, Store, Treat, and Discharge		X		Phase 2	Phase 3
Treatment options					
- Traditional Treatment/Small Package			X	Phase 3	Phase 4*
- Storm Water Filtration			X	Phase 3	Phase 4*
- Advanced Oxidation			X	Phase 3	Phase 4*
- Peracetic Acid/bactericides			X	Phase 3	Phase 4*
- SSF Wetlands			X	Phase 3	Phase 4*

*if necessary

5.14.3 Description of Potential Pilot Project

The following table describes a potential pilot project for this subwatershed. It includes a project target location, treatment measure, and preliminary budget estimate. As previously stated it is expected that features related to this pilot project may change.

The potential creek restoration pilot project will improve riparian function and water quality through various instream habitat enhancement elements. Ancillary benefits include the reduction of flooding impacts, property damage or bank failure; improvement of creek form and function; and protection of fish and other wildlife. Public awareness, education and participation will be critical to the success of the pilot project and will help the water quality public education elements, as more people would be encouraged to value the restored natural environment. The physical attributes of Las Flores Creek will provide insight to potential solutions applicable to other sites. Hence, this potential pilot project can be used as a model for restoration and structural BMP projects.

Project Name	Las Flores Canyon Restoration and Water Quality Improvements
Jurisdictional Lead	City of Malibu
Project Description/Benefit	Restoration of Las Flores creek and acquisition of adjacent properties for biofiltration and infiltration prior to discharge to the creek.
Regional, Sub-Regional, or On-Site	Regional and sub-regional
Subwatershed and basis for selection	Las Flores High Priority based on TMDL exceedance days in critical year
Integrated Project Element	Multiple pollutants, biodiversity and habitat enhancement
Candidate Locations	Las Flores creek upstream of PCH
Candidate Target Volume	80-90% of watershed area 5 MGD total, smaller volumes in tributary drains
Permitting/ Environmental Issues	CDFG 1600 USACE 404 RWQCB 401
Budgetary Estimates	To be determined

Photo/Map: 	 Copyright © 2002-2004 Kenneth & Gabrielle Adelman, California Coastal Records Project, www.californiacoastline.org
Photo: Existing Creek	

Photo: Outlet to Bay	

5.15 Piedra Gorda

5.15.1 Watershed-Specific Description

General Description

Piedra Gorda is a 629-acre subwatershed that is bounded by Las Flores Canyon to the northwest and Pena to the southeast. About 80 percent of the land within this subwatershed is designated as open space, with the majority of that area proposed for ownership by SMMC. Even with this high percentage of undeveloped land, this subwatershed is threatened by contamination from development given that all remaining lands within the subwatershed are characterized by medium to high residential use, and these developed lands are located near the shoreline.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 3 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 1 million gallons.

Specific/Historical Concerns

Piedra Gorda Canyon is considered a high priority subwatershed based on the critical year exceedances listed in the TMDL.

5.15.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1.

Piedra Gorda Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns	X			Phase 1 or 2	Phase 3
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.16 Pena

5.16.1 Watershed-Specific Description

General Description

Pena Canyon is the smallest subwatershed area within the J1/4 jurisdictions, and is a 625-acre subwatershed that is bounded by Piedra Gorda to the northwest and Tuna to the southeast. About 96 percent of this subwatershed is represented by open space lands, and much of this area is proposed for acquisition by SMMC. Medium to high density residential development and beach park are the only other uses within the subwatershed and both of these uses are along the shoreline.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 3 million gallons, though based on detailed hydrologic studies in adjacent subwatershed, this volume could be reduced to 1 million gallons.

Specific/Historical Concerns

Pena is considered a low priority subwatershed based on the source prioritization effort described previously

5.16.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Pena Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns			X	Phase 3	Phase 4*
b) Storage and Reuse			X	Phase 3	Phase 4*
c) Small Scale Infiltration			X	Phase 3	Phase 4*
d) On-site Wastewater			X	Phase 3	Phase 4*

*if necessary

5.17 Tuna

5.17.1 Watershed-Specific Description

General Description

Tuna Canyon is a 1007-acre subwatershed that is bounded by Pena Canyon to the northwest and Topanga Canyon to the east. It has 39 acres of residential development. This subwatershed is virtually undeveloped with the exception of a few scattered areas of rural residential development in the east and medium to high density and commercial development along the shoreline. Nearly the entire subwatershed is proposed for acquisition by SMMC.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 4 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to 1 million gallons.

Specific/Historical Concerns

Tuna Canyon is considered a low priority subwatershed based on the source prioritization effort described previously

5.17.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Tuna Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
c) Small Scale Infiltration			X	Phase 3	Phase 4*

*if necessary

5.18 Topanga

5.18.1 Watershed-Specific Description

General Description

Topanga Canyon is the largest subwatershed within the J1/4 area. It is a 12,611-acre subwatershed that is bounded by Tuna Canyon to the northwest and represents the eastern boundary of the J1/4 jurisdictional area. Nearly every category of land use is represented within its borders. There is little development near the shoreline other than a beach park, a small commercial area, and a small (2-acre) industrial site. The central and eastern areas of the subwatershed are marked by rural residential, commercial, public, horse ranch, educational, and mixed urban/construction land uses. This subwatershed has a relatively high concentration of horse ranches; however these ranches are all in the upper subwatershed. In the CSMP monitoring site vicinity, the Pacific Coast Highway, at the corner of Topanga Creek Boulevard, is flanked by a number of restaurants and shops. Within 2 miles up from the Pacific Coast Highway, Topanga Creek Boulevard is primarily surrounded by residential development.

Estimate of Potential Total Runoff to Be Managed

Hypothetical target 24-hour operational storage and treatment volumes were developed should structural measures be eventually required within the subwatershed. The upper limit of this volume is 65 million gallons, though based on detailed hydrologic studies in adjacent subwatersheds this volume could be reduced to less than 24 million gallons. For a subwatershed of this size, additional hydrologic studies are recommended prior to feasibility-level designs.

Specific/Historical Concerns

Topanga Canyon is the largest and most complex subwatershed in the study area. It is considered a medium priority subwatershed based on both the TMDL exceedance day monitoring for the critical year and the source prioritization effort described previously.

5.18.2 Watershed-Specific Plan of Activities

The following matrix summarizes the activities specifically designated for this subwatershed. The basis for activities selected in this matrix is primarily the subwatershed priority status. Descriptions of general activities described below were provided in Section 5.1.1. Specifics regarding potential implementation scheduling are provided in Appendix B.

Topanga Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
Non-Structural Measures					
Public Information and Participation Programs					
Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact or purchase	X			Phase 1	Phase 1
Locate areas with corralled animals and educate property owners on bacteria TMDLs		X		Phase 2	Phase 3
Identify horse stables in the region and implement pilot program		X		Phase 2	Phase 3
Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean up horse waste			X	Phase 2	Phase 3*
Outreach at trailheads encouraging hikers to use restroom facilities			X	Phase 2	Phase 3*
Provide septic system (OWTS) pumpers and customers with septic system guides.	X			Phase 1	Phase 2
Increase coordination between agencies and environmental organizations in preparing outreach materials	X			Phase 1	Phase 1
Industrial/Commercial Facilities Control Programs					
Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers			X	Phase 2	Phase 3*
Provide for regular BMP inspections for restaurants	X			Phase 1	Phase 1
Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program		X		Phase 2	Phase 3
Conduct industry specific workshops	X			Phase 1	Phase 1
Investigate the possibility of increasing frequency of trash collection at restaurants	X			Phase 1	Phase 2
Development Planning and Construction Program					
Further emphasize applicable existing BMPs in development planning and construction programs	X			Phase 2	Phase 2
Public Agency Activity Control Program					
Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities	X			Phase 1	Phase 1
Caltrans-Malibu Joint Agency Activities			X	Phase 1	Phases 1 & 2
Structural Measures					
On-Site Options					
a) Cisterns	X			Phase 1 or 2	Phase 3
b) Storage and Reuse	X			Phase 1 or 2	Phase 3
c) Small Scale Infiltration	X			Phase 1 or 2	Phase 3
d) On-site Wastewater			X	Phase 2	Phase 3*
Regional Solutions					
- Capture, Store, Treat, and Discharge			X	Phase 2	Phase 3*
- Capture, Store, Treat, and Reuse			X	Phase 2	Phase 3*
Treatment Options					
- Traditional Treatment/Small Package			X	Phase 2	Phase 3*
- Storm Water Filtration			X	Phase 3	Phase 3*
- Advanced Oxidation			X	Phase 2	Phase 3*

Topanga Best Management Practices	Commit	Pilot	Consider	Initiate Planning	Initiate Implementation*
- Peracetic Acid/bactericides			X	Phase 3	Phase 3*
- SSF Wetlands			X	Phase 2	Phase 3*

5.19 Integrated Water Resources Plan Elements

The Implementation Plan was developed consistent with an Integrated Water Resources Approach (IWRA) on the basis of a) multiple pollutants removed and b) integrated water resources benefits. For each recommended BMP, both the target pollutants and water resources benefits are listed. For discussion purposes, target pollutants are grouped in the following families:

- Bacteria
- Nutrients
- Metals
- Organics
- Pathogens
- Trash

Integrated water resources benefits listed include:

- Conservation
- Reuse/Recycling
- Habitat
- Geomorphology (Hydromodification)
- Hydrology (Stream)
- Flood Control

5.20 Performance Evaluation

Assessing the effectiveness of the management measures is also critical to tracking progress toward meeting full TMDL compliance. Two basic approaches, discussed in Section 3.6 are presented in the Final Plan: 1) a Presumptive Compliance Approach and 2) a Targeted Monitoring-Based Approach.

The Presumptive Compliance Approach (PCA) assumes that the implementation of structural and non-structural BMPs will lead directly to reductions of exceedance days and attempts to quantify this relationship.

The focused and targeted monitoring-based approach (TMBA) adopts some measures of presumptive compliance but incorporates monitoring data and attempts to normalize and

extrapolate this monitoring data throughout the region. TMB results are presented in Interim Compliance Reports.

Other performance metrics include informational surveys, tracking of volumes of pollutants removed, and a comparison of expenditures relative to full implementation budgets.

The table below describes, for each recommended BMP, the performance evaluation measure and methods to be implemented to gage progress toward meeting TMDL targets.

Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

Activity Number	BMPs and Activities TMDL Monitoring and Studies	Water Quality Benefits: Multiple Pollutants B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	Additional Integrated Water Resources Benefits CONS = water conserv RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	Performance Evaluation Measure and Method
1	TMDL Monitoring: Trancas	B,N,M,O	N/A	Monitoring Results
2	TMDL Monitoring: Solstice	B,N,M,O	N/A	Monitoring Results
3	TMDL Monitoring: Marie Canyon	B,N,M,O	N/A	Monitoring Results
4	TMDL Monitoring: Sweetwater Creek	B,N,M,O	N/A	Monitoring Results
5	TMDL Monitoring: Topanga Lagoon (sandbar)	B,N,M,O	N/A	Monitoring Results
6	TMDL Monitoring: Topanga Lagoon (bridge)	B,N,M,O	N/A	Monitoring Results
7	Hydrologic Loading Estimates	N/A	HYD, GEO	Study Results
8	Structural BMP Monitoring	B,N,M,O	N/A	Study Results
9	Identification of the Most Relevant Human Health Indicators Study	B,P	N/A	Study Results
10	Hydrology vs. Bacteria Loading	B	HYD, GEO	Study Results
11	Bacteria Seasonal Variation Study	B	N/A	Study Results
	Non-Structural Measures			
	Public Information Participation Programs			
12	Outreach to pet owners establishing a link between animal wastes and health issues and focus on point of contact	B, N, P	N/A	Interim Compliance Reports, Information Surveys, PCA
13	Locate areas with corralled animals and educate property owners on bacteria TMDLs	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA

Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

	BMPs and Activities	Water Quality Benefits: Multiple Pollutants	Additional Integrated Water Resources Benefits	Performance Evaluation Measure and Method
Activity Number	TMDL Monitoring and Studies	B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	CONS = water conserv RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	
14	Identify horse stables in the region and implement pilot program	B, N, P	GEO	Interim Compliance Reports, TMBA, PCA
15	Post signs at County and City-owned trailheads designated for equestrian users to not clean out horse trailers in parking lots and to clean horse waste	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA
16	Outreach at trailheads encouraging hikers to use restroom facilities	B, N, P	N/A	Information surveys, Interim Compliance Reports, TMBA
17	Coordinate outreach activities with Pepperdine University	B,N,M,O	CONS,RE	Interim Compliance Reports, TMBA, PCA
18	Increase coordination between agencies and environmental organizations in preparing outreach materials	B,N,M,O,P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Information Surveys
	Industrial/Commercial Facilities Control Programs			
19	Provide an outreach program for all commercial facilities with corralled animals, including equestrian centers	B, N, P	N/A	Interim Compliance Reports, TMBA, PCA
20	Provide for regular BMP inspections for restaurants	B, N, P	N/A	Information surveys, Interim Compliance

Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

Activity Number	BMPs and Activities TMDL Monitoring and Studies	Water Quality Benefits: Multiple Pollutants B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	Additional Integrated Water Resources Benefits CONS = water conserv RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	Performance Evaluation Measure and Method
				Reports, TMBA
21	Increase awareness of BMPs in restaurants by establishing a restaurant reward and recognition program	B,N,P	N/A	Interim Compliance Reports, Information Surveys, TMBA, PCA
22	Conduct industry specific workshops	B,N,M,O,P,T	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Information Surveys, PCA
23	Investigate the possibility of increasing frequency of trash collection at restaurants	B,N,M,O,P,T	N/A	Interim Compliance Reports
	Development Planning and Construction Programs			
24	Further emphasize applicable existing BMPs in development planning and construction programs	B,N,M,O,P,T	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports
	Public Agency Activity Control Program			
25	Establish guidelines for optimizing frequency of cleaning cycles for drainage facilities and implement recommendations on Caltrans facilities	B,N,M,O,P,T	N/A	Volume and Expenditure Tracking

Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

	BMPs and Activities	Water Quality Benefits: Multiple Pollutants	Additional Integrated Water Resources Benefits	Performance Evaluation Measure and Method
Activity Number	TMDL Monitoring and Studies	B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	CONS = water conserv RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	
26	Caltrans-Malibu Joint Agency Activities	B,N,M,O,P,T	HAB	Interim Compliance Reports, Information Surveys
	Structural Measures			
	On-Site Options			
27	Residential Cisterns	B,N,M,O,P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
28	On-site Storage and Reuse Projects	B,N,M,O,P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
29	Small Scale Infiltration Projects	B,N,M,O,P	CONS, RE, HAB, GEO, HYD, FLD	Interim Compliance Reports, Expenditure Tracking, Activities
	Pilot Project Treatment Options			
30	Paradise Cove Pretreatment and System Upgrade	B,N,M,P		Monitoring results
32	Las Flores Canyon Restoration and Water Quality Improvements (Biofiltration and infiltration)	B,N,M,O,P	GEO, HYD, FLD	Monitoring results, Study Activities

Summary of Best Management Practices, Integrated Water Resources Approach, and Performance Evaluation Measures

Activity Number	BMPs and Activities TMDL Monitoring and Studies	Water Quality Benefits: Multiple Pollutants B = Bacteria N = Nutrients M = Metals O = Organics P = Pathogens T = Trash	Additional Integrated Water Resources Benefits CONS = water conserv RE = reuse/recycling HAB = habitat GEO = geomorphology HYD = hydrology (stream) FLD = flood & volume	Performance Evaluation Measure and Method
33	Marie Canyon Drain Retrofit / Peracetic Acid/bactericides	B, N only		Monitoring results
34	Latigo Shores Subsurface Flow Wetlands	B,N,M,O,P	CONS, RE, HAB	Monitoring results

5.21 Target Exceedance Day Reductions

It is desired to provide a basis from which measured data can be compared for the purposes of documenting compliance milestones. The following table presents target reductions by phase and subwatershed of exceedance days based on the 90th percentile condition. It should be emphasized that this is a prediction based on the implementation approach described previously and very limited available data. It is presented for the purposes of quantifying potential improvements on a subwatershed basis. As previously discussed, these reductions are provided assuming the daily sampling protocol, and should weekly sampling be conducted appropriate scaling should be applied.

Table of Target Exceedance Days Reductions

Station	Description	90th Percentile Conditions	Allowable Exceedance Days	Total Required Day Reduction	Implementation Schedule			
					10%	25%	50%	100%
DHS010	Leo Carillo	17	17	0	0	0	0	0
DHS009	Nicholas	14	14	0	0	0	1	1
DHS010a	Broad Bch	15	15	0	0	0	1	1
DHS008	Trancas	19	17	2	1	2	2	3
DHS007	Westward, e. of Zuma	17	17	0	0	0	1	1
DHS006	Paradise Cove	23	17	6	1	2	4	6
DHS005	Latigo Canyon	33	17	16	2	4	8	16
DHS005a	Corral	17	17	0	1	1	1	3
DHS001a	Las Flores	29	17	12	1	3	6	12
DHS001	Big Rock	30	17	13	2	4	8	13
S2	Topanga	26	17	9	2	4	8	12
Target Totals				**60**	**10**	**20**	**40**	**68**
Minimum				**60**	**6**	**13**	**30**	**60**

6. Program Cost and Budget

6.1 Introduction

The following discussion on potential program budgets should be considered for preliminary programmatic budgetary planning only. The budget analysis does not consider those items that are to be considered, but not committed to or implemented on a pilot scale. In addition, specific allocation of budgets between jurisdictional agencies is not addressed in this Plan. Budgets are not being provided with the Draft Implementation Plan submittal, but the budgeting methodology is as follows.

Planning-level (order-of-magnitude) budget and staff resource (Full Time Equivalent, or FTE) estimates are estimated to the extent possible based on the preliminary concepts for projects and programs contained in Section 5. The estimates are intended to provide decision-makers with an order-of-magnitude sense of what expenditures and staff resources may be anticipated over the proposed 18-year implementation schedule. Given the iterative and adaptive nature of the implementation plan, and the many uncertainties associated with many of the programs and projects, the forecast for later phases are relatively speculative.

Budget estimates encompass in three broad categories:

- "Initial" budgets, for start up of non-structural programs, and planning, permitting, design and construction of structural measure;
- "Annual Operations and Maintenance (O&M)" budgets for ongoing expenditures of direct costs for conducting non-structural programs, or operating pilot or structural projects; and
- Annual full time equivalents (FTEs)" for potential staff resources for carrying out the program.

Some key assumptions made to develop the budget estimates for the committed and pilot projects are summarized below.

6.1.1 Non-Structural Programs (Commit and Pilot)

Budget estimates for committed non-structural programs include start-up or first year costs which may include a combination of staff and/or consultant labor, materials and other direct costs, workshops, etc. After the initial start-up year or period, a lower level of annual O&M budget, and an annual FTE level was estimated. It is assumed that all of the committed non-structural programs would continue at this level throughout the full implementation period.

Budget estimates for non-structural pilot programs include similar considerations as the committed programs during the pilot period. It is also assumed that all of the pilot programs with on exception as noted would prove sufficiently effective and be well enough defined to warrant continuing implementation, and annual O&M budgets and FTE's were

estimated to continue at this level throughout the full implementation period. The one exception is with respect to increasing frequency of trash collection as restaurants. Initial budgets are shown to conduct the study, but the outcome cannot be predicted, and would not necessarily lead to increased costs to the local agencies, so no on-going budgets are shown.

6.1.2 On-Site Structural Solutions (Commit and Pilot)

Budgets for the implementation for on-site solutions assume that construction funding would be provided to assist those homeowners, commercial property owners willing to install and maintain accepted on-site measures including a potential mix of cisterns, on-site storage and reuse projects, and small scale infiltration projects. The budgets include planning and design, construction and long-term O&M plus a limited on-going staff effort (FTEs) to oversee, monitor and track the program implementation.

6.1.3 Regional and Sub-Regional Structural Solutions (Pilot)

The budget for implementing structural pilot projects was taken from the estimates developed and presented in Section 5. The initial budgets include the planning, engineering and construction, annual O&M are as shown in Section 5. For budgeting purposes, it is assumed that all four pilot projects will prove to be feasible and effective in helping reduce exceedances and will remain in place after the pilot program phase is over. Therefore, the annual O&M is carried forward throughout the remainder of the 18 year implementation period.

While it is possible that additional regional structural measures may be needed after assessing program results and progress after the first three phases, or, conversely, the one or more of the initial pilot projects may not be effective or necessary to continue. The budget estimate does not speculate on additional or expanded program elements beyond Phase 3.

6.1.4 Monitoring Budgets

Estimated costs to perform monitoring activities and special studies identified in Section 4 are also a key part of the cost estimate.

6.2 Total Budget by Year

Annual budgets will estimate capital, ongoing and FTE costs, beginning with the initial implementation period of FY 2005-06 and continuing through the end of the implementation period of 18 years. Initial budgets for various programs and projects will be spread over the implementation period, and annual O&M budgets and FTE's will be shown every year after the initial phase is complete. Total budgets (initial or O&M) and FTE's of each program/project will be totaled for each fiscal year throughout the implementation period, and depicted graphically.

7. Conclusions

The Implementation Plan discussed here presents an iterative, adaptive, and integrated approach to TMDL implementation for the North Santa Monica Bay Beaches J1/4 areas. This approach requires a review and emphasis on multiple beneficial uses and the targeting of multiple pollutants. Philosophically, the implementation approach balances of low risk (high cost), low cost (higher potential for exceedances), and high beneficial reuse to determine site specific implementation.

The following activities were conducted during the development of the Implementation Plan:

- Estimating and Establishing Baseline Conditions
- Developing a Menu of Potential Activities
- Identifying Implementation Considerations
- Selecting and Prioritizing
- Planning and Implementation during the next 18 Years

In order to most-effectively implement activities, different levels of commitment were established for this plan. These levels were:

- "commit"—the Agencies commit to this activity

- "pilot"—the Agencies are willing to commit to a pilot study to determine whether the proposed activity the preliminary design parameters are appropriate.

- "consider" – the Agencies will consider this effort, depending on the results of committed activities.

In order to prioritize subwatersheds, results of a source prioritization effort were combined with monitoring data from the TMDL-defined "critical year". This analysis resulted in the following categories:

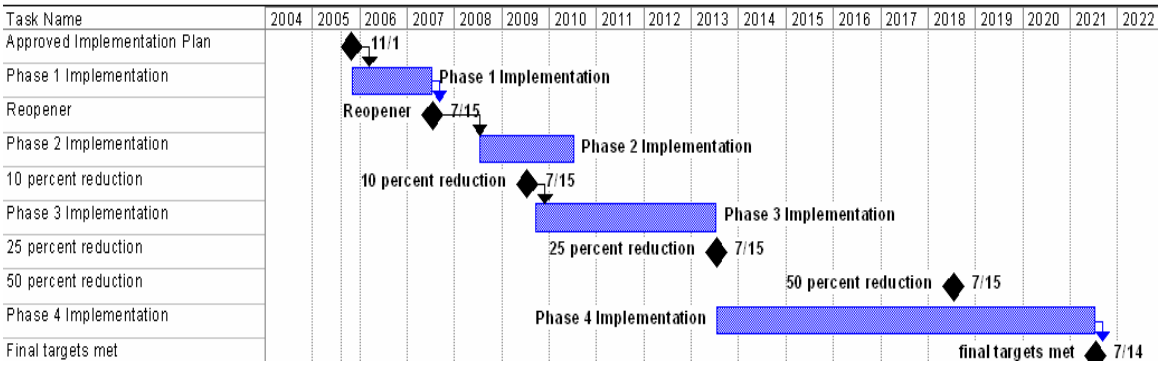
- High Priority subwatersheds: Latigo, Corral, Las Flores, Piedra Gorda, and Ramirez
- Medium Priority subwatersheds: Carbon, Los Alisos, Topanga, and Escondido
- Low Priority subwatersheds: Nicholas, Encinal, Trancas, Zuma, Solstice, Pena, and Tuna

These priorities, in conjunction with subwatershed specific characteristics and the desired risk-cost-beneficial reuse relationship, contributed to the development of a unique suite of activities for each subwatershed.

