



CITY OF STOCKTON

DEPARTMENT OF MUNICIPAL UTILITIES

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www.stocktongov.com

September 1, 2010

Storm Water Section
Attention: Mike Conway, Stormwater Unit
California Regional Water Quality
Control Board – Central Valley Region
11020 Sun Center Drive, Ste. 200
Rancho Cordova, CA 95870-6114

**CITY OF STOCKTON STORMWATER MANAGEMENT PROGRAM 2009/2010
ANNUAL REPORT, ORDER NO. R5-2007-0173, NPDES PERMIT NO. CAS083470**

Please find attached a copy of the 2009/2010 Annual Report for the City of Stockton Stormwater Management Program. The attached report reflects all stormwater activities conducted during Fiscal Year 2009-2010 required by City's Stormwater NPDES Permit.

If you have any questions regarding the report, please contact Courtney Vasquez at (209) 937-8705.

MARK J. MADISON, P.E.
DIRECTOR OF MUNICIPAL UTILITIES

MJM:CDV:rmk

Attachments: 2009/2010 Annual Report with Appendixes

cc: Mack Walker, Larry Walker Associates
Karen Ashby, Larry Walker Associates

emc: Courtney D. Vasquez, Stormwater Program Manager





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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Executed on the 1st day of September 2010, at the City of Stockton.

Mark J. Madison
Director of Municipal Utilities



SEPTEMBER 1, 2010

CITY OF STOCKTON

National Pollutant Discharge Elimination System Municipal Stormwater Program *2009-2010 Annual Report*

prepared by

LARRY WALKER ASSOCIATES



**CITY OF STOCKTON
STORMWATER MANAGEMENT PROGRAM
2009-2010 ANNUAL REPORT
TABLE OF CONTENTS**

	<u>Page</u>
Section 1 Program Management	
1.1 Overview	1-1
1.2 Control Measures	1-1
1.3 Program Coordination	1-2
1.3.1 Review and Revise the SWMP	1-2
1.3.2 Permittees Meet Quarterly	1-2
1.3.3 Internal Stormwater Program Meetings (City Divisions and Departments)	1-4
1.3.4 Statewide Stormwater-Related Meetings, Conferences, and Stakeholder Groups	1-7
1.3.5 Review and Revise MOUs as Necessary	1-8
1.3.6 Establish, Review, and Revise Cooperative Agreements	1-8
1.4 Fiscal Analysis	1-9
1.4.1 Complete a Stormwater Rate Study	1-9
1.4.2 Review and Revise the Fiscal Analysis Reporting Format	1-9
1.4.3 Report the Fiscal Analysis within the Annual Report	1-10
1.5 Legal Authority	1-12
1.5.1 Review the Legal Authority	1-12
1.6 Program Effectiveness Assessment	1-13
1.7 Program Management Modifications	1-14
Section 2 Illicit Discharges	
2.1 Overview	2-1
2.2 Control Measures	2-1
2.3 ID1 – Detection of Illicit Discharges and Illegal Connections	2-2
2.3.1 Spill Response Procedures	2-2
2.3.2 Public Reporting	2-2
2.3.3 Dry Weather Field Screening	2-6
2.3.4 Field Crew Inspections	2-7
2.4 ID2 – Illegal Connection Identification and Elimination	2-8
2.4.1 Investigate/Eliminate Illegal Connections	2-8
2.4.2 Coordinate with Planning and Land Development Program	2-9
2.4.3 Coordinate with Construction Program	2-9
2.5 ID3 – Investigation/Inspection and Follow-Up	2-10

TABLE OF CONTENTS (CONTINUED)

2.5.1	Response and Investigation	2-10
2.5.2	Cleanup	2-11
2.5.3	Recordkeeping and Tracking	2-11
2.6	ID4 – Enforcement	2-13
2.6.1	Implement Progressive Enforcement Policy	2-13
2.6.2	Review/Revise Illicit Discharges Database to Incorporate Enforcement-Related Information	2-13
2.6.3	Track Enforcement Actions in the Illicit Discharges Database	2-13
2.7	ID5 – Training	2-14
2.7.1	Conduct Training	2-14
2.8	ID6 – Effectiveness Assessment	2-16
2.9	Illicit Discharges Program Modifications	2-24
Section 3	Public Outreach	
3.1	Overview	3-1
3.2	Control Measures	3-1
3.3	PO1 – Public Participation	3-2
3.3.1	Implement Storm Drain Marker Program	3-2
3.3.2	Organize, Support, and/or Participate in Stream Cleanup Events	3-3
3.3.3	Promote Used Oil and Household Hazardous Waste Programs	3-6
3.3.4	Coordinate with Household Hazardous Waste Program for Pesticide Disposal	3-8
3.3.5	Update City Website	3-8
3.4	PO2 – Hotline	3-10
3.4.1	Maintain Hotline	3-10
3.4.2	Promote/Publicize Hotline	3-10
3.5	PO3 – Public Outreach Implementation	3-11
3.5.1	Update/Conduct Public Opinion Survey	3-12
3.5.2	Identify and/or Create, Revise, and Distribute Educational Materials	3-19
3.5.3	Ensure Educational Materials Address Proper Disposal of Pet Waste	3-20
3.5.4	Develop Outreach Materials Targeting Pet Owners	3-20
3.5.5	Provide Pet Waste Outreach/Literature to Pet Owners and Animal Adoption Agencies	3-21
3.5.6	Implement Pet Waste Outreach Program	3-21
3.5.7	Develop Language for and Produce Pet Waste Signs	3-22
3.5.8	Install Pet Waste Signs	3-23
3.5.9	Implement Phased Installation and Maintenance of Pet Waste Bag	3-25

TABLE OF CONTENTS (CONTINUED)

	Dispensing Stations	
3.5.10	Track Installation of Pet Waste Bag Dispensing Stations	3-25
3.5.11	Update Audiovisual Tools and Web Site	3-25
3.5.12	Conduct Mixed Media Campaigns	3-25
3.5.13	Participate in Community-Wide Events	3-26
3.5.14	Provide Community Relations	3-28
3.5.15	Implement Pesticide Outreach Efforts	3-29
3.5.16	Conduct Periodic Pest Control Product Surveys	3-30
3.6	PO4 – Public School Education	3-32
3.6.1	Send Letters to Fifth Grade Teachers and Principals	3-32
3.6.2	Reach Out to School Age Children Outside of School	3-32
3.6.3	Present at Day Camps	3-33
3.6.4	Develop Interactive Exhibit for Display at Children’s Museum	3-33
3.6.5	Implement Educational Signage and Displays Relevant to Stormwater Pollution	3-33
3.7	PO5 – Business Outreach	3-35
3.7.1	Conduct Business Workshops	3-35
3.7.2	Distribute Educational Material to Selected Businesses	3-35
3.7.3	Ensure Business Workshops Address Mercury	3-35
3.7.4	Revise Business-Specific Fact Sheets to Address Mercury	3-35
3.8	PO6 – Effectiveness Assessment	3-36
3.9	Public Outreach Program Modifications	3-45
Section 4	Municipal Operations	
4.1	Overview	4-1
4.2	Control Measures	4-1
4.3	MO1 – Sanitary Sewer Overflow and Spill Response	4-2
4.3.1	Implement Sanitary Sewer Overflow Emergency Response Plan	4-2
4.3.2	Review/Revise Sanitary Sewer Overflow Emergency Response Plan	4-2
4.4	MO2 – New Development and Construction Requirements for Municipal Capital Improvement Projects	4-3
4.4.1	Review CIP Designs to Ensure Specifications and Notes are Included	4-3
4.4.2	Require Submission of NOI for CIP Greater than or Equal to One Acre	4-3
4.4.3	Ensure CIP Priority Projects are Developed in Conformance with the SWQCCP	4-3

TABLE OF CONTENTS (CONTINUED)