The Implementation Plan was divided into four phases of activities. The activities consisted of implementation activities, as well as monitoring and additional studies that could be used to provide better information for future activities. To provide useful information, the additional studies will require extended development and implementation periods. Upon completion of these studies, it would be desirable to confirm, or adjust if necessary, the

direction and requirements of the Implementation Plan. As such, the County of Los Angeles and J1/4 Agencies proposed the addition of appropriately timed re-evaluation milestones (re-openers). Implementation activities, suggested re-opener, and implementation milestones are illustrated below:

Santa Monica Bay Beaches Bacterial TMDL – J1/4



Implementation Plan Phasing

The general intent of what would be accomplished under each of the phases is as follows:

- Phase I – Conduct planning and initiate all committed non-structural activities and implement selected non--structural measures; initiate pre-feasibility studies for sub-regional pilot projects; develop inter-agency agreements for structural projects, initiate planning for on-site measures; initiate monitoring, additional studies, and source identification activities. The 2007 re-opener would follow Phase I. Note that Phase I is assumed to begin in November 2005, which is the basis of the proposed schedule. Should the initiation date change, the remaining implementation deadlines may change accordingly.

- Phase II – Continue implementation of committed non-structural activities; conduct non-structural pilot programs; continue planning for on-site measures; initiate planning and construction of pilot regional structural solutions; and continue and complete monitoring and source identification studies. A re-evaluation is proposed to follow Phase II and is intended to leverage results not only from additional studies in these jurisdictional areas, but also from advances in the technical, legal, and regulatory body of knowledge.

- Phase III – Refocus and reprioritize efforts as appropriate, and continue implementation of committed non-structural activities; implement successful piloted non-structural programs; begin implementation of on-site measures; and operate and evaluate pilot regional structural solutions.

- Phase IV – Refocus and reprioritize efforts as appropriate and continue implementation of non-structural solutions; continue or expand on-site measures; and continue, modify and/or initiate regional structural solutions.

Additional studies are proposed to support management and regulatory decision-making for the 2007 re-opener, as well as proposed additional re-openers. Upon completion of the initial two years of monitoring, an evaluation will be made to determine whether microbial source tracking activities are required. Rationale for recommending such studies could include, but not be limited to, the need for further source identification; site specific, objective data development; and potential health risk assessments. This may include an evaluation of the appropriateness of the TMDL indicator constituents of concern.

Studies that would contribute to more cost-effective implementation of the bacteria TMDL, and which could be included in the J1/4 implementation effort include:

- Identification of the Most Relevant Human Health Indicators Study (2007-2009)
- Hydrology vs. Bacteria Loading Study (2005-2010)
- Bacterial Seasonal Variation Study (2005-2008)

Potential program budgets are not provided, but would eventually be considered for preliminary programmatic budgetary planning only. An initial budget analysis did not include those activities that are *considered* for implementation, but do include activities that are committed to or implemented on a *pilot* scale. In addition, specific allocation of costs between jurisdictional agencies was not addressed in this Plan.

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U.S. Census Bureau. www.census.gov

APPENDIX A

State of California
California Regional Water Quality Control Board, Los Angeles Region

RESOLUTION NO. 2002-022
December 12, 2002

Amendment to the Water Quality Control Plan (Basin Plan) for the Los Angeles Region to Incorporate Implementation Provisions for the Region's Bacteria Objectives and to Incorporate a Wet-Weather Total Maximum Daily Load for Bacteria at Santa Monica Bay Beaches

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region, finds that:

1. The federal Clean Water Act (CWA) requires the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) to develop water quality standards which include beneficial use designations and criteria to protect beneficial uses for each water body found within its region.

2. The Regional Board carries out its CWA responsibilities through California's Porter-Cologne Water Quality Control Act and establishes water quality objectives designed to protect beneficial uses contained in the Water Quality Control Plan for the Los Angeles Region (Basin Plan).

3. Section 303(d) of the CWA requires states to identify and to prepare a list of water bodies that do not meet water quality standards and then to establish load and waste load allocations, or a total maximum daily load (TMDL), for each water body that will ensure attainment of water quality standards and then to incorporate those allocations into their water quality control plans.

4. Many of the beaches along Santa Monica Bay were listed on California's 1998 section 303(d) list, due to impairments for coliform or for beach closures associated with bacteria generally. The beaches appeared on the 303(d) list because the elevated bacteria and beach closures prevented full support of the beaches' designated use for water contact recreation (REC-1).

5. A consent decree between the U.S. Environmental Protection Agency (USEPA), Heal the Bay, Inc. and BayKeeper, Inc. was approved on March 22, 1999. This court order directs the USEPA to complete TMDLs for all the Los Angeles Region's impaired waters within 13 years. A schedule was established in the consent decree for the completion of 29 TMDLs within 7 years, including completion of a TMDL to reduce bacteria at Santa Monica Bay beaches by March 2002. The remaining TMDLs will be scheduled by Regional Board staff within the 13-year period.

6. The elements of a TMDL are described in 40 CFR 130.2 and 130.7 and section 303(d) of the CWA, as well as in USEPA guidance documents (e.g., USEPA, 1991). A TMDL 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). Regulations further stipulate that TMDLs must be set at "levels necessary to attain and maintain the applicable narrative and numeric water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations

and water quality" (40 CFR 130.7(c)(1)). The provisions in 40 CFR 130.7 also state that TMDLs shall take into account critical conditions for stream flow, loading and water quality parameters.

7. Upon establishment of TMDLs by the State or USEPA, the State is required to incorporate the TMDLs along with appropriate implementation measures into the State Water Quality Management Plan (40 CFR 130.6(c)(1), 130.7). The Basin Plan and applicable statewide plans serve as the State Water Quality Management Plans governing the watersheds under the jurisdiction of the Regional Board.

8. Santa Monica Bay is located in Los Angeles County, California. The proposed TMDL addresses documented bacteriological water quality impairments at 44 beaches from the Los Angeles/Ventura County line, to the northwest, to Outer Cabrillo Beach, just south of the Palos Verdes Peninsula.

9. The Regional Board is establishing the above-mentioned TMDL to preserve and enhance the water quality at Santa Monica Bay beaches and for the benefit of the 55 million beachgoers, on average, that visit these beaches each year. At stake is the health of swimmers and surfers and associated health costs as well as sizeable revenues to the local and state economy. Estimates are that visitors to Santa Monica Bay beaches spend approximately $1.7 billion annually.

10. The Regional Board's goal in establishing the above-mentioned TMDL is to reduce the risk of illness associated with swimming in marine waters contaminated with bacteria. Local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects, such as gastroenteritis and upper respiratory illness, and recreational water quality, as measured by bacteria indicator densities. The water quality objectives on which the TMDL numeric targets are based will ensure that the risk of illness to the public from swimming at Santa Monica Bay beaches generally will be no greater than 19 illnesses per 1,000 swimmers, which is defined by the US EPA as an "acceptable health risk"in marine recreational waters.

11. Interested persons and the public have had reasonable opportunity to participate in review of the amendment to the Basin Plan. Efforts to solicit public review and comment include staff presentations to the Santa Monica Bay Restoration Project's Bay Watershed Council and Technical Advisory Committee between May 1999 and October 2001 and creation of a Steering Committee in July 1999 to provide input on scientific and technical components of the TMDL with participation by the Southern California Coastal Water Research Project, City of Los Angeles, County of Los Angeles Department of Public Works, County Sanitation Districts of Los Angeles County, Heal the Bay, and Santa Monica Bay Restoration Project.

12. A first draft of the TMDL for bacteria at Santa Monica Bay beaches was released for public comment on November 9, 2001; an interim draft TMDL covering wet weather only was released on June 21, 2002, for discussion at a public workshop; and a public workshop on the draft Wet-Weather TMDL was held on June 27, 2002 at a regularly scheduled Regional Board meeting.

13. A final draft of the Wet-Weather TMDL along with a Notice of Hearing and Notice of Filing were published and circulated 45 days preceding Board action; Regional Board staff responded to oral and written comments received from the public; and the Regional Board

held a public hearing on September 26, 2002 to consider adoption of the Wet-Weather TMDL.

14. The Regional Board continued the item from the September 26, 2002 Board meeting to the December 12, 2002 Board meeting to give staff time to make revisions based on public comments and Board discussion at the September 26, 2002 Board meeting. Specifically, the Board wanted an implementation program that was reasonable and as short as practicable given the testimony on impairments to the REC-1 beneficial use.

15. The Regional Board recognizes that there are two broad approaches to implementing the TMDL. One approach is an integrated water resources approach that takes a holistic view of regional water resources management by integrating planning for future wastewater, storm water, recycled water, and potable water needs and systems; focuses on beneficial re-use of storm water, including groundwater infiltration, at multiple points throughout a watershed; and addresses multiple pollutants for which Santa Monica Bay or its watershed are listed on the CWA section 303(d) List as impaired. The other approach is a non-integrated water resources approach.

    Some responsible jurisdictions and agencies have indicated a preference to take an integrated water resources approach to realize the benefits of re-using storm water to preserve local groundwater resources and to reduce reliance on imported water. The Regional Board recognizes that an integrated water resources approach not only provides water quality benefits to the people of the Los Angeles Region, but also recognizes that the responsible jurisdictions implementing this TMDL can serve a variety of public purposes by adopting an integrated water resources approach. An integrated water resources approach will address multiple pollutants, and as a result, responsible jurisdictions can recognize cost-savings because capital expenses for the integrated approach will implement several TMDLs that address pollutants in storm water. In addition, jurisdictions serve multiple roles for their citizenry, and an integrated approach allows for the incorporation and enhancement of other public goals such as water supply, recycling and storage; environmental justice; parks, greenways and open space; and active and passive recreational and environmental education opportunities.

    The Regional Board acknowledges that a longer timeframe is reasonable for an integrated water resources approach because it requires more complicated planning and implementation such as identifying markets for the water and efficiently siting storage and transmission infrastructure within the watershed(s) to realize the multiple benefits of such an approach.

16. Therefore, after considering testimony, the Regional Board directed staff to adjust the implementation provisions of the TMDL to allow for a longer implementation schedule (up to 18 years) only when the responsible jurisdictions and agencies clearly demonstrate their intention to undertake an integrated water resources approach and justify the need for a longer implementation schedule. In contrast, testimony indicated that a shorter implementation schedule (up to 10 years) is reasonable and practicable for non-integrated approaches because the level of planning is not as complicated.

17. A revised draft of the Basin Plan amendment and Tentative Resolution were circulated 45 days preceding Board action. Regional Board staff responded to oral and written comments received from the public on the revised draft. The Regional Board held a second public hearing on December 12, 2002 to consider adoption of the Wet-Weather TMDL.

18. On October 25, 2001, the Regional Board adopted Resolution 2001-018 establishing revised bacteriological water quality objectives for the Water Contact Recreation (REC-1) beneficial use, and the TMDL is intended to accompany and to implement the revised water quality objectives. The State Water Resources Control Board approved the Regional Board's Basin Plan amendment on July 18, 2002 in State Board Resolution 2002-0142, the Office of Administrative Law approved it on September 19, 2002 in OAL File No. 02-0807-01-S, and the US EPA approved it on September 25, 2002.

19. Under certain circumstances and through the TMDL development process, the Regional Board proposes to implement the aforementioned revised bacteria objectives using either a 'reference system/anti-degradation approach' or a 'natural sources exclusion approach.' As required by the CWA and Porter-Cologne Water Quality Control Act, the Basin Plan includes beneficial uses of waters, water quality objectives to protect those uses, an anti-degradation policy, collectively referred to as water quality standards, and other plans and policies necessary to implement water quality standards. This TMDL and its associated waste load allocations, which will be incorporated into relevant permits, are the vehicles for implementation of the bacteria standards as required under Water Code section 13242.