	4.4.4	Improve Interdepartmental Communication to Facilitate Accurate Recordkeeping and Reporting	4-4
4.5	MO3 – Pollution Prevention at County Facilities		4-5
	4.5.1	Assess Facilities to Determine if They Require Coverage under the General Industrial Permit	4-5
	4.5.2	Modify SWPPP for Corporation Yard and Other Facilities into an FPPP	4-5
	4.5.3	Implement SWPPP (FPPP) for Corporation Yard and other Facilities	4-5
	4.5.4	Update FPPP on an Annual Basis	4-6
	4.5.5	Review CIP Projects for Compliance with General Stormwater Requirements	4-6
	4.5.6	Develop BMP Fact Sheets for Non-Emergency Fire Fighting Flows	4-6
	4.5.7	Distribute BMP Fact Sheets for Non-Emergency Fire Fighting Flows	4-7
	4.5.8	Develop Procedures to Address Emergency Events	4-7
4.6	MO4 – Landscape and Pest Management		4-8
	4.6.1	Implement Pesticide and Fertilizer Application Protocol	4-8
	4.6.2	Implement IPM Program	4-9
	4.6.3	Develop Formal Document Describing IPM-Related Policies and Procedures	4-10
	4.6.4	Maintain and Expand Internal Inventory on Pesticide Use	4-10
	4.6.5	Implement Landscaping Standards	4-12
4.7	MO5 – Storm Drain System Maintenance		4-13
	4.7.1	Implement Storm Drain System Mapping	4-13
	4.7.2	Review/Revise Prioritization for Catch Basin Cleaning	4-13
	4.7.3	Maintain and Annually Update Catch Basin Database	4-14
	4.7.4	Implement Catch Basin Maintenance Program	4-14
	4.7.5	Implement Pump Station Maintenance Program	4-15
	4.7.6	Develop Maintenance Procedures and Prioritization for Cleaning Detention Basins	4-15
	4.7.7	Implement Detention Basin Maintenance Program	4-16
	4.7.8	Implement Notification Procedures for ID/IC and Missing Catch Basin Markers or Illegible Stencils	4-16
	4.7.9	Include Special Event Use Provisions in Special Use Permits	4-17
	4.7.10	Treatment Feasibility Study	4-17
4.8	MO6 – Street Cleaning and Maintenance		4-19
	4.8.1	Implement Street Sweeping Program	4-19
	4.8.2	Review/Revise Prioritization of Streets for Street Sweeping	4-19

TABLE OF CONTENTS (CONTINUED)

	Program	
4.8.3	Implement Green Waste Collection Program	4-22
4.8.4	Update Maintenance Staff Guide – Road Maintenance and Small Construction BMPs	4-22
4.8.5	Implement Maintenance Staff Guide – Road Maintenance and Small Construction BMPs	4-22
4.9	MO7 – Parking Lots Maintenance	4-23
4.9.1	Implement BMPs for Parking Lot Cleaning	4-23
4.9.2	Inspect City-Owned Parking Lots Annually	4-23
4.10	MO8 – Training	4-24
4.10.1	Conduct Training	4-24
4.11	MO9 – Effectiveness Assessment	4-25
4.12	Municipal Operations Program Modifications	4-36
Section 5	Industrial and Commercial	
5.1	Overview	5-1
5.2	Control Measures	5-1
5.3	IC1 – Facility Inventory	5-2
5.3.1	Perform Internal Audit of Database	5-2
5.3.2	Maintain and Annually Update the Industrial and Commercial Facility Inventory	5-2
5.3.3	Map Industrial and Commercial Facilities	5-3
5.3.4	Develop a Mobile Business Pilot Program	5-3
5.3.5	Implement a Mobile Business Pilot Program	5-3
5.4	IC2 – Prioritization and Inspection	5-4
5.4.1	Prioritize Facilities	5-4
5.4.2	Evaluate the Prioritization Criteria and Incorporate Exceedances of Water Quality Benchmarks as Criteria for Prioritizing Industrial Facilities	5-4
5.4.3	Inspections	5-4
5.5	IC3 – Industrial/Commercial Outreach	5-10
5.5.1	Review/Revise BMP Fact Sheets for High Priority Facilities	5-10
5.5.2	Distribute BMP Fact Sheets During Inspections	5-11
5.5.3	Target Outreach Efforts as Needed	5-11
5.5.4	Identify BMPs and Develop an Outreach/Education Strategy for the Mobile Business Category Identified in IC1	5-12
5.5.5	Implement Outreach Efforts to Mobile Businesses	5-12
5.6	IC4 – Enforcement	5-13

TABLE OF CONTENTS (CONTINUED)

5.6.1	Implement the Progressive Enforcement and Referral Policy	5-13
5.6.2	Track Enforcement Actions Using the Industrial/Commercial Database	5-13
5.6.3	Implement Procedures for Responding to Regional Water Board-Based Complaints	5-13
5.6.4	Implement Industrial Referral Policy	5-14
5.6.5	Develop an Enforcement Strategy Specifically Addressing the Mobile Business Category Identified in IC1	5-14
5.7	IC5 – Training	5-16
5.7.1	Conduct Training	5-16
5.8	IC6 – Effectiveness Assessment	5-17
5.9	Industrial and Commercial Program Modifications	5-22
Section 6	Construction	
6.1	Overview	6-1
6.2	Control Measures	6-1
6.3	CO1 – Municipal Code for Construction Sites	6-2
6.3.1	Review/Modify Grading and Erosion Control Ordinance and Standard Specifications	6-2
6.4	CO2 – Plan Review and Approval Process	6-3
6.4.1	Review Grading and Building Permit Applications for SWPPP Requirements	6-3
6.4.2	Develop a Plan & Permit Application Review Procedure Handout	6-4
6.4.3	Distribute the Plan & Permit Application Review Procedure Handout	6-4
6.4.4	Evaluate the County’s Construction Small Site SWMP	6-4
6.5	CO3 – Construction Projects Inventory	6-5
6.5.1	Maintain and Update the Construction Projects Database	6-5
6.6	CO4 – Construction Outreach	6-6
6.6.1	Distribute Appropriate BMP Fact Sheets During Inspections	6-6
6.6.2	Conduct Contractor Tailgate Meetings	6-6
6.6.3	Conduct Training for Developers, Builders and Contractors	6-7
6.7	CO5 – Construction Site Inspections & BMP Implementation	6-8
6.7.1	Review/Revise Stormwater Construction Site Inspection Form	6-8
6.7.2	Evaluate Options for a Construction Site Compliance Rating System	6-8
6.7.3	Inspect Construction Sites ≥ 1 Acre	6-8
6.8	CO6 – Enforcement	6-10
6.8.1	Implement Progressive Enforcement and Referral Policy	6-10

TABLE OF CONTENTS (CONTINUED)

	6.8.2	Track Enforcement Actions Using Construction Database	6-11
	6.8.3	Review/Modify Procedures for Informing Regional Water Board of Violations	6-12
6.9		CO7 – Training	6-13
	6.9.1	Conduct Training	6-13
6.10		CO8 – Effectiveness Assessment	6-15
6.11		Construction Program Modifications	6-21
Section 7		Planning and Land Development	
7.1		Overview	7-1
7.2		Control Measures	7-1
7.3		LD1 – Incorporation of Water Quality Protection Principles into County Procedures and Policies	7-2
	7.3.1	Review and Revise CEQA Review Documents	7-2
	7.3.2	Revise Municipal Code	7-2
7.4		LD2 – New Development Standards	7-3
	7.4.1	Require Priority Projects to Implement the 2009 SWQCCP	7-3
	7.4.2	Review Local Development Standards for Compatibility with the 2009 SWQCCP	7-3
7.5		LD3 – Plan Review Sign-Off	7-5
	7.5.1	Review the Post-Construction Plan Review Checklist	7-5
	7.5.2	Revise the Post-Construction Plan Review Checklist	7-5
	7.5.3	Use Post-Construction Plan Review Checklist	7-5
	7.5.4	Participate on the DRC	7-5
	7.5.5	Review Project Plans and Grading Plans for Stormwater BMPs	7-5
	7.5.6	Explore Options for a GIS or Other Electronic System for Tracking Projects with Post-Construction Treatment Control BMPs	7-8
	7.5.7	Implement a GIS or Other Electronic System for Tracking Projects that Have Been Conditioned for Post-Construction Treatment Control BMPs	7-8
	7.5.8	Conduct Inspections of Completed Priority Projects	7-8
7.6		LD4 – Maintenance Agreement and Transfer	7-8
	7.6.1	Require Stormwater Treatment Device Access and Maintenance Agreement	7-9
	7.6.2	Finalize and Populate Post-Construction BMP Tracking Spreadsheet	7-9
	7.6.3	Finalize Post-Construction BMP Maintenance Oversight Protocols	7-9
	7.6.4	Implement Post-Construction BMP Maintenance Oversight Protocols	7-9
7.7		LD5 – Training	7-11

TABLE OF CONTENTS (CONTINUED)

7.7.1	Conduct Project Planning & Design Training	7-11
7.7.2	Conduct Project Inspection Training	7-11
7.8	LD6 – Effectiveness Assessment	7-13
7.9	Planning and Land Development Program Modifications	7-24
Section 8	Water Quality Monitoring Program	
8.1	Baseline Monitoring Activities	8-2
8.1.1	Storm Tracking and Selection	8-2
8.1.2	Urban Runoff Discharge and Receiving Water Monitoring	8-5
8.1.3	Water Column Toxicity Monitoring	8-15
8.1.4	Dry Weather Field Screening	8-22
8.2	Supplemental Monitoring	8-24
8.2.1	Legion Park Best Management Practice (BMP) Study	8-25
8.2.2	BMP Effectiveness Studies	8-25
8.2.3	Bioassessment Report	8-26
8.2.4	Sediment Plan and Sediment Toxicity Monitoring	8-31
8.2.5	Detention Basin Monitoring	8-38
8.3	Data Quality Evaluation	8-38
8.4	Report of Water Quality Exceedances	8-40
8.4.1	Metals	8-52
8.4.2	<i>E. coli</i> and Fecal Coliform	8-53
Section 9	Water Quality Based Program	
9.1	Overview	9-1
9.2	Pesticide Plan Progress Report	9-3
9.2.1	Public Education and Outreach	9-4
9.2.1.1	“Our Water Our World” Program Outreach	9-4
9.2.1.2	Annual Public Outreach Messages	9-5
9.2.1.3	Pest Control Workshops	9-5
9.2.1.4	Survey of Pesticides Available to the Public	9-5
9.2.1.5	Coordination with Household Hazardous Waste Collection	9-6
9.2.2	Municipal Operations	9-6
9.2.2.1	Review of Pesticide Application Protocols and Landscape Standards	9-7
9.2.2.2	Implementation of IPM Protocols	9-7
9.2.2.3	Training for Municipal Employees	9-8
9.2.3	Effectiveness Assessment	9-9
9.2.4	Water Quality Monitoring	9-9

TABLE OF CONTENTS (CONTINUED)

	9.2.4.1	Pesticide Plan Monitoring Results	9-11
	9.2.5	2010-2011 Pesticide Plan Activities	9-22
9.3		Pathogen Plan Progress Report	9-23
	9.3.1	Phase I Activities	9-25
	9.3.1.1	Phase I Characterization Monitoring	9-25
	9.3.1.2	Source Identification Monitoring	9-27
	9.3.1.3	BMP Implementation	9-27
	9.3.1.4	Phase I Effectiveness Monitoring	9-28
	9.3.2	Phase II Activities	9-28
	9.3.2.1	Characterization Monitoring	9-28
	9.3.2.2	Source Identification Monitoring	9-31
	9.3.2.3	BMP Implementation	9-37
	9.3.2.4	Phase II Effectiveness Monitoring	9-37
	9.3.3	Phase III Activities	9-37
	9.3.4	2010-2011 Pathogen Plan Activities	9-44
9.4		Mercury Plan	9-40
	9.4.1	Mercury Plan Components	9-40
	9.4.1.1	Public Outreach	9-41
	9.4.1.2	Commercial and Industrial Outreach	9-41
	9.4.1.3	Municipal Operations	9-41
	9.4.1.4	Erosion Prevention BMPs	9-42
	9.4.1.5	Mercury Characterization Monitoring	9-42
	9.4.2	2010-2011 Mercury Plan Activities	9-51
9.5		Low Dissolved Oxygen Plan	9-52
	9.5.1	2009/2010 Low DO Work Plan	9-52
	9.5.2	Monitoring Challenges and Modifications	9-54
	9.5.3	Field Monitoring	9-54
	9.5.4	Results and Discussion	9-57
	9.5.5	Stockton Deep Water Ship Channel	9-71
Section 10		Program Implementation, Assessment, and Reporting	
10.1		Overview	10-1
10.2		Control Measures	10-1
10.3		Program Implementation	10-1
	10.3.1	Annual Work Plan	10-1
10.4		Evaluation/Assessment	10-2

TABLE OF CONTENTS (CONTINUED)

10.5	Reporting	10-2
	10.5.1 Annual Report	10-2
	10.5.2 Report of Waste Discharge	10-2
10.6	Program Modifications	10-3

TABLE OF CONTENTS (CONTINUED)

APPENDICES

A	Program Management
A-1	2010 Final Stormwater Rate Study and Fee Report
B	Illicit Discharges
B-1	Spill Response Procedures
B-2	Stormwater Complaint Form
B-3 a/b	List of Illicit Discharges (2009-2010) and Corresponding Key
B-4	Investigative Guidance Manual
B-5	Waste Categories Memorandum
B-6 a/b	List of Illicit Discharges (2010-2011) and Corresponding Key
B-7	Illicit Discharges and Illegal Connections Map (2009-2010)
B-8	Municipal Utilities Department Directive
C	Public Outreach
C-1	Stormwater Outreach Materials
C-2	Public Opinion Survey Report 2009
D	Municipal Operations
D-1	Summary of Reported SSOs (2009-2010)
D-2	2009 Large Event Reporting
D-3	Maintenance Staff Guide
E	Industrial and Commercial
E-1	Industrial and Commercial Inventory
E-2	Mobile Business Pilot Program: Carpet Cleaners Implementation Strategy
E-3	Industrial Facility Prioritization Criteria Memorandum
E-4	Industrial Inspection Checklist
E-5	Commercial Inspection Checklists (3)
E-6	BMP Fact Sheets for High Priority Facilities
F	Construction
F-1	List of All Construction Sites Inspected
F-2	Construction Inspection Form
F-3	Construction Enforcement Actions Issued
G	Planning and Land Development
G-1	2009 Stormwater Quality Control Criteria Plan (SWQCCP) Fact Sheet
G-2	Volume Reduction Requirement (VPP) Calculator
G-3	Post-Construction BMP Tracking Map

TABLE OF CONTENTS (CONTINUED)

	G-4	City Assessment Districts Map
	G-5	Maintenance Oversight Letter and Database
	G-6	2009 SWQCCP Workshop Agenda
H		Water Quality Monitoring Program
	H-1a/b	2009-2010 Stormwater Monitoring Data and Laboratory Reports
	H-2	2009-2010 Water Column Toxicity Reports
	H-3	2009-2010 Dry Weather Field Screening Data
	H-4	2009-2010 Legion Park BMP Study Data
	H-5	2010 Bioassessment Report
	H-6	Sediment Toxicity Study
I		Water Quality Based Program
	I-1	Pest Control Product Survey Report
	I-2	Draft IPM Policy and Guidelines
	I-3	Pesticide Plan 2009-2010 Monitoring Data
	I-4	Pathogen Plan Phase II Source ID Monitoring Results
	I-5	Mercury Plan Municipal Mercury Use Survey Report
	I-6	Mercury Plan 2009-2010 Monitoring Data
	I-7	Low Dissolved Oxygen Plan 2009-2010 Monitoring Data
J		Program Implementation, Assessment, and Reporting (<i>none</i>)

Section 1

Program Management

1.1 OVERVIEW

The Stormwater Management Plan (SWMP) has been developed for and will be implemented within the jurisdictional limits of the City of Stockton (City) and the urbanized areas of San Joaquin County (County) within the Phase I National Pollutant Discharge Elimination System (NPDES) permit area¹. The SWMP, which includes existing and enhanced program control measures, represents the five-year strategy for controlling the discharge of pollutants from the municipal storm drain system to the maximum extent practicable (MEP).

As a result of the third term municipal stormwater permit (Permit) requirements², the SWMP was revised in June 2008 and submitted to the Central Valley Regional Water Quality Control Board (RWQCB or Regional Water Board). The 2008 SWMP was subsequently revised, submitted to the RWQCB on April 15, 2009, and approved by the RWQCB on October 8, 2009.³ The 2009 SWMP includes a wide range of continuing, enhanced, and new Best Management Practices (BMPs) and control measures that will be implemented during the Permit period (2007-2012). It is the intent of the 2009 SWMP to meet all Permit requirements through an iterative process. These BMPs and control measures will assist the City in improving the overall effectiveness of the stormwater program and focusing on the specific activities. Where possible, the BMPs and control measures were developed to address specific pollutants of concern or sources to enhance pollution reduction and provide increased environmental benefit.

The City has developed a comprehensive approach for managing the development and implementation of the stormwater program within the Stockton Urbanized Area (SUA). As a part of this effort, the City coordinates the program management activities internally as well as with the County (Section 1 of the 2009 SWMP). Additional information is included within each of the Program Control Measures.

1.2 CONTROL MEASURES

The City has developed several Control Measures to ensure that the program management requirements are effectively developed and implemented. The Program Management Control Measures consist of the following:

Control Measure
Program Coordination
Fiscal Analysis
Legal Authority

The next section of the Annual Report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Program Management Performance Standards and implementation schedules.

¹ The City and the County are collectively referred to as "Permittees"

² Order No. R5-2007-0173

³ Resolution No. R5-2009-0105

1.3 PROGRAM COORDINATION

The implementation of the 2009 SWMP requires a coordinated management effort by the City and County. While named as co-permittees to one permit in accordance with 40 C.F.R. §122.26(b)(4)(iii), the City and County need only comply with permit conditions relating to discharges from the municipal separate storm sewer for which they are operators, pursuant to 40 C.F.R. §122.26(a)(3)(vi), and for that reason, have separate programs and submit documents and reports separately to the Regional Water Board. However, the programs are very similar, and the Permittees collaborate with each other to address common issues, to plan and coordinate common activities, and to ensure consistency in program development and implementation.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

1.3.1 Review and Revise the SWMP

The City reviewed and revised the proposed, draft SWMP (submitted to the Regional Water Board April 1, 2007 as a part of the Report of Waste Discharge) to ensure it was consistent with the Permit that was adopted December 7, 2007. The SWMP was submitted to the Regional Water Board for approval on June 6, 2008. Based on the comments received on the 2008 SWMP in November 2008, the SWMP has since been revised and was re-submitted for Regional Water Board approval on April 15, 2009. The 2009 SWMP was approved by the RWQCB on October 8, 2009.