20. Both the 'reference system/anti-degradation approach' and the 'natural sources exclusion approach' recognize that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives.

21. The Regional Board's intent in implementing the bacteria objectives using a 'reference system/anti-degradation approach' is to ensure that bacteriological water quality is at least as good as that of a reference site and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of a reference site. The Regional Board's intent in implementing the bacteria objectives using a 'natural sources exclusion approach' is to ensure that all anthropogenic sources of bacteria are controlled such that they do not cause an exceedance of the single sample objectives. These approaches are consistent with state and federal anti-degradation policies (State Board Resolution No. 68-16 and 40 C.F.R. 131.12), while acknowledging that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas. While treatment and diversion of natural sources may fully address the impairment of the water contact recreation beneficial use, such an approach may adversely affect valuable aquatic life and wildlife beneficial uses in the Region.

22. For the Wet-Weather and Dry-Weather Bacteria TMDLs at Santa Monica Bay beaches, Leo Carrillo Beach and its associated drainage area, Arroyo Sequit Canyon, were selected as the local reference system until other reference sites or approaches are evaluated and the necessary data collected to support the use of alternative reference sites or approaches when the TMDL is revised four years after the effective date. Leo Carrillo Beach was selected as the interim reference site because it best met the three criteria for selection of a reference system. Specifically, its drainage is the most undeveloped subwatershed in the larger Santa Monica Bay watershed, the subwatershed has a freshwater outlet (i.e., creek) to the beach, and adequate historical shoreline monitoring data were available. It is the intent of the Regional Board to re-evaluate the use of Leo Carrillo Beach due to potential problems arising from the heavy recreational use of the beach and the close proximity of two campgrounds.

23. Northern Bay beach monitoring sites are fewer in number and provide less comprehensive data than the extensive shoreline monitoring network elsewhere in Santa Monica Bay.

24. The numeric targets in this TMDL are not water quality objectives and do not create new bases for enforcement against dischargers apart from the water quality objectives they translate. The targets merely establish the bases through which load allocations and wasteload allocations (WLAs) are calculated. WLAs are only enforced for a dicharger's own discharges, and then only in the context of it National Pollutant Discharge Elimination System (NPDES) permit, which must be consistent with the assumptions and requirements of the WLA. The Regional Board will develop permit requirements through a subsequent permit action that will allow all interested persons, including but not limited to municipal storm water dischargers, to provide comments on how the waste load allocations will be translated into permit requirements.

25. The Regional Board has the authority to authorize compliance schedules through the basin planning process. In this Basin Plan amendment, the Regional Board establishes a schedule for implementation that affords the responsible jurisdictions and agencies up to ten or eighteen years, depending on the implementation approaches pursued, to implement this Wet-Weather Bacteria TMDL.

26. Previously, the Regional Board adopted a Dry-Weather Bacteria TMDL for the Santa Monica Bay Beaches. The Dry-Weather TMDL includes implementation provisions contained in Table 7-4.3 of the Basin Plan, including a provision to reconsider two years after the effective date the Dry-Weather TMDL and specifically the reference beach(es) used. Because that effort overlaps with reconsideration of the reference beach(es) anticipated by this Wet-Weather TMDL, the Regional Board proposes to coordinate the reconsiderations of the reference beach approach to assure efficiency and consistency in implementing the two Santa Monica Beaches TMDLs.

27. The basin planning process has been certified as functionally equivalent to the California Environmental Quality Act requirements for preparing environmental documents (Public Resources Code, Section 21000 et seq.) and as such, the required environmental documentation and CEQA environmental checklist have been prepared.

28. The proposed amendment results in no potential for adverse effect (de minimis finding), either individually or cumulatively, on wildlife.

29. The regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, section 11353, subdivision (b).

30. The Basin Plan amendment incorporating a TMDL for bacteria at Santa Monica Bay beaches must be submitted for review and approval by the State Water Resources Control Board (State Board), the State Office of Administrative Law (OAL), and the USEPA. The Basin Plan amendment will become effective upon approval by OAL and USEPA. A Notice of Decision will be filed.

THEREFORE, be it resolved that pursuant to Section 13240 and 13242 of the Water Code, the Regional Board hereby amends the Basin Plan as follows:

1. Pursuant to sections 13240 and 13242 of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby adopts the amendments to Chapters 3 and 7 of the Water Quality Control Plan for the Los Angeles Region, as set forth in Attachment A hereto, to incorporate the elements of the Santa Monica

Bay Beaches Bacteria TMDL for wet weather and to implement the water quality objectives for bacteria set to protect the water contact recreation beneficial use.

2. Pursuant to sections 13240 and 13242 of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby adopts the amendments to Chapter 7 of the Water Quality Control Plan for the Los Angeles Region, as set forth in Attachment B hereto, to amend Table 7-4.3 of the Santa Monica Bay Beaches Bacteria TMDL for dry weather to change the date for revision of the TMDL from two years after the effective date to four years after the effective date [of the Wet-Weather TMDL] to achieve consistency in scheduling between the Dry-Weather and Wet-Weather TMDLs.

3. The Executive Officer is directed to exercise authority under Water Code section 13267, or other applicable law, to require additional monitoring data in the northern Bay beach regions to ensure that wet weather bacteria exposure is adequately quantified before the TMDL is reconsidered in four years.

4. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Board in accordance with the requirements of section 13245 of the California Water Code.

5. The Regional Board requests that the State Board approve the Basin Plan amendment in accordance with the requirements of sections 13245 and 13246 of the California Water Code and forward it to OAL and the USEPA.

6. If during its approval process the State Board or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Board of any such changes.

7. The Executive Officer is authorized to sign a Certificate of Fee Exemption.

I, Dennis A. Dickerson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Los Angeles Region, on December 12, 2002.

ORIGINAL SIGNED BY
Dennis A. Dickerson
Executive Officer

Attachment A to Resolution No. 2002-022

Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate Implementation Provisions for the Region's Bacteria Objectives and to incorporate the Santa Monica Bay Beaches Wet-Weather Bacteria TMDL

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on December 12, 2002.

Amendments:

List of Figures, Tables and Inserts

Add under Chapter 7, Section 7-4 (Santa Monica Bay Beaches Bacteria TMDL):

Tables

7-4.4. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Elements

7-4.5. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Final Allowable Exceedance Days by Beach Location

7-4.6. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Interim Compliance Targets by Jurisdictional Groups

7-4.7. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Significant Dates

Chapter 3. Water Quality Objectives, "Bacteria, Coliform"

Add under "Implementation Provisions for Water Contact Recreation Bacteria Objectives"

The single sample bacteriological objectives shall be strictly applied except when provided for in a Total Maximum Daily Load (TMDL). In all circumstances, including in the context of a TMDL, the geometric mean objectives shall be strictly applied. In the context of a TMDL, the Regional Board may implement the single sample objectives in fresh and marine waters by using a 'reference system/antidegradation ap□roach' or 'natural sources exclusion approach' as discussed below. A reference system is defined as an area and associated monitoring point that is not impacted by human activities that potentially affect bacteria densities in the receiving water body.

These approaches recognize that there are natural sources of bacteria, which may cause or contribute to exceedances of the single sample objectives for bacterial indicators. They also acknowledge that it is not the intent of the Regional Board to require treatment or diversion of natural water bodies or to require treatment of natural sources of bacteria from undeveloped areas. Such requirements, if imposed by the Regional Board, could adversely affect valuable aquatic life and wildlife beneficial uses supported by natural water bodies in the Region.

Under the reference system/antidegradation implementation procedure, a certain frequency of exceedance of the single sample objectives above shall be permitted on the basis of the observed exceedance frequency in the selected reference system or the targeted water body, whichever is less. The reference system/anti-degradation approach ensures that bacteriological water quality is at least as good as that of a reference system and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of the selected reference system.

Under the natural sources exclusion implementation procedure, after all anthropogenic sources of bacteria have been controlled such that they do not cause or contribute to an exceedance of the single sample objectives and natural sources have been identified and quantified, a certain frequency of exceedance of the single sample objectives shall be permitted based on the residual exceedance frequency in the specific water body. The residual exceedance frequency shall define the background level of exceedance due to natural sources. The 'natural sources exclusion' approach may be used if an appropriate reference system cannot be identified due to unique characteristics of the target water body. These approaches are

consistent with the State Antidegradation Policy (State Board Resolution No. 68-16) and with federal antidegradation requirements (40 CFR 131.12).

The appropriateness of these approaches and the specific exceedance frequencies to be permitted under each will be evaluated within the context of TMDL development for a specific water body, at which time the Regional Board may select one of these approaches, if appropriate.

These implementation procedures may only be implemented within the context of a TMDL addressing municipal storm water, including the municipal storm water requirements of the Statewide Permit for Storm Water Discharges from the State of California Department of Transportation (Caltrans), and non-point sources discharges. These implementation provisions do not apply to NPDES discharges other than MS4 discharges.[1]

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries, Section 7-4 (Santa Monica Bay Beaches Bacteria TMDL)

Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only)*

This TMDL was adopted by the Regional Water Quality Control Board on December 12, 2002.

This TMDL was approved by:

The State Water Resources Control Board on [Insert Date].
The Office of Administrative Law on [Insert Date].
The U.S. Environmental Protection Agency on [Insert Date].

The following table summarizes the key elements of this TMDL.

[1] Municipal storm water discharges in the Los Angeles Region are those with permits under the Municipal Separate Storm Sewer System (MS4) NPDES Program. For example, the MS4 permits at the time of this amendment are the Los Angeles County Municipal Storm Water NPDES Permit, Ventura County Municipal Storm Water NPDES Permit, City of Long Beach Municipal Storm Water NPDES Permit, and elements of the statewide storm water permit for the California Department of Transportation (Caltrans).

Table 7-4.4. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Elements

Element	Key Findings and Regulatory Provisions
Problem Statement	Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at many Santa Monica Bay (SMB) beaches. Swimming in waters with elevated bacterial indicator densities has long been associated with adverse health effects. Specifically, local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects and recreational water quality, as measured by bacterial indicator densities.
Numeric Target *(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)*	The TMDL has a multi-part numeric target based on the bacteriological water quality objectives for marine water to protect the water contact recreation (REC-1) use. These targets are the most appropriate indicators of public health risk in recreational waters. These bacteriological objectives are set forth in Chapter 3 of the Basin Plan, as amended by the Regional Board on October 25, 2001. The objectives are based on four bacterial indicators and include both geometric mean limits and single sample limits. The Basin Plan objectives that serve as numeric targets for this TMDL are: 1. Rolling 30-day Geometric Mean Limits a. Total coliform density shall not exceed 1,000/100 ml. b. Fecal coliform density shall not exceed 200/100 ml. c. Enterococcus density shall not exceed 35/100 ml. 2. Single Sample Limits a. Total coliform density shall not exceed 10,000/100 ml. b. Fecal coliform density shall not exceed 400/100 ml. c. Enterococcus density shall not exceed 104/100 ml. d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1. These objectives are generally based on an acceptable health risk for marine recreational waters of 19 illnesses per 1,000 exposed individuals as set by the US EPA (US EPA, 1986). The targets apply throughout the year. The final compliance point for the targets is the wave wash[2] where there is a freshwater outlet (i.e., publicly-owned storm drain or natural creek) to the beach, or at ankle depth at beaches without a freshwater outlet. Implementation of the above bacteria objectives and the associated TMDL numeric targets is achieved using a 'reference system/anti-degradation approach' rather than the alternative 'natural sources exclusion approach' or strict application of the single sample objectives. As required by the CWA and Porter-Cologne Water Quality Control Act, Basin Plans include beneficial uses of waters, water quality objectives to protect those uses, an anti-degradation policy, collectively referred to as water quality standards, and other plans and policies necessary to implement water quality standards. This TMDL and its associated waste load allocations, which shall be incorporated into relevant permits, are the vehicles for implementation of the Region's

[2] The wave wash is defined as the point at which the storm drain or creek empties and the effluent from the storm drain initially mixes with the receiving ocean water.

Element	Key Findings and Regulatory Provisions
	standards. The 'reference system/anti-degradation approach' means that on the basis of historical exceedance levels at existing shoreline monitoring locations, including a local reference beach within Santa Monica Bay, a certain number of daily exceedances of the single sample bacteria objectives are permitted. The allowable number of exceedance days is set such that (1) bacteriological water quality at any site is at least as good as at a designated reference site within the watershed and (2) there is no degradation of existing shoreline bacteriological water quality. This approach recognizes that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives and that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas. The geometric mean targets may not be exceeded at any time. The rolling 30-day geometric means will be calculated on each day. If weekly sampling is conducted, the weekly sample result will be assigned to the remaining days of the week in order to calculate the daily rolling 30-day geometric mean. For the single sample targets, each existing shoreline monitoring site is assigned an allowable number of exceedance days during wet weather, defined as days with 0.1 inch of rain or greater and the three days following the rain event. (A separate amendment incorporating the Santa Monica Bay Beaches Dry-Weather Bacteria TMDL addressed the allowable number of summer and winter dry-weather exceedance days.)
Source Analysis	With the exception of isolated sewage spills, storm water runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to SMB beaches during wet weather. Because the bacterial indicators used as targets in the TMDL are not specific to human sewage, storm water runoff from undeveloped areas may also be a source of elevated bacterial indicator densities. For example, storm water runoff from natural areas may convey fecal matter from wildlife and birds or bacteria from soil. This is supported by the finding that, at the reference beach, the probability of exceedance of the single sample targets during wet weather is 0.22.
Loading Capacity	Studies show that bacterial degradation and dilution during transport from the watershed to the beach do not significantly affect bacterial indicator densities at SMB beaches. Therefore, the loading capacity is defined in terms of bacterial indicator densities, which is the most appropriate for addressing public health risk, and is equivalent to the numeric targets, listed above. As the numeric targets must be met in the wave wash and throughout the day, no degradation allowance is provided.
Waste Load Allocations *(for point sources)*	Waste load allocations are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets identified under "Numeric Target." Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

Element	Key Findings and Regulatory Provisions
	For each shoreline monitoring site and corresponding subwatershed, an allowable number of exceedance days is set for wet weather. The allowable number of exceedance days for a shoreline monitoring site for each time period is based on the lesser of two criteria (1) exceedance days in the designated reference system and (2) exceedance days based on historical bacteriological data at the monitoring site. This ensures that shoreline bacteriological water quality is at least as good as that of a largely undeveloped system and that there is no degradation of existing shoreline bacteriological water quality. All responsible jurisdictions and responsible agencies[3] within a subwatershed are jointly responsible for complying with the allowable number of exceedance days for each associated shoreline monitoring site identified in Table 7-4.5 below. The three Publicly Owned Treatment Works (POTWs), the City of Los Angeles' Hyperion Wastewater Treatment Plant, Los Angeles County Sanitation Districts' Joint Water Pollution Control Plant, and the Las Virgenes Municipal Water Districts' Tapia Wastewater Reclamation Facility, discharging to Santa Monica Bay are each given individual WLAs of zero (0) days of exceedance during wet weather.

[3] For the purposes of this TMDL, "responsible jurisdictions and responsible agencies" are defined as: (1) local agencies that are responsible for discharges from a publicly owned treatment works to the Santa Monica Bay watershed or directly to the Bay, (2) local agencies that are permittees or co-permittees on a municipal storm water permit, (3) local or state agencies that have jurisdiction over a beach adjacent to Santa Monica Bay, and (4) the California Department of Transportation pursuant to its storm water permit.

Element	Key Findings and Regulatory Provisions
Load Allocations *(for nonpoint sources)*	Because all storm water runoff to SMB beaches is regulated as a point source, load allocations of zero days of exceedance are set in this TMDL. If a nonpoint source is directly impacting shoreline bacteriological quality and causing an exceedance of the numeric target(s), the permittee(s) under the Municipal Storm Water NPDES Permits are not responsible through these permits. However, the jurisdiction or agency adjacent to the shoreline monitoring location may have further obligations as described under "Compliance Monitoring" below.
Implementation	The regulatory mechanisms used to implement the TMDL will include primarily the Los Angeles County Municipal Storm Water NPDES Permit (MS4 Permit), the Caltrans Storm Water Permit, the three NPDES permits for the POTWs, the authority contained in sections 13267 and 13263 of the Water Code, and regulations to be adopted pursuant to section 13291 of the Water Code. Each NPDES permit assigned a waste load allocation shall be reopened or amended at reissuance, in accordance with applicable laws, to incorporate the applicable waste load allocation(s) as a permit requirement. The implementation schedule will be determined on the basis of the implementation plan(s), which must be submitted to the Regional Board by responsible jurisdictions and agencies within two years of the effective date of the TMDL (see Table 7-4.7). After considering the implementation plan(s), the Regional Board shall amend the TMDL at a public hearing and, in doing so, will adopt an individual implementation schedule for each jurisdictional group (described in paragraph 3 below) that is as short as possible taking into account the implementation approach being undertaken. Responsible jurisdictions and agencies must clearly demonstrate in the above-mentioned plan whether they intend to pursue an integrated water resources approach.[4] If an integrated water resources approach is pursued, responsible jurisdictions and agencies may be allotted up to an 18-year implementation timeframe, based on a clear demonstration of the need for a longer schedule in the implementation plan, in recognition of the additional planning and time needed to achieve the multiple benefits of this approach. Otherwise, at most a 10-year implementation timeframe will be allotted, depending upon a clear demonstration of the time needed in the implementation plan. The subwatersheds associated with each beach monitoring location may

[4] An integrated water resources approach is one that takes a holistic view of regional water resources management by integrating planning for future wastewater, storm water, recycled water, and potable water needs and systems; focuses on beneficial re-use of storm water, including groundwater infiltration, at multiple points throughout a watershed; and addresses multiple pollutants for which Santa Monica Bay or its watershed are listed on the CWA section 303(d) List as impaired. Because an integrated water resources approach will address multiple pollutants, responsible jurisdictions can recognize cost-savings because capital expenses for the integrated approach will implement several TMDLs that address pollutants in storm water. An integrated water resources approach shall not only provide water quality benefits to the people of the Los Angeles Region, but it is also anticipated that an integrated approach will incorporate and enhance other public goals. These may include, but are not limited to, water supply, recycling and storage; environmental justice; parks, greenways and open space; and active and passive recreational and environmental education opportunities.

Element	Key Findings and Regulatory Provisions
	include multiple responsible jurisdictions and responsible agencies. Therefore, a "primary jurisdiction," defined as the jurisdiction comprising greater than fifty percent of the subwatershed land area, is identified for each subwatershed (see Table 7-4.6).[5] Seven primary jurisdictions are identified within the Santa Monica Bay watershed, each with a group of associated subwatersheds and beach monitoring locations. These are identified as "jurisdictional groups" (see Table 7-4.6). The primary jurisdiction of each "jurisdictional group" shall be responsible for submitting the implementation plan described above, which will determine the implementation timeframe for the subwatershed. A jurisdictional group may change its primary jurisdiction by submitting a joint, written request, submitted by the current primary jurisdiction and the proposed primary jurisdiction, to the Executive Officer requesting a reassignment of primary responsibility. Two jurisdictional groups may also choose to change the assignment of monitoring locations between the two groups by submitting a joint, written request, submitted by the current primary jurisdiction and the proposed primary jurisdiction, to the Executive Officer requesting a reassignment of the monitoring location. If an integrated water resources approach is pursued, the jurisdictional group(s) must achieve a 10% cumulative percentage reduction from the total exceedance-day reduction required for the group of beach monitoring locations within 6 years, a 25% reduction within 10 years, and a 50% reduction within 15 years of the effective date of the TMDL. These interim milestones for the jurisdictional group(s) will be re-evaluated, considering planning, engineering and construction tasks, based on the written implementation plan submitted to the Regional Board two years after the effective date of the TMDL (see Table 7-4.7). If an integrated water resources approach is not pursued, the jurisdictional group(s) must achieve a 25% cumulative percentage reduction from the total exceedance-day reduction required for the group of beach monitoring locations within 6 years, and a 50% reduction within 8 years of the effective date of the TMDL (see Table 7-4.7). For those beach monitoring locations subject to the antidegradation provision, there shall be no increase in exceedance days during the implementation period above that estimated for the beach monitoring location in the critical year as identified in Table 7-4.5. The final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach location no later than 18 years after the TMDL's effective date if an integrated water resources approach is pursued, or no later than 10 years after the TMDL's effective date if an integrated water resources approach is not pursued. In addition, the geometric mean targets must be achieved for each individual beach location no later than 18 years or 10 years after the effective date, respectively, depending on whether a integrated

[5] Primary jurisdictions are not defined for the Ballona Creek subwatershed or the Malibu Creek subwatershed, since separate bacteria TMDLs are being developed for these subwatersheds.

Element	Key Findings and Regulatory Provisions
	water resources approach is pursued or not.

Element	Key Findings and Regulatory Provisions
Margin of Safety	The TMDL is set at levels that are exactly equivalent to the applicable water quality standards along with the proposed reference system/antidegradation implementation procedure. An implicit margin of safety is included in the supporting water quality model by assuming no dilution between the storm drain and the wave wash, the point of compliance. This is a conservative assumption since studies have shown that there is a high degree of variability in the amount of dilution between the storm drain and wave wash temporally, spatially and among indicators, ranging from 100% to 0%.
Seasonal Variations and Critical Conditions	Seasonal variations are addressed by developing separate waste load allocations for three time periods (wet weather, summer dry weather and winter dry weather) based on public health concerns and observed natural background levels of exceedance of bacterial indicators. (The two dry-weather periods are addressed in the Santa Monica Bay Beaches Dry-Weather Bacteria TMDL.) The critical condition for this bacteria TMDL is wet weather generally, when historic shoreline monitoring data for the reference beach indicate that the single sample bacteria objectives are exceeded on 22% of the wet-weather days sampled. To more specifically identify a critical condition within wet weather in order to set the allowable exceedance days shown in Tables 7-4.5 and 7-4.6, the 90th percentile 'storm year'[6] in terms of wet days is used as the reference year. Selecting the 90th percentile year avoids a situation where the reference beach is frequently out of compliance. It is expected that because responsible jurisdictions and agencies will be planning for this 'worst-case' scenario, there will be fewer exceedance days than the maximum allowed in drier years. Conversely, in the 10% of wetter years, it is expected that there may be more than the allowable number of exceedance days.
Compliance Monitoring	Responsible jurisdictions and agencies as defined in Footnote 2 shall conduct daily or systematic weekly sampling in the wave wash at all major drains[7] and creeks or at existing monitoring stations at beaches without storm drains or freshwater outlets to determine compliance.[8] At all locations, samples shall be taken at ankle depth and on an incoming wave. At locations where there is a freshwater outlet, during wet weather, samples should be taken as close as possible to the wave wash, and no further away than 10 meters down current of the storm drain or outlet.[9] At locations where there is a freshwater outlet, samples shall be taken when the freshwater outlet is flowing into the surf zone. If the number of exceedance days is greater than the allowable number of exceedance days for any jurisdictional group at the interim implementation milestones the responsible jurisdictions and agencies

[6] For purposes of this TMDL, a 'storm year' means November 1 to October 31. The 90th percentile storm year was 1993 with 75 wet days at the LAX meteorological station.

[7] Major drains are those that are publicly owned and have measurable flow to the beach during dry weather.

[8] The frequency of sampling (i.e., daily versus weekly) will be at the discretion of the implementing agencies. However, the number of sample days that may exceed the objectives will be scaled accordingly.

[9] Safety considerations during wet weather may preclude taking a sample in the wave wash.