1.3.2 Permittees Meet Quarterly

To facilitate the ongoing communication and coordination between the two agencies, Permittee meetings were held at least once per quarter to address common issues and to ensure consistency in program development and implementation. The coordination meetings include a focus on policy related issues (with the Director and/or Deputy Director) or program implementation such as public education, monitoring, and planning and land development. All meetings included the City of Stockton Municipal Utilities Department and the County of San Joaquin Department of Public Works. A summary of the meetings held during 2009-2010 is provided below.

Type/Focus of Meeting	Meeting Date
Pyrethroids Working Group	7/1/2009
Monitoring/Special Studies	7/22/2009
Outreach	7/28/2009
Monitoring Tour with RWQCB	8/25/2009
Monitoring/Special Studies	8/26/2009
Program Implementation Meeting	9/14/2009
Monitoring/Special Studies	9/30/2009
NPDES Policy	10/6/2009
Program Implementation/Policy	10/23/2009
Public Opinion Survey Strategy	11/4/2009
Monitoring/Special Studies	11/4/2009
Conference Call – Low DO Plan Alternate Locations and Sampling Options	11/10/2009

Type/Focus of Meeting	Meeting Date
Pathogen Plan BMP Implementation	11/10/2009
SWQCCP Implementation	11/19/2009
Monitoring/Special Studies	12/7/2009
Pathogen Plan BMP	12/7/2009
SWQCCP Implementation	12/15/2009
Monitoring/Special Studies	1/6/2010
Public Opinion Survey Results	1/26/2010
IPM Strategy	1/27/2010
Pesticide/Pathogen Plan BMP Implementation	1/27/2010
Monitoring/Special Studies	2/3/2010
Seasonal Media Messaging	2/16/2010
Monitoring Tour with RWQCB	2/18/2010
NPDES Program Implementation	2/19/2010
TIE Recommendations	2/19/2010
SWQCCP Pre-Workshop	2/25/2009
Mobile Business Pilot Program	3/2/2010
Monitoring/Special Studies	3/3/2010
Program Implementation/Policy	3/4/2010
Pesticide/Pathogen Plan BMP Implementation	3/9/2010
Monitoring/Special Studies	4/7/2010
NPDES Program Implementation	4/16/2010
Conference Call on IPM	4/29/10
Mobile Business Pilot Program	5/4/2010
Conference Call on IPM	5/4/10
Monitoring/Special Studies	5/5/2010
Mobile Business Pilot Program	5/14/2010
Monitoring/Special Studies	6/2/2010
Mobile Business Pilot Program	6/8/2010
Conference Call CA Coastal Clean-up	06/14/10

1.3.3 Internal Stormwater Program Meetings (City Divisions and Departments)

The City's Municipal Utilities Department (MUD) Stormwater Management Division has primary responsibility for the development and implementation of the 2009 SWMP. The City's designated stormwater program manager oversees the implementation of the 2009 SWMP and the day-to-day operations. The stormwater program manager contact information is provided below.

Primary Stormwater Program Contact	
Name	Courtney D. Vasquez
Title	Stormwater Program Manager Program Manager III
Department/Division	Municipal Utilities Department/Stormwater
Address	2500 Navy Drive, Stockton, CA 95206
Phone Number	(209) 937-8705
E-mail Address	courtney.vasquez@ci.stockton.ca.us

Although administered and principally staffed by MUD, the implementation of the 2009 SWMP requires the assistance of and close coordination with several other City departments. MUD has recently coordinated with the other City departments who have a primary or secondary responsibility under the stormwater program and instituted a series of internal stormwater committees in order to ensure that the program requirements are understood and effectively implemented. The coordination meetings include an overall policy management meeting and a series of subcommittees that focus on planning and land development, inspections and enforcement, public outreach, monitoring and special studies, and municipal operations. Although the structure and focus of the subcommittees may be modified over time, this internal coordination provides a solid foundation for the program and will be continued throughout the permit term. A summary of the quarterly internal Stormwater Program Meetings is provided below.

Type/Focus of Meeting	Meeting Date	City Department(s) Participating
LWA Conference Call Scope of Work Prioritize FY 09/10 Work Efforts	07/14/09	MUD Stormwater
WGR Commercial Inspection Proposal	07/15/09	MUD Stormwater
SW Planning/Land Development Implementation	07/17/09	MUD Stormwater, PW, Community Development, Redevelopment , MUD Engineering
Redevelopment Standards to include Low Impact Development	07/24/09	MUD Stormwater, Redevelopment, PW
Assessment District/Special Project Update	07/27/09	MUD Stormwater
Stormwater Illicit Discharge Program Implementation	07/29/09	MUD Stormwater, Code Enforcement, Fire, EC
Stormwater Municipal Operations Program	07/29/09	MUD Stormwater, Collections, PW, Eng Redevelopment PW Solid Waste, PW Streets, EC, Corpyard,
Stormwater Construction Program Implementation Discussion	07/30/09	MUD Stormwater MUD Engineering

Type/Focus of Meeting	Meeting Date	City Department(s) Participating
Commercial Inspection Discussion with WGR	07/30/09	MUD Stormwater
FOG Commercial Inspection Program	08/05/09	MUD Stormwater, EC
Detention Basin Maintenance Discussion	08/07/09	MUD Stormwater, MUD Engineering
Basin Pre-Maintenance Meeting w/ Odyssey	08/12/09	MUD Stormwater, MUD Engineering
Stormwater Post Construction Device Maintenance	08/13/09	MUD Stormwater
Stormwater Planning/Land Development Program Implementation Discussion	08/17/09	MUD Stormwater, Redevelopment, Community Development, , PW Engineering
Post Construction Access & Maintenance Agreement	09/06/09	MUD Stormwater, MUD Engineering
Storm Pump Station Maintenance Discussion	09/09/09	MUD Maintenance, EC, Lab, MUD Stormwater
Pump Stations/Equipment Issues	10/09/09	MUD Stormwater MUD Maintenance, EC, Lab
FY 09-10 Stormwater Budgets	10/09/09	MUD Stormwater/Business Services
City of Stockton Development Discussion Conference Call	10/23/09	MUD Stormwater, Community Developmnet
Storm Season Emergency Response	10/26/09	MUD Stormwater, EC, RCO, PW Streets, Parks
Waste Management Meeting Asparagus Festival	10/28/09	MUD Stormwater – Citywide Event Planning
Discuss Stormwater Budget Shortfalls	11/09/09	MUD Stormwater/Business Services
Industrial Inspection Program State Audit	01/05/10	MUD Stromwater/EC
Asparagus Festival Planning Meetings	01/13/10	MUD Stormwater – Citywide Event
FPPP+ Parks Maintenance Issues	01/28/10	MUD Stormwater, PW –Corp Yard
IPM Discussion – Park Tour	02/02/10	MUD Stormwater, PW
Maintenance Bid Assessment District - Underground Stormwater Treatment Devices	02/16/10	MUD Stormwater, EC, Collections
Standard Specifications Update	02/17/10	MUD Stormwater, MUD Engineering
Asparagus Festival Planning and Meetings	03/10/10	MUD Stormwater – Citywide Event
IPM	04/29/10	MUD Stormwater/PW
IPM	05/04/10	MUD Stormwater/PW
SWPPP Requirements for new Construction	05/18/10	MUD Stormwater/MUD Engineering
Industrial Facility Referral Protocols	05/20/10	MUD Stormwater/Code Enforcement
Linear Construction Project Updates/Training	06/10/10	MUD Stormwater, MUD Engineering, PW Engineering

Each of the key Departments has a responsibility for the day-to-day implementation of the 2009 SWMP. A general overview of the Program Elements and responsible City Departments is presented in **Table 1-1**. For specific information regarding each Control Measure and Performance Standard, the appropriate 2009 SWMP section should be consulted.

Table 1-1. City Departments Responsible for Implementing the Stormwater Program¹

Department	Program Management & Reporting	Illicit Discharges	Public Education	Municipal Operations ¹	Industrial/Commercial	Construction	Planning & Land Development	Monitoring	Water Quality Based Programs
MUD – Stormwater Management	P	S	P	S	P	P	S	P	P
MUD – Engineering	S			P			P		
MUD – Environmental Control	S	P	S		S			P	
MUD – O & M				P					
MUD – Stormwater Assessment				S					
Community Development	S	S	S		S	S	P		
Fire							S		
Library							S		
Police							S		
PW – Engineering	S			P		S	S		
PW – Operations & Maintenance				P					
PW – Solid Waste & Recycling				P					
Parks and Recreation	S		S	P					
City Attorney	S	S			S	S	S		

Notes:

1. Multiple departments are listed as having primary responsibility due to differing responsibilities for various control measures.

P – Primary responsibility

S – Provides support to primary department

MUD – Municipal Utilities Department

PW – Public Works

1.3.4 Statewide Stormwater-Related Meetings, Conferences, and Stakeholder Groups

Participation in statewide stormwater-related meetings, conferences, and stakeholder groups serves as training and information-sharing sessions for the participants. A summary of the statewide stormwater-related meetings, conferences, and stakeholder groups in which the City participated during the reporting period is provided below.