Element	Key Findings and Regulatory Provisions
	shall be considered out-of-compliance with the TMDL. If the number of exceedance days exceeds the allowable number of exceedance days for a target beach at the final implementation deadline, the responsible jurisdictions and agencies within the contributing subwatershed shall be considered out-of-compliance with the TMDL. Responsible jurisdictions or agencies shall not be deemed out of compliance with the TMDL if the investigation described in the paragraph below demonstrates that bacterial sources originating within the jurisdiction of the responsible agency have not caused or contributed to the exceedance. If a single sample shows the discharge or contributing area to be out of compliance, the Regional Board may require, through permit requirements or the authority contained in Water Code section 13267, daily sampling in the wave wash or at the existing open shoreline monitoring location (if it is not already) until all single sample events meet bacteria water quality objectives. Furthermore, if a beach location is out-of-compliance as determined in the previous paragraph, the Regional Board shall require responsible agencies to initiate an investigation, which at a minimum shall include daily sampling in the wave wash or at the existing open shoreline monitoring location until all single sample events meet bacteria water quality objectives. If bacteriological water quality objectives are exceeded in any three weeks of a four-week period when weekly sampling is performed, or, for areas where testing is done more than once a week, 75% of testing days produce an exceedence of bacteria water quality objectives, the responsible agencies shall conduct a source investigation of the subwatershed(s) pursuant to protocols established under Water Code 13178. If a beach location without a freshwater outlet is out-of-compliance or if the outlet is diverted or being treated, the adjacent municipality, County agency(s), or State or federal agency(s) shall be responsible for conducting the investigation and shall submit its findings to the Regional Board to facilitate the Regional Board exercising further authority to regulate the source of the exceedance in conformance with the Porter-Cologne Water Quality Control Act.

Note: The complete staff report for the TMDL is available for review upon request.

Attachment A to Resolution No. 2002-022

Table 7-4.5. Final Allowable Wet-Weather Exceedance Days by Beach Location

Beach Monitoring Location	Estimated no. of wet weather exceedance days in critical year (90th percentile)*	Final allowable no. of wet weather exceedance days (daily sampling)*
DHS 010 - Leo Carrillo Beach, at 35000 PCH	17	17
DHS 009 - Nicholas Beach- 100 feet west of lifeguard tower	14	14
DHS 010a - Broad Beach	15	15
DHS 008 - Trancas Beach entrance, 50 yards east of Trancas Bridge	19	17
DHS 007 - Westward Beach, east of Zuma Creek	17	17
DHS 006 - Paradise Cove, adjacent to west side of Pier	23	17
DHS 005 - Latigo Canyon Creek entrance	33	17
DHS 005a - Corral State Beach	17	17
DHS 001a - Las Flores Beach	29	17
DHS 001 - Big Rock Beach, at 19900 PCH	30	17
DHS 003 - Malibu Point	18	17
DHS 003a - Surfrider Beach (second point)- weekly	45	17
S1 - Surfrider Beach (breach point)- daily	47	17
DHS 002 - Malibu Pier- 50 yards east	45	17
S2 - Topanga State Beach	26	17
DHS 101 - PCH and Sunset Bl.- 400 yards east	25	17
DHS 102 - 16801 Pacific Coast Highway, Bel Air Bay Club (chain fence)	28	17
S3 - Pulga Canyon storm drain- 50 yards east	23	17
DHS 103 - Will Rogers State Beach- Temescal Canyon (25 yrds. so. of drain)	31	17
S4 - Santa Monica Canyon, Will Rogers State Beach	25	17
DHS 104a - Santa Monica Beach at San Vicente Bl.	34	17
DHS 104 - Santa Monica at Montana Av. (25 yrds. so. of drain)	31	17
DHS 105 - Santa Monica at Arizona (in front of the drain)	31	17
S5 - Santa Monica Municipal Pier- 50 yards southeast	35	17
S6 - Santa Monica Beach at Pico/Kenter storm drain	42	17
DHS 106 - Santa Monica Beach at Strand St. (in front of the restrooms)	36	17
DHS 106a - Ashland Av. storm drain- 50 yards north	39	17
S7 - Ashland Av. storm drain- 50 yards south	22	17
DHS 107 - Venice City Beach at Brooks Av. (in front of the drain)	40	17

Attachment A to Resolution No. 2002-022

Beach Monitoring Location	Estimated no. of wet weather exceedance days in critical year (90th percentile)*	Final allowable no. of wet weather exceedance days (daily sampling)*
S8 - Venice City Beach at Windward Av.- 50 yards north	13	13
DHS 108 - Venice Fishing Pier- 50 yards south	17	17
DHS 109 - Venice City Beach at Topsail St.	38	17
S11 - Dockweiler State Beach at Culver Bl.	23	17
DHS 110 - Dockweiler State Beach- south of D&W jetty	30	17
S12 - Imperial HWY storm drain- 50 yards north	17	17
DHS 111 - Hyperion Treatment Plant One Mile Outfall	18	17
DHS 112 - Dockweiler State Beach at Grand Av. (in front of the drain)	25	17
S10 - Ballona Creek entrance- 50 yards south	34	17
S13 - Manhattan State Beach at 40th Street	4	4
S14 - Manhattan Beach Pier- 50 yards south	5	5
DHS 114 - Hermosa City Beach at 26th St.	12	12
S15 - Hermosa Beach Pier- 50 yards south	8	8
DHS 115 - Herondo Street storm drain- (in front of the drain)	19	17
S16 - Redondo Municipal Pier- 50 yards south	14	14
DHS 116 - Redondo State Beach at Topaz St. - north of jetty	19	17
S17 - Redondo State Beach at Avenue I	6	6
S18 - Malaga Cove, Palos Verdes Estates-daily	3	3
LACSDM - Malaga Cove, Palos Verdes Estates-weekly	14	14
LACSDB - Palos Verdes (Bluff) Cove, Palos Verdes Estates	0	0
LACSD1 - Long Point, Rancho Palos Verdes	5	5
LACSD2 - Abalone Cove Shoreline Park	1	1
LACSD3 - Portuguese Bend Cove, Rancho Palos Verdes	2	2
LACSD5 - Royal Palms State Beach	6	6
LACSD6 - Wilder Annex, San Pedro	2	2
LACSD7 - Cabrillo Beach, oceanside	3	3

Notes: * The compliance targets are based on existing shoreline monitoring data and assume daily sampling. If systematic weekly sampling is conducted, the compliance targets will be scaled accordingly. These are the compliance targets until additional shoreline monitoring data are collected prior to revision of the TMDL. Once additional shoreline monitoring data are available, the following will be re-evaluated when the TMDL is revised 1) estimated number of wet-weather exceedance days in the critical year at all beach locations, including the reference system(s) and 2) final allowable wet-weather exceedance days for each beach location.

Table 7-4.6. Interim Compliance Targets by Jurisdictional Group

Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather*/***		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
1	County of Los Angeles	Caltrans Malibu City of Los Angeles (Topanga only) Calabasas (Topanga only)	Arroyo Sequit	DHS 010	221	212	197
			Carbon Canyon	none			
			Corral Canyon	DHS 005a			
			Encinal Canyon	DHS 010a#			
			Escondido Canyon	none			
			Las Flores Canyon	DHS 001a			
			Latigo Canyon	DHS 005			
			Los Alisos Canyon	none			
			Pena Canyon	none			
			Piedra Gorda Canyon	DHS 001			
			Ramirez Canyon	DHS 006			
			Solstice Canyon	none			
			Topanga Canyon	S2			
			Trancas Canyon	DHS 008			
			Tuna Canyon	none			
			Zuma Canyon	DHS 007			
2	City of Los Angeles	Caltrans County of Los Angeles El Segundo (DW only) Manhattan Beach (DW only) Culver City (MDR only) Santa Monica	Castlerock	none	342	324	294
			Dockweiler	S11, DHS 110, S12, DHS 111, DHS 112			
			Marina del Rey	DHS 107, S8#, DHS 108, DHS 109			
			Pulga Canyon	S3, DHS 103			
			Santa Monica Canyon	S4			
			Santa Ynez Canyon	DHS 101, DHS 102			

Attachment A to Resolution No. 2002-022

Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather***		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
3	Santa Monica	Caltrans City of Los Angeles County of Los Angeles	Santa Monica	DHS 104a, DHS 104, DHS 105, S5, S6, DHS 106, DHS 106a, S7	257	237	203
4	Malibu	Caltrans County of Los Angeles	Nicholas Canyon	DHS 009#	14	14	14
5	Manhattan Beach	Caltrans El Segundo Hermosa Beach Redondo Beach	Hermosa	S13#, S14#, DHS 114#, S15#	29	29	29
6	Redondo Beach	Caltrans Hermosa Beach Manhattan Beach Torrance County of Los Angeles	Redondo	DHS 115, S16#, DHS 116, S17#	58	57	56

Attachment A to Resolution No. 2002-022

Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather***		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
7	Rancho Palos Verdes	Caltrans City of Los Angeles Palos Verdes Estates Redondo Beach Rolling Hills Rolling Hills Estates Torrance County of Los Angeles	Palos Verdes Peninsula	S18#, LACSDM#, LACSDB#, LACSD1#, LACSD2#, LACSD3#, LACSD5#, LACSD6#, LACSD7#	36	36	36

Notes: *Interim milestones will be re-calculated during the revision of the TMDL based on shoreline monitoring data collected from the wave wash and a re-evaluation of the most appropriate reference system and reference year. Furthermore, if an integrated water resources approach is pursued, as demonstrated by the implementation plans to be submitted to the Regional Board by the primary jurisdictions within two years of the effective date of the TMDL, the interim milestones will be re-evaluated on the basis of the implementation plan, considering planning, engineering and construction tasks. **Interim milestones for the Malibu and Ballona shoreline monitoring locations will be identified in subsequent bacteria TMDLs to be developed for these two watersheds. ***Monitoring sites are those shoreline locations currently monitored by the City of Los Angeles, County Sanitation Districts of Los Angeles County, and the Los Angeles County Department of Health Services at the time of adoption of this TMDL by the Regional Board. This list does not preclude the establishment of additional monitoring stations. For those subwatersheds without an existing shoreline monitoring site, responsible jurisdictions and agencies must establish a shoreline monitoring site if there is measurable flow from a creek or publicly owned storm drain to the beach during dry weather. # For those beach monitoring locations subject to the antidegradation provision, there shall be no increase in exceedance days during the implementation period above that estimated for the beach monitoring location in the critical year as identified in Table 7-4.5.

Table 7-4.7. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Significant Dates

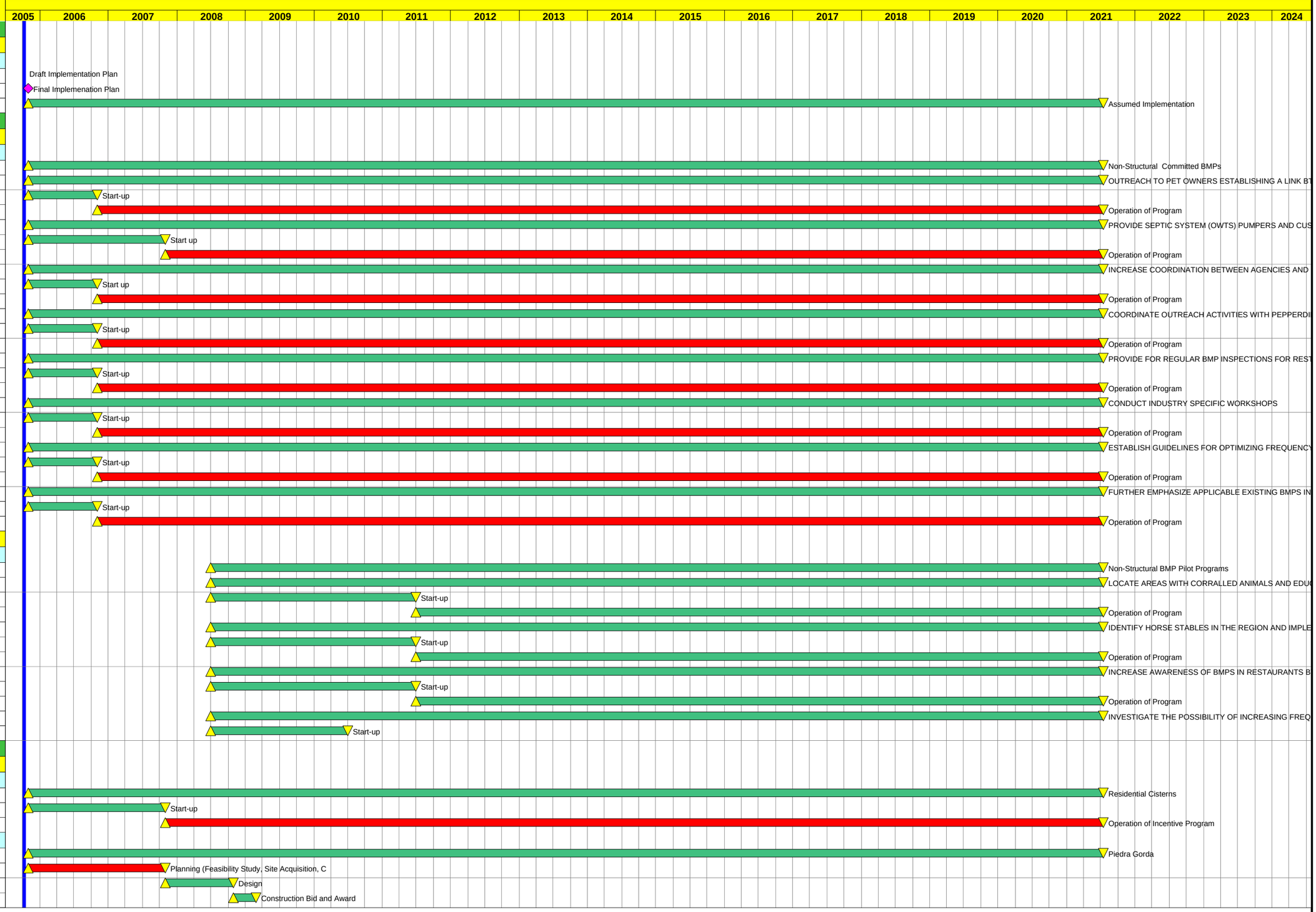
Date	Action
120 days after the effective date of the TMDL	Pursuant to a request from the Regional Board, responsible jurisdictions and responsible agencies must submit coordinated shoreline monitoring plan(s) to be approved by the Executive Officer, including a list of new sites* and/or sites relocated to the wave wash at which time responsible jurisdictions and responsible agencies shall select between daily or systematic weekly shoreline sampling.
20 months after the effective date of the TMDL	Responsible jurisdictions and agencies shall provide a draft written report to the Regional Board outlining how each intends to cooperatively (through Jurisdictional Groups) achieve compliance with the TMDL. The report shall include implementation methods, an implementation schedule, and proposed milestones.
Two years after effective date of TMDL	Responsible jurisdictions and agencies shall provide a written report to the Regional Board outlining how each intends to cooperatively (through Jurisdictional Groups) achieve compliance with the TMDL. The report shall include implementation methods, an implementation schedule, and proposed milestones. Under no circumstances shall final compliance dates exceed 10 years for non-integrated approaches or 18 years for integrated water resources approaches. Regional Board staff shall bring to the Regional Board the aforementioned plans as soon as possible for consideration.
4 years after effective date of TMDL	The Regional Board shall reconsider the TMDL to: (1) refine allowable wet weather exceedance days based on additional data on bacterial indicator densities in the wave wash and an evaluation of site-specific variability in exceedance levels, (2) re-evaluate the reference system selected to set allowable exceedance levels, including a reconsideration of whether the allowable number of exceedance days should be adjusted annually dependent on the rainfall conditions and an evaluation of natural variability in exceedance levels in the reference system(s), (3) re-evaluate the reference year used in the calculation of allowable exceedance days, and (4) re-evaluate whether there is a need for further clarification or revision of the geometric mean implementation provision.

Date	Action
Significant Dates for Responsible Jurisdictions and Agencies *Not* Pursuing an Integrated Water Resources Approach	
6 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 25% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
8 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 50% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
10 years after effective date of the TMDL	Final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach as identified in Table 7-4.5. In addition, the geometric mean targets must be achieved for each individual beach location.
Significant Dates for Responsible Jurisdictions and Agencies Pursuing an Integrated Water Resources Approach to Implementation	
6 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 10% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
10 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 25% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
15 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 50% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
18 years after effective date of the TMDL	Final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach as identified in Table 7-4.5. In addition, the geometric mean targets must be achieved for each individual beach location.

Notes: *For those subwatersheds without an existing shoreline monitoring site, responsible jurisdictions and agencies must establish a shoreline monitoring site if there is measurable flow from a creek or publicly owned storm drain to the beach during dry weather.

APPENDIX B

Activity ID	Activity Description
Implementation Plan	
210	Draft Implementation Plan
215	Final Implemenation Plan
220	Assumed Implementation
Non-Structural BMP's	
Non-Structural Committed BMP's	
0003	Non-Structural Committed BMPs
0004	OUTREACH TO PET OWNERS
0005	Start-up
0006	Operation of Program
0007	PROVIDE SEPTIC SYSTEM (OWTS)
0008	Start up
0009	Operation of Program
0010	INCREASE COORDINATION BETWEEN
0011	Start up
0012	Operation of Program
0013	COORDINATE OUTREACH ACTIVITIES
0014	Start-up
0015	Operation of Program
0016	PROVIDE FOR REGULAR BMP
0017	Start-up
0018	Operation of Program
0019	CONDUCT INDUSTRY SPECIFIC
0020	Start-up
0021	Operation of Program
0022	ESTABLISH GUIDELINES FOR
0023	Start-up
0024	Operation of Program
0025	FURTHER EMPHASIZE APPLICABLE
0026	Start-up
0027	Operation of Program
Non-Structural BMP Pilot Programs	
0028	Non-Structural BMP Pilot Programs
0029	LOCATE AREAS WITH CORRALLED
0030	Start-up
0031	Operation of Program
0032	IDENTIFY HORSE STABLES IN THE
0033	Start-up
0034	Operation of Program
0035	INCREASE AWARENESS OF BMPS IN
0036	Start-up
0037	Operation of Program
0038	INVESTIGATE THE POSSIBILITY OF
0039	Start-up
Onsite Structural Programs	
Residential Cisterns	
.	
0041	Residential Cisterns
0042	Start-up
0043	Operation of Incentive Program
Piedra Gorda	
0045	Piedra Gorda
0046	Planning (Feasibility Study, Site Acquisition,
0047	Design
0048	Construction Bid and Award



Start Date	15MAR05
Finish Date	19JUL21
Data Date	10OCT05
Run Date	23AUG05 09:34

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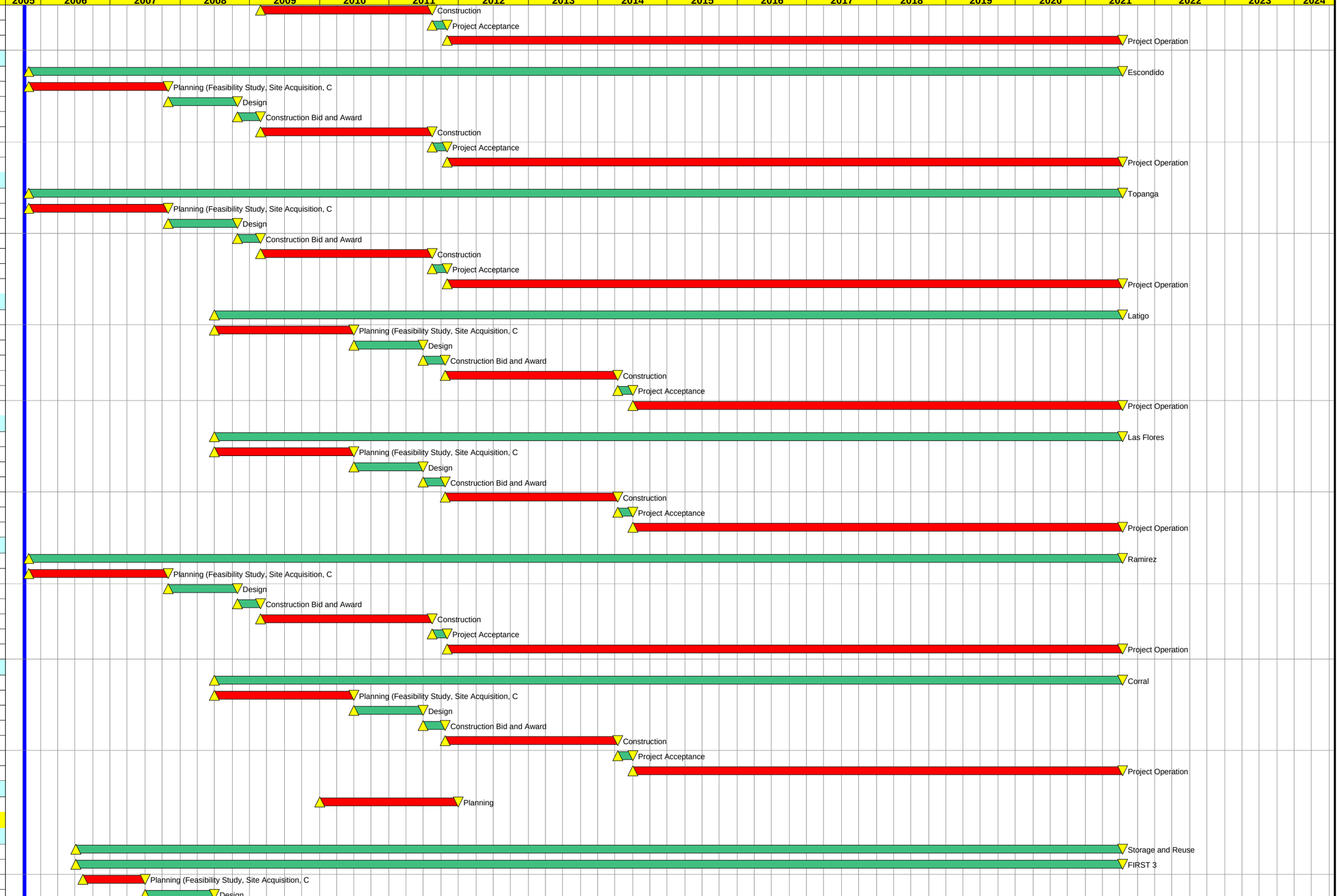
Sheet 1 of 5

Santa Monica Bay Wet-Weather Bacteria TMDL
Jurisdictions 1 and 4 Implementation Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Description
0049	Construction
0050	Project Acceptance
0051	Project Operation
Escondido	
0052	Escondido
0053	Planning (Feasibility Study, Site Acquisition,
0054	Design
0055	Construction Bid and Award
0056	Construction
0057	Project Acceptance
0058	Project Operation
Topanga	
0059	Topanga
0060	Planning (Feasibility Study, Site Acquisition,
0061	Design
0062	Construction Bid and Award
0063	Construction
0064	Project Acceptance
0065	Project Operation
Latigo	
0066	Latigo
0067	Planning (Feasibility Study, Site Acquisition,
0068	Design
0069	Construction Bid and Award
0070	Construction
0071	Project Acceptance
0072	Project Operation
Las Flores	
0073	Las Flores
0074	Planning (Feasibility Study, Site Acquisition,
0075	Design
0076	Construction Bid and Award
0077	Construction
0078	Project Acceptance
0079	Project Operation
Ramirez	
0080	Ramirez
0081	Planning (Feasibility Study, Site Acquisition,
0082	Design
0083	Construction Bid and Award
0084	Construction
0085	Project Acceptance
0086	Project Operation
Corral	
0087	Corral
0088	Planning (Feasibility Study, Site Acquisition,
0089	Design
0090	Construction Bid and Award
0091	Construction
0092	Project Acceptance
0093	Project Operation
Other Watersheds	
0113	Planning
Storage and Reuse/Small Scale Infiltration	
0094	Storage and Reuse
0095	FIRST 3
0096	Planning (Feasibility Study, Site Acquisition,
0097	Design