Type/Focus of Meeting	Sponsoring Agency/ Group	Meeting Date	City Department(s) Participating
Delta Methyl Mercury TMDL	Central Valley Clean Water Association	08/20/2009	MUD Stormwater
Bay Delta Conservation Plan (BDCP) Public Workshop - Stockton	BDCP Steering Committee	09/22/2009	MUD Stormwater
Preseason Flood Coordination	<i>(Countywide meeting)</i>	10/27/2009	MUD Stormwater
BDCP	BDCP Steering Committee	01/21/2010	MUD Stormwater
Delta Methyl Mercury TMDL Conference Call	Central Valley Clean Water Association	03/10/2010	MUD Stormwater
Sediment Quality Analysis	State Water Resources Control Board	03/15/2010	MUD Stormwater
Sediment Quality Analysis	State Water Resources Control Board	03/16/2010	MUD Stormwater
CASQA Meeting	CASQA	05/13/2010	MUD Stormwater

1.3.5 Review and Revise MOUs as Necessary

In 1995, the City and County entered into a Memorandum of Understanding (MOU) for filing as Permittees under one NPDES permit as well as the development of a receiving waters monitoring program. The MOU provided a mechanism for the City and County to continue to work cooperatively on the development and implementation of additional NPDES programs.

The Permittees have reviewed and revised their existing MOU to ensure that it provides for designation of joint responsibilities, decision making, information management of data and reports, cost sharing objectives, and any other collaborative arrangements that are necessary for compliance with the Permit. The MOU was approved by the County Board of Supervisors and the City Council on September 16, 2008. The updated, final MOU was included as Appendix A-1 to the 2009 SWMP and as Appendix A-1 of the 2008-2009 Annual Report.

1.3.6 Establish, Review, and Revise Cooperative Agreements

To help control the contribution of pollutants from one portion of the stormwater system to another, the City may participate in cooperative agreements with other agencies as the need or opportunity arises.

The Stormwater Program participates with numerous community groups, various state agencies, and local Phase II cities on outreach events, regional advertising, and training. Details on meetings, dates, and types of events sponsored are found in more detail in Section 3, Public Education.

1.4 FISCAL ANALYSIS

The Fiscal Analysis includes the following:

- The expenditures for the previous fiscal year;
- The budget for the current fiscal year; and
- A description of the source of funds.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

1.4.1 Complete a Stormwater Rate Study

During the reporting period, the City completed a Stormwater Rate Study to review the current rate structure and make recommendations to increase the monthly stormwater user fees in order to adequately fund the Program. Although this was due by September 30, 2009, the City finalized the Rate Study in June 2010. The final Stormwater Rate Study is included as **Appendix A-1**. A community vote on the proposed new Clean Water Fee is anticipated to occur in the fall of 2010.

1.4.2 Review and Revise the Fiscal Analysis Reporting Format

Pursuant to the Permit, the Permittees reviewed the fiscal analysis reporting format so that expenditures are consistently assessed by SWMP Program Element from year to year. The Fiscal Analysis reporting format was revised during the reporting period to more accurately reflect expenditures for staff salaries. The Fiscal Analysis is provided below, and it will continue to be modified as needed.

1.4.3 Report the Fiscal Analysis within the Annual Report

The City assessed the current NPDES expenditures as well as the projected expenditures for the next fiscal year. The budget summary includes the expenditures incurred to implement the SWMP and written explanations where necessary. The summary below also includes a description of the source(s) of the funds, including any legal restrictions on the use of the funds.

Program Element	Expenditures During Fiscal Year 2009-2010	Estimated Budget for Fiscal Year 2010-2011
Program Management: Staff salaries, utility billing, phone charges, computer software/rentals, memberships, permit fees, indirect cost allocations, training, consultant contracts	\$1,596,207	\$2,078,628
Public Outreach: Includes industrial, commercial, residential programs including media and community events	\$293,187	\$103,000
Municipal Operations: Includes CIPs and Storm Drain System Cleaning and Maintenance (includes Illicit Discharges , illegal connections mitigation, and clean-up) ¹	\$1,598,888	\$2,472,618
Industrial and Commercial: Includes consultant contracts and follow-up inspections. Business Outreach included under Public Outreach budget. ²	\$117,442	\$0 ²
Construction	N/A ^{3, 4}	N/A ^{3, 4}
Planning and Land Development	N/A ³	N/A ³
Water Quality Monitoring Programs: Includes Baseline Monitoring Program, Bioassessment Analysis, Dry Weather Field Screening, Smith Canal Bathymetry Study, Detention Basin Monitoring, BMP Effectiveness Study, Sediment Toxicity, Smith Canal/Mosher Slough Low DO13267 Letter Monitoring,	\$597,586	\$673,550
Water Quality Based Programs: Includes Pesticide, Pathogen, Mercury, and DO Work Plans and Implementation	\$335,233	\$607,365
TOTAL	\$4,538,543	\$5,935,161

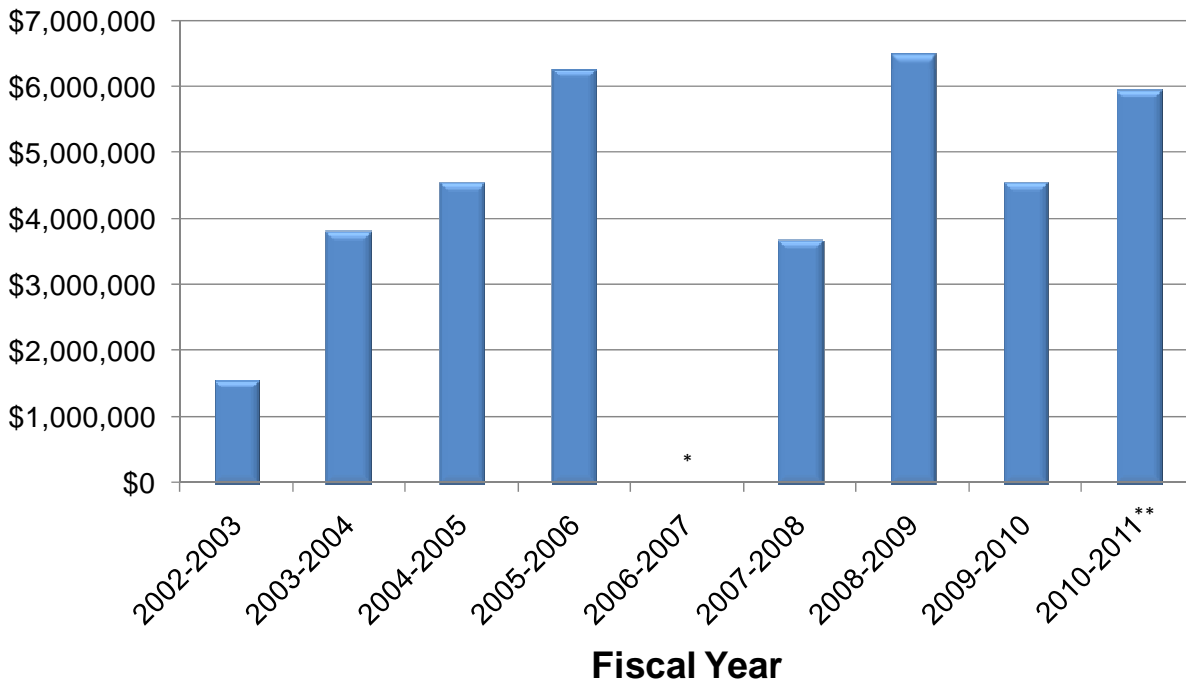
Note:

1. FPPP is paid for out of Public Works budget and is not a Stormwater Expense
2. Industrial and Commercial Inspection Program will resume in 2011-2012
3. Staff salaries are included in Program Management budget.
4. Construction outreach is included under Public Outreach budget.

The figure below depicts the City's Stormwater Program annual expenditures for each fiscal year from 2002 through 2010, as well as the projected expenditures for the 2010-2011 fiscal year.

Stormwater Program Annual Expenditures

2002-2011 Fiscal Years



* Data not available.

** Estimated Program Expenditures for 2009-2010 FY

■ Expenditures by Fiscal Year

The City's stormwater program is funded by a storm drain maintenance or user fee. The fee/equivalent residential unit is \$2.10/month per Equivalent Residential Unit.

1.5 LEGAL AUTHORITY

The Permit requires that the Permittees implement a stormwater management program to reduce the pollutants in stormwater discharges to the MEP. Central to this program is the establishment and/or verification that the Permittees have adequate legal authority to regulate the discharge of pollutants to the storm drain system.

The City enacted a Stormwater Management and Discharge Control Ordinance (Chapter 13.16 of the recodified Stockton Municipal Code⁴) to specifically control stormwater runoff quality. This ordinance both complements and supplements the existing ordinances and establishes uniform requirements for protecting and enhancing the water quality of the City's watercourses, water bodies, and wetlands in a manner consistent with the Clean Water Act.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

1.5.1 Review the Legal Authority

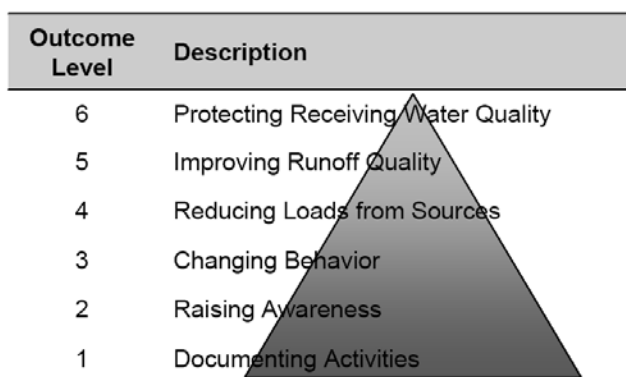
The City Attorney has reviewed the existing legal authority to ensure that the City has adequate legal authority to implement and enforce each of the requirements within Order No. R5-2007-0173. The legal authority will continue to be reviewed as needed.

⁴ Available online at: <http://www.stocktongov.com/smc/>

1.6 PROGRAM EFFECTIVENESS ASSESSMENT

The City has adopted a method for assessing program effectiveness based on an approach developed by the California Stormwater Quality Association™ (CASQA). The effectiveness assessment is more comprehensive than past assessments and addresses the major stormwater program areas and activities. As illustrated below, there are six outcome levels for the effectiveness assessment. The outcome levels represent ways in which the effectiveness of the program can be determined, even if it is intermediate.⁵

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 1-1**. As illustrated in the Figure below, there are six outcome levels for the effectiveness assessment. The outcome levels help to categorize and describe the desired results or goals of the program.



Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities

Figure 1-1. Effectiveness Assessment Outcome Levels

Within each individual section (starting with Section 2), the effectiveness assessment identifies the outcome level(s) achieved, as well as any program modifications that have been identified because of the assessment. In future annual reports, the effectiveness assessment will be expanded and modified as necessary in order to report out on key items.

Some important points to remember about these effectiveness assessments include:

- The ability of a stormwater program to assess an outcome level tends to become progressively more difficult as you assess higher outcome levels (levels 4-6). This is because the higher outcome levels assess the impact that the SWMP has on water quality, which requires a much more robust dataset over an extended period of time.
- Outcome levels 1-3 (and sometimes 4) are typically assessed using program management data, whereas outcome levels 4-6 are assessed using physical and/or water quality monitoring data.
- Each program element can be assessed at one or more outcome levels based on the data and information available.

In future annual reports, the effectiveness assessment will be expanded and modified as necessary in order to report out on key items.

⁵ California Stormwater Quality Association, *Municipal Program Effectiveness Assessment Guidance*, May 2007.

1.7 PROGRAM MANAGEMENT MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Program Management Element. In addition to the anticipated tasks that are identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, and determines if any additional program modifications are necessary in order to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that were identified during 2009-2010 include the following:

- **Report the Fiscal Analysis within the Annual Report:** All staff salary information for staff with stormwater program responsibilities will be tracked under the Program Management Element, rather than within specific Program Elements (e.g., Municipal Operations, Construction).

Section 2

Illicit Discharges (ID)

2.1 OVERVIEW

An illicit discharge is defined as any discharge to the storm drain system that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. Illicit discharges include the disposal of materials such as paint, spa water, or waste oil into the storm drain or the discharge of waste streams containing pollutants to the storm drain. Illegal connections are a subset of illicit discharges. Illegal connections are defined as undocumented and/or unpermitted physical connections from a facility to the storm drain system or receiving water (e.g., a sanitary sewer connection to the storm drain).

Because illicit discharges and illegal connections can be a significant source of pollutants to the storm drain system and receiving waters, the purpose of this Program Element is to ensure implementation of a comprehensive program for detecting, responding to, investigating and eliminating these types of discharges and connections in an efficient and effective manner.

2.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that the illicit discharge related permit requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the SWMP.

The Illicit Discharges Program Control Measures consist of the following:

ID	Control Measure
ID1	Detection of Illicit Discharges and Illegal Connections <ul style="list-style-type: none">• Public Reporting (Hotline)• Dry Weather Field Screening• Field Crew Inspections
ID2	Illegal Connection Identification and Elimination <ul style="list-style-type: none">• Investigation and Elimination• Enforcement
ID3	Investigation/Inspection and Follow Up <ul style="list-style-type: none">• Response and Investigation• Cleanup• Recordkeeping and Tracking
ID4	Enforcement
ID5	Training
ID6	Effectiveness Assessment

The next section of the Annual Report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Illicit Discharges Performance Standards and implementation schedules.

2.3 ID1 – DETECTION OF ILLICIT DISCHARGES AND ILLEGAL CONNECTIONS

Detection of illicit discharges through the availability of a public hotline, conducting dry weather field screening, and utilizing field crews ensures that the Illicit Discharges program is proactive in identifying and eliminating problematic discharges. This control measure reflects the City's efforts to detect and eliminate illicit discharges and illegal connections and provides several mechanisms for receiving information.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

2.3.1 Spill Response Procedures

The City addresses three types of spills: sewage, non-hazardous, and hazardous spills. Procedurally, the sewage and non-hazardous spills are addressed in the same manner, whereas the hazardous spills are responded to and addressed by a licensed contractor.

During the 2009-2010 reporting period, the City developed a document, *Spill Response Procedures for Non-Hazardous Materials and Wastes*, that includes a responsibility flow chart and outlines a timeline and response steps to address emergency and non-emergency spills of non-hazardous materials and wastes. The *Spill Response Procedures for Non-Hazardous Materials and Wastes* are attached as **Appendix B-1**.

2.3.2 Public Reporting

Maintain and Advertise Hotline/Ask Stockton

The City has established and maintains a 24-hour Hotline (**209-937-8341**) to encourage the public to report water pollution problems. The reporting program is based on a published directory that lists the telephone numbers of all City staff and departments. The directory is designed to facilitate the public's access to the City government by giving every City employee the ability to direct initial inquiries to the appropriate department or person.

- Business Hours – During normal business hours, City personnel are available to answer and direct calls to the appropriate department.
- Evenings and Weekends – After hours, calls are automatically deferred to 911 and the Fire Department dispatcher.

Each complaint or spill is investigated within two business days and tracked to ensure that information is not lost. Internal communication between departments has been established through a series of notification flowcharts for particular types of incidents to ensure response, adequate tracking and corrective actions. Each incident is documented using the incident response form included in the City's Emergency Spill Response Plan.

[Stockton Homepage](#)
[For Residents](#)
[For Visitors](#)
[For Businesses](#)
[Helpful Resources](#)
[Contact Us](#)
[SEARCH](#)

Municipal Utilities Department: 2500 Navy Drive * Stockton, CA * 95206 * (209) 937-8750 * (209) 937-8708 (fax) * [Send an E-Mail](#)

Municipal Utilities Department

General Info

REPORT A PROBLEM

RWCF Office Hours

Monday - Thursday
7 am - 6 pm

Friday
7 am - 5 pm
(209) 937-8700
On alternate Fridays, offices are closed.

When a problem arises, MUD is here to help.

Service Center and 24-hour Emergency Phone Number
(209) 937-8341

You know it's an emergency if...

1. Raw sewage is backing up onto your property or into the gutter. ([more info](#))
2. Your street is flooded due to clogged storm drains. ([more info](#))
3. A water pipe is broken and water is running out into the street. ([more info](#))
4. Paint, oil, swimming pool water, or other types of hazardous waste are being dumped or washed into the gutter or storm drain. ([more info](#))
5. A maintenance-hole cover is missing or not sitting correctly on the opening. ([more info](#))

If it is NOT an emergency, please send us an [email](#) or call during regular RWCF office hours.

Municipal Utilities (MUD)

General Info

- Utility Services
 - Water
 - Waste water
 - Stormwater
 - Water Conservation
- Billing / Account Info
- City or County?
- Fee Schedule (pdf)
- Report A Problem
- Service Area
- About MUD
- FAQ
- Project Info /Updates
- Regulatory Info
- Staff
- Contact us

Business

- Getting Started
- Permits / Fees
- Reports / Forms
- Inspection Program
- Bids / RFPs
- Helpful Resources

In addition, the City has established a web-based public reporting system called Ask Stockton. The Stormwater Program uses Ask Stockton to address various stormwater related issues, questions, and concerns. Ask Stockton is advertised through the City of Stockton's web site, utility bill inserts, and various outreach materials created throughout the City.

Welcome to the City of Stockton California

Stockton Homepage For Residents For Visitors For Business Contact Us SEARCH

General contact information: 425 N. El Dorado Street • Stockton, CA • 95202 • (209) 937-8212

ASK STOCKTON

Use this form to make a service request, ask a question, or make a comment.