Start Date	15MAR05
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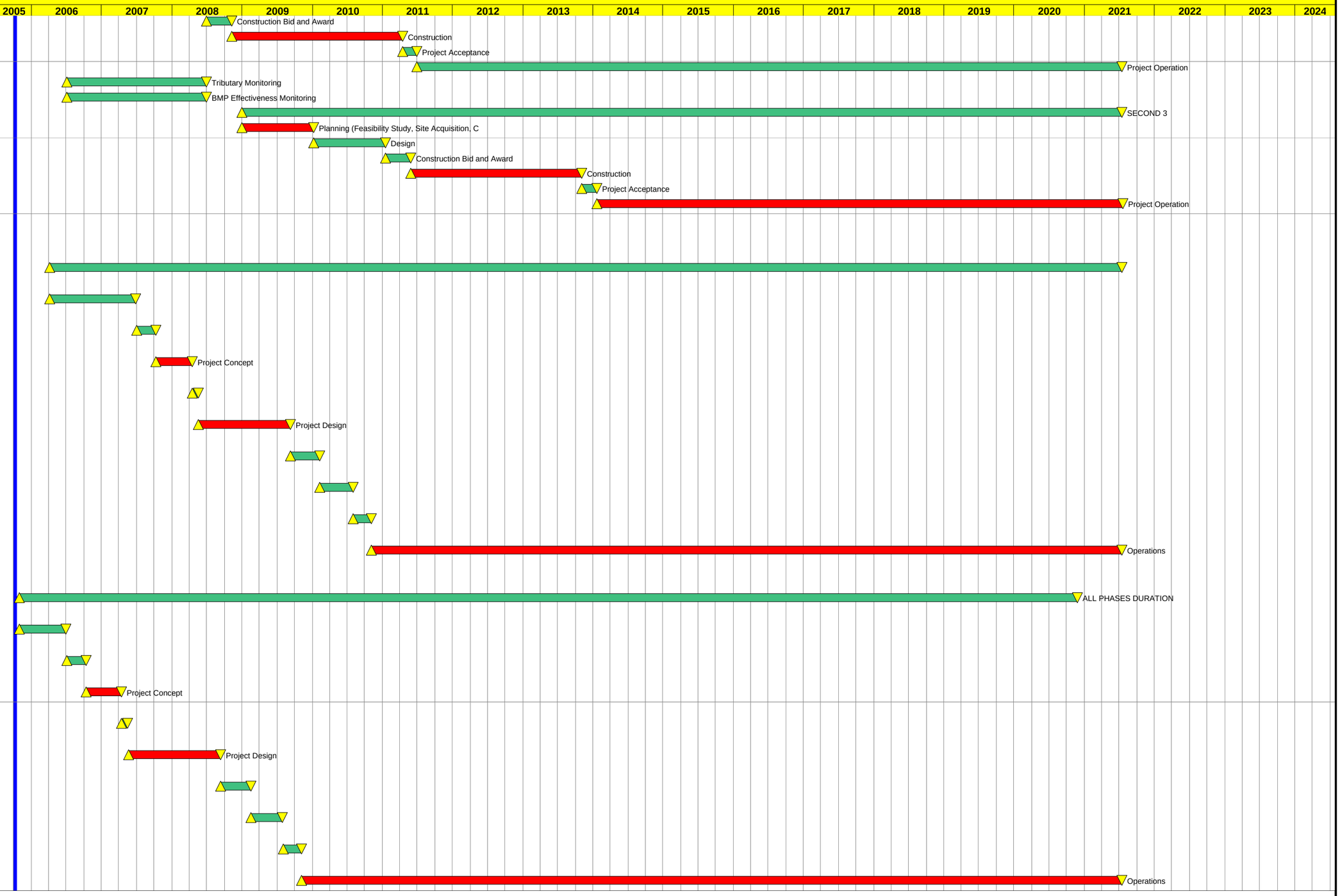
Sheet 2 of 5

Santa Monica Bay Wet-Weather Bacteria TMDL Jurisdictions 1 and 4 Implementation Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Description
0098	Construction Bid and Award
0099	Construction
0100	Project Acceptance
0101	Project Operation
0102	Tributary Monitoring
0103	BMP Effectiveness Monitoring
0104	SECOND 3
0105	Planning (Feasibility Study, Site Acquisition,
0106	Design
0107	Construction Bid and Award
0108	Construction
0109	Project Acceptance
0110	Project Operation
Regional Structural Pilots Prgrams	
Paradise Cove Pre-Treatment and System Upgrade	
+ Duration	
+ Pre-Feasibility Study	
+ Feasibility Study	
Project Concept	
46800	Project Concept
+ Construction	
Project Design	
42800	Project Design
+ Construction Bid and Award	
+ Construction Process	
+ Project Acceptance	
Operations	
48610	Operations
Las Flores Canyon Restoration	
Duration	
10500	ALL PHASES DURATION
+ Pre-Feasibility Study	
+ Feasibility Study	
Project Concept	
16700	Project Concept
+ Construction	
Project Design	
12800	Project Design
+ Construction Bid and Award	
+ Construction Process	
+ Project Acceptance	
Operations	
18610	Operations



Start Date	15MAR05
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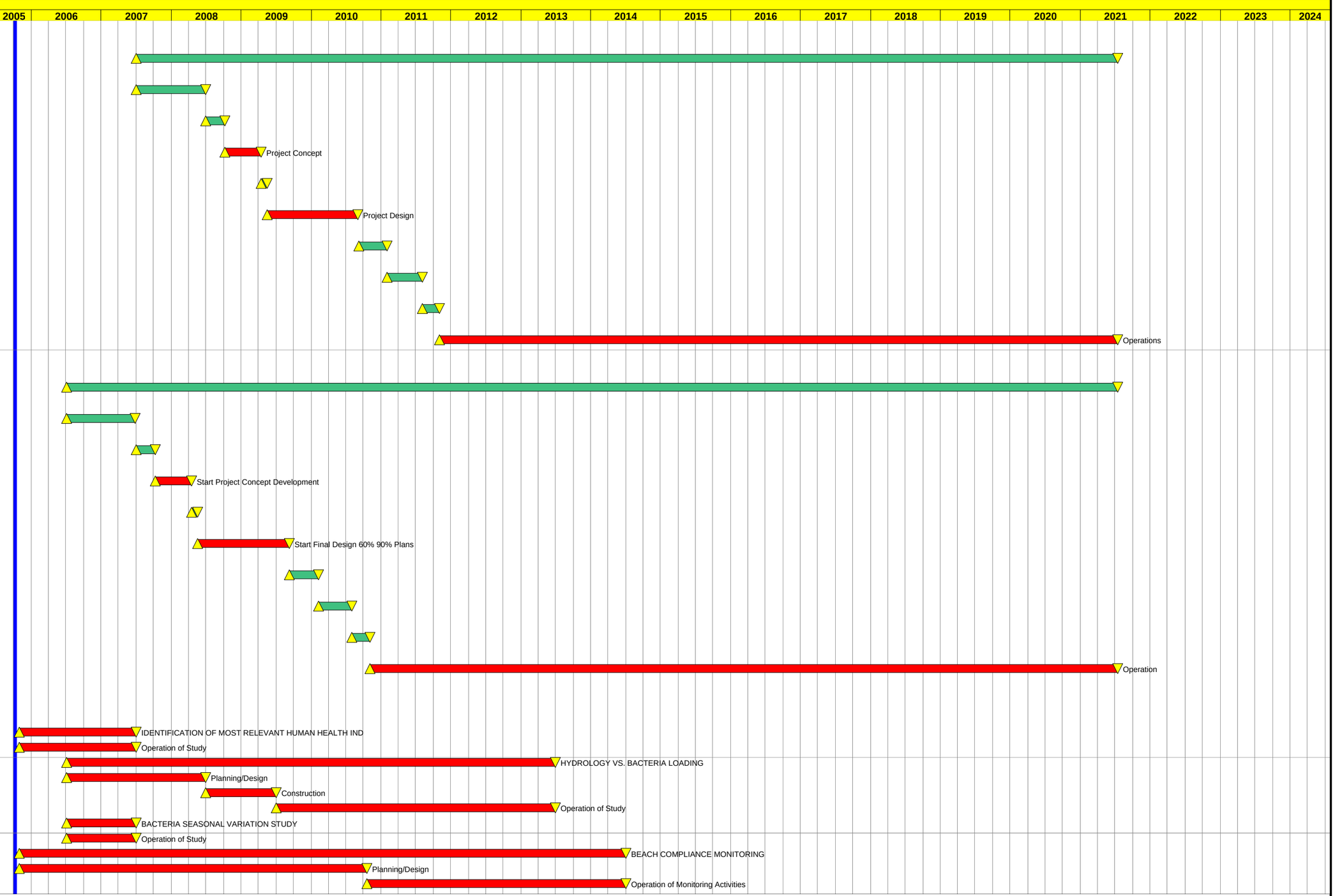
Sheet 3 of 5

Santa Monica Bay Wet-Weather Bacteria TMDL
Jurisdictions 1 and 4 Implementation Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Description
Marie Canyon Drain Retrofit	
+ Duration	
+ Pre-Feasibility Study	
+ Feasibility Study	
Project Concept	
26700	Project Concept
+ Construction	
Project Design	
22800	Project Design
+ Construction Bid and Award	
+ Construction Process	
+ Project Acceptance	
Operations	
28610	Operations
Latigo Shores Subsurface Flow Wetland	
+ Duration	
+ Pre-Feasibility Study	
+ Feasibility Study	
Project Concept	
36700	Start Project Concept Development
+ Construction	
Project Design	
32800	Start Final Design 60% 90% Plans
+ Construction Bid and Award	
+ Construction Process	
+ Project Acceptance	
Operations	
38610	Operation
Special Studies and Monitoring	
55030	IDENTIFICATION OF MOST RELEVANT
55040	Operation of Study
55050	HYDROLOGY VS. BACTERIA LOADING
55060	Planning/Design
55070	Construction
55080	Operation of Study
55090	BACTERIA SEASONAL VARIATION STUDY
55100	Operation of Study
55110	BEACH COMPLIANCE MONITORING
55120	Planning/Design
55130	Operation of Monitoring Activities



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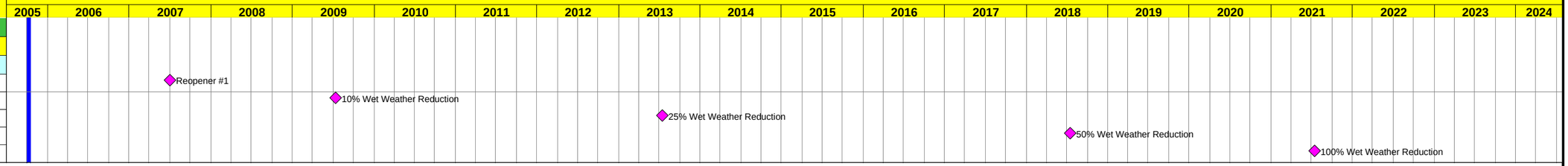
Sheet 4 of 5

Santa Monica Bay Wet-Weather Bacteria TMDL
Jurisdictions 1 and 4 Implementation Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Description
Other	
0120	Reopener #1
0121	10% Wet Weather Reduction
0122	25% Wet Weather Reduction
0123	50% Wet Weather Reduction
0124	100% Wet Weather Reduction



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Sheet 5 of 5

Santa Monica Bay Wet-Weather Bacteria TMDL
Jurisdictions 1 and 4 Implementation Schedule

Date	Revision	Checked	Approved