If this is your first time using this form, you will be given the option to register after sending the form.

Before submitting a question - have you checked the [Frequently Asked Questions](#)? You may find your answer there!

For return visitors, sign in here

User name: Password: ☐ Remember me [Sign in](#) [Password assistance?](#)

Please tell us how we may assist you by entering your request below. * These fields are required

Request type: Problem

* Select a Topic: (Please select)

* Please describe your problem or question in detail

So we may best serve you, please tell us how you can be contacted. Entering your name and email address allows us to communicate with you and allows you to track this request.

First Name: Last Name:

Phone number: Email address:

Alt. Phone: Address:

City: Stockton State: CA Zip code:

[Send](#)

The City facilitated the reporting of illicit discharges by maintaining the Hotline/Ask Stockton and advertising them:

- In the public/business education materials
- On the City Web site (www.stockton.gov/mud)
- In the telephone book – Government pages
- In all printed material

The number of water pollution complaints received and verified and the source of the complaints are listed below.

	Source	Total Number of Calls/Forms Submitted	Total Number of Water Pollution Complaints Received	Total Number of Water Pollution Complaints Verified
Last Year 2008-2009	Hotline	356	22	17
	Ask Stockton	Not Tracked	1	1
This Year 2009-2010	Hotline	Not Tracked	23	20
	Ask Stockton	Not Tracked	0	N/A

Coordinate with Other Departments and Agencies

During the reporting period, the City coordinated with other departments and agencies to ensure that all reports of water pollution problems are appropriately received, routed, tracked, and investigated.

The City continued to coordinate throughout the year by:

- Advertising the hotline number internally
- Conducting internal meetings/training
- Providing telephone numbers/flow charts
- Including the hotline number in all printed material

Review Complaint Documentation Form

During the 2009-2010 reporting period, the City reviewed and revised the Stormwater Program Illicit Discharge Complaint Form that is used to document the complaints received. The revised Stormwater Program Illicit Discharge Complaint Form is attached as **Appendix B-2**.

2.3.3 Dry Weather Field Screening

Conduct Dry Weather Field Screening

The City has established an annual dry weather field screening program that ensures all outfalls are surveyed within five years (see also Section 8 of this Annual Report). The field screening program identifies new dry weather flows and provides a check on the effectiveness of the ID Program and supports this Program by identifying “hot spots” and conducting the appropriate follow-up action(s). All outfalls are sampled and tested for temperature, pH, chlorine, copper, phenols, dissolved oxygen, electrical conductivity and detergents. The results of the dry weather field screening and information regarding the source identification studies is provided in Section 8 of the Annual Report. A brief summary of the program is provided below.

The number of outfalls monitored and the number of problem areas identified are listed below.

	Total Number of Outfalls Monitored	Total Number of Dry Weather Discharges Exceeding Action Levels
Last Year 2008-2009	23	2
This Year 2009-2010	22	0

Of the 22 outfall locations investigated during the 2009-2010 monitoring program, field analytical results indicated that all other constituent concentrations were below action levels.

Evaluate Effectiveness of Dry Weather Field Screening Program

- Did the City evaluate the effectiveness of the dry weather field screening program in identifying Illicit Discharges/Illegal Connections (ID/IC) issues and revise as needed (*by June 30, 2012*)?

Yes ☐

No, not required to be completed until June 30, 2012 ☒

2.3.4 Field Crew Inspections

Field staff are trained to recognize illicit discharges so that, during their normal maintenance activities, they can identify signs of previous, current, or potential non-stormwater discharges/connections or illegal dumping into the storm drain system. Once they are discovered, the field staff notify the MUD – Stormwater Management Program for follow-up investigation. The City’s primary spill response investigator conducts follow-up inspections and accompanies field crews during cleanup to ensure that reported spills are properly cleaned up and identified illicit connections are corrected. During 2009-2010 the City field staff observed and reported illicit discharges.

The number of water pollution issues identified by field staff is listed below.

	Source	Total Number of Illicit Discharges Identified	Total Number of Sources Verified
Last Year 2008-2009	Field Staff	23	20
This Year 2009-2010	Field Staff	63	57

For illicit discharges identified by field staff, information from the Illicit Discharges Database (i.e., the types of pollutants involved; whether the discharge was verified; whether the source was identified; enforcement actions taken; contractor cleanup status; source of complaint; and whether the complaint was investigated within two business days) is provided in **Appendix B-3**. Some illicit discharges identified by field staff (52) are not included in this database.

2.4 ID2 – ILLEGAL CONNECTION IDENTIFICATION AND ELIMINATION

In parallel with the City's efforts to detect and eliminate illicit discharges (see ID1), the City proactively detects illegal connections to the storm drain system. Upon identification of an illegal connection, the City investigates and eliminates illegal connections through a variety of mechanisms including, but not limited to, permitting or plugging the connection.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

2.4.1 Investigate/Eliminate Illegal Connections

As a part of their normal maintenance activities, City field staff identifies signs of illegal connections to the storm drain system. Once they are discovered, the illegal connections are addressed and corrected/eliminated.

- Did the City field staff continue to identify illegal connections?
Yes, illegal connections identified ☒
Yes, but no illegal connections identified ☐
No ☐
- Did the responsible MUD staff investigate the potential illegal connections within 21 calendar days to determine the source of the connection, the nature and volume of discharge through the connection, and the responsible party for the connection?
Yes ☒
No, no illegal connections identified ☐
- Did the responsible MUD staff eliminate identified illegal connections?
Yes ☒
No, no illegal connections identified ☐

The table below summarizes the illegal connections investigation/elimination efforts.

	Source	Total Number of Illegal Connections Reported	Total Number of Illegal Connections Verified	Total Number of Illegal Connections Eliminated
Last Year 2008-2009	Hotline	0	0	0
	Ask Stockton	0	0	0
	Field Staff	1	1	1
This Year 2009-2010	Hotline	0	0	0
	Ask Stockton	0	0	0
	Field Staff	3	3	3

2.4.2 Coordinate with Planning and Land Development Program

The City requires that tentative parcel maps be reviewed to ensure that they are consistent with the City standards, including the storm drain standards. Plan reviews ensure that no illegal connections are proposed. All plan reviews are tracked in a database and construction inspections are conducted upon project completion to ensure that the project was built correctly.

- Did the City coordinate with the Planning and Land Development program to conduct plan reviews and identify illegal connections throughout the year?

Yes, illegal connections identified ☐

Yes, but no illegal connections identified ☒

No ☐

The number of illegal connections identified through Planning and Land Development plan reviews is listed below.

	Source	Total Number of Plans Reviewed	Total Number of Illegal Connections Identified
Last Year 2008-2009	Planning/Land Development Plan Review	100	0
This Year 2009-2010	Planning/Land Development Plan Review	75	0

2.4.3 Coordinate with Construction Program

- Did the City coordinate with the Construction program to inspect projects and identify illegal connections throughout the year?

Yes, illegal connections identified ☐

Yes, but no illegal connections identified ☒

No ☐

Municipal Utilities Department Engineering (Permit Center) staff coordinated with the Planning Division throughout the year to identify illegal connections during the Plan Review Stage. Information on all approved projects is communicated to Municipal Utilities Department's Stormwater Construction Inspector to begin the required monthly inspections of active construction sites once any issues have been resolved and the project is active.

The number of illegal connections identified through Construction project inspections is listed below.

	Source	Total Number of Illegal Connections Identified
Last Year 2008-2009	Project Construction Inspections	0
This year 2009-2010	Project Construction Inspections	0

2.5 ID3 – INVESTIGATION/INSPECTION AND FOLLOW UP

The investigation and inspection of potential illicit discharges and illegal connections to the storm drain system, as well as appropriate follow-up actions, are essential in order to eliminate illicit discharges and illegal connections. The response and follow-up actions may include cleanup and/or other necessary actions to mitigate the impacts of the discharge.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

2.5.1 Response and Investigation

When a notification or complaint is received, the Municipal Utilities Department (MUD) provides an on-site assessment to determine the conditions of the discharge within two (2) business days (during or immediately following containment and cleanup). The investigation process includes determining whether the discharge is occurring on private or public property, whether the discharge is an authorized non-stormwater discharge, and whether the discharge is hazardous.

In addition, during the 2009-2010 reporting period, the City developed *Spill Response Procedures for Non-Hazardous Materials and Wastes* that include a responsibility flow chart and outlined timeline and response steps to address emergency and non-emergency spills of non-hazardous materials and waste. The *Spill Response Procedures for Non-Hazardous Materials and Wastes* are attached as **Appendix B-1**.

The City completes a detailed description of each report, action taken, and final resolution. A Stormwater Program Illicit Discharge Complaint Form has been developed to ensure all pertinent information is gathered, and this form was revised during the 2009-2010 reporting period (**Appendix B-2**).

Respond to Illicit Discharges

A table summarizing the responses is provided below. For illicit discharges identified via the Hotline, Ask Stockton, and MUD Environmental Control Staff, information from the Illicit Discharges Database (i.e., the types of pollutants involved; whether the discharge was verified; whether the source was identified; enforcement actions taken; contractor cleanup status; source of complaint; and whether the complaint was investigated within two business days) is provided in **Appendix B-3**. Some illicit discharges identified by field staff (52) are not included in this database.

	Total Number of Complaints/Notifications Reported (All Sources) ¹	Total Number of Illicit Discharges Verified (All Sources)	Total Number of Complaints/Notifications Investigated within Two (2) Business Days
Last Year 2008-2009	78	67	78
This year 2009-2010	92	84	92

Note:

1. Sources include the Hotline (23), Ask Stockton (0), Field Staff (63), and Other (6).

A table summarizing the types of materials involved in the reported incidents is provided below.

Type of Materials	Total Number of Illicit Discharges Verified (2009-2010)
Inorganic	6
Paint	3
Petroleum Products	28
Sewage	12
Miscellaneous	40
Unidentified	0

Develop an Investigative Guidance Manual

During the 2009-2010 reporting period, the City developed an Investigative Guidance Manual to ensure that inspections of ID/IC are conducted in a uniform manner (**Appendix B-4**). The Investigative Guidance Manual establishes general guidelines that may be utilized to ensure that the procedures followed and information obtained during an investigation are defensible. The Investigative Guidance Manual covers protocols for obtaining permission to inspect, proper collection of evidence, and appropriate enforcement actions. This document has been distributed to and will be used by MUD Environmental Control and MUD Stormwater staff.

2.5.2 Cleanup

The main objective of the cleanup effort is to restore the impacted area back to its original state and prevent further environmental degradation in the area surrounding the incident. Depending on the incident, the City may serve the owner or occupant of the property with an invoice for the cleanup cost.

The City maintained contractual services for the cleanup and removal of hazardous materials. The number of illicit discharges requiring contractor clean-up is listed below.

	Total Number of Illicit Discharges Requiring Clean-Up
Last Year 2008-2009	22
This Year 2009-2010	17

2.5.3 Recordkeeping and Tracking

The City developed an Illicit Discharge Database and utilizes the information to identify and respond to areas that require focused attention. The City also maps the locations of the illicit discharges and illegal connections on a GIS-based map and uses the information to evaluate patterns and trends with the objective of identifying priority areas and tracking repeat offenders.

Maintain Illicit Discharges Database

The City maintained the Illicit Discharges database. Information related to the illicit discharges, including the types of pollutants involved, whether the discharge was verified, whether the source was identified,

enforcement actions taken, contractor cleanup status, source of complaint, and whether the complaint was investigated within two business days is provided as **Appendix B-3**.

Evaluate, Optimize, and Incorporate Waste Categories

During the reporting period, the City evaluated and optimized the waste categories it uses to categorize illicit discharges in order to minimize the number of illicit discharges described as miscellaneous or unidentified and more accurately characterize the pollutants and activities involved (see the Waste Categories Memorandum, **Appendix B-5**). This will allow the City to effectively focus resources on the more prevalent types of incidents. By targeting pollutants and associated activities for additional outreach efforts, the City may be able to eliminate a large portion of the incidents that occur, thereby resulting in a more effective Illicit Discharge program.

Under the new system, each illicit discharge is tracked by facility type, activity causing the illicit discharge, and updated waste categories that are a hybrid of categories previously used by the City and categories recommended by CASQA. These waste categories have been incorporated into the illicit discharge database and will be used to track illicit discharges beginning in 2010-2011 (**Appendix B-6**).

Identify Reported Illicit Discharges on a Map

The City mapped the identified illicit discharges. The Illicit Discharges Location Map is provided as **Appendix B-7**. In the past, the City has observed that clusters of sanitary sewer overflow (SSO) incidents tend to occur in areas of the City where the sewage infrastructure is older. The City will continue to monitor these areas for discharges and provide appropriate outreach that targets these areas.

2.6 ID4 – ENFORCEMENT

The Enforcement Control Measure establishes policies and procedures and outlines the progressive levels of enforcement applied to responsible parties not complying with City ordinances. By adopting and implementing a progressive enforcement policy, the City will ensure that the program is effective at reducing illicit discharges and illegal connections.

The performance standards for this control measure and the activities that have been initiated and/or completed during this reporting period are summarized below.

2.6.1 Implement Progressive Enforcement Policy

The City has a progressive enforcement and referral policy so that the enforcement actions match the severity of the violation and include distinct, progressive steps. Enforcement actions are taken in accordance with the *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive, **Appendix B-8**). Options are available for progressive, corrective actions for repeat offenders. In general, the progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by businesses are addressed in a more formal manner through the issuance of administrative citations, notices of non-compliance, cease and desist orders, and criminal enforcement, depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

2.6.2 Review/Revise Illicit Discharges Database to Incorporate Enforcement-Related Information

The Illicit Discharges Database has been updated to incorporate enforcement-related information (**Appendix B-3**). All enforcement actions associated with an incident are tracked. The database is supported by records kept by MUD Environmental Control and MUD Stormwater for all citations written and enforcement actions taken.

2.6.3 Track Enforcement Actions in the Illicit Discharges Database

The City used the Illicit Discharges Database to track enforcement actions. The number and types of enforcement actions taken for illicit discharges and illegal connections are summarized below.

Type of Enforcement Action	Number
Verbal Warning	30
Administrative Enforcement	
Notice of Violation	16
Notice to Clean	28
Correction Order	31
Criminal Enforcement	
Misdemeanor	0
Infraction	0

Note:

1. The total number of enforcement actions taken is greater than the number of verified sources due to multiple enforcement actions for a single discharge.

Total number of complaints/problems referred to the Regional Board: 0

Number of repeat offenders identified: 0

2.7 ID5 – TRAINING

Training is important for the implementation of the Illicit Discharges Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

Areas of Focus for the Illicit Discharge Detection and Elimination Program Training

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none">Hotline staffPublic Works maintenance crewsIndustrial/Commercial inspectorsBuilding and construction inspectorsPolice Dept.Fire Dept.Environmental Control Officers	<ul style="list-style-type: none">ClassroomField Demos	<ul style="list-style-type: none">Overview of stormwater management programStormwater ordinance and enforcement policyIdentification and eliminationConducting field inspectionsResponse and notificationDatabase tracking	<ul style="list-style-type: none">Training seminars or workshops related to ID/ICs may be made available by other organizations

2.7.1 Conduct Training

- Did the City conduct Responders Introduction training for key staff involved in the ID program (by June 30, 2010 and September 30, 2011)?

Yes ☐

No ☒

Although the City did not specifically conduct Responders Introduction training, City staff attend annual training to maintain certifications. During 2010-2011, the City will develop and provide three to four workshops to address the training elements outlined in the SWMP.

- Did the City conduct Responders Field Implementation training for key staff involved in the ID program (by June 30, 2010 and September 30, 2011)?

Yes ☐

No ☒

Although the City did not specifically conduct Responders Field Implementation training, City staff attend annual training to maintain certifications. During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP.

- Did the City conduct Investigative Techniques training for key staff involved in the ID program (by June 30, 2010 and June 30, 2012)?

Yes ☐

No ☒

Although the City did not specifically conduct Investigative Techniques training, City staff attend annual training to maintain certifications. During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP.

- Did the City conduct Fire Department Activities training for key staff involved in the ID program (by *June 30, 2010 and June 30, 2012*)?

Yes ☐

No ☒

The City's Fire Department is typically the first responder to illicit discharge calls of an unknown substance. MUD Stormwater do not train Fire Department staff; the Fire Department has its own training program that includes appropriate response to spills.

2.8 ID6 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Illicit Discharges Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Illicit Discharge Program, the assessment primarily focused on Outcome Levels 1-3.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the 2009 SWMP?
- Outcome Level 2 (L2) answers the question: Can the City demonstrate that the control measure/performance standard significantly increased the awareness of a target audience?
- Outcome Level 3 (L3) answers the question: Can the City demonstrate that the control measure/performance standard significantly modified the behavior of a target audience?

The table below summarizes the effectiveness assessment that was conducted for the Illicit Discharges Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Illicit Discharges

Illicit Discharges	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
ID1 - Detection of Illicit Discharges and Illegal Connections	C – Maintained and Advertised Hotline C – Coordination with Other Dept and Agencies C – Review of Internal Forms C – Implemented Dry Weather Field Screening	C- Hotline Calls	C – Identification of Illicit Discharges by Field Crews	N/A
ID2 - Illegal Connections Identification and Elimination	C – Identification and Elimination	N/A	N/A	N/A
ID3 - Investigation/Inspection and Follow Up	C – Response Activities C – Developed Spill Response Procedures C -- Evaluated, Optimized, and Incorporated Waste Categories	C – Reports of Verified Illicit Discharges	A	A
ID4 - Enforcement	C – Enforcement Action	N/A	N/A	N/A
ID5 - Training	A	A	N/A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

N/A – This outcome level is not applicable for this control measure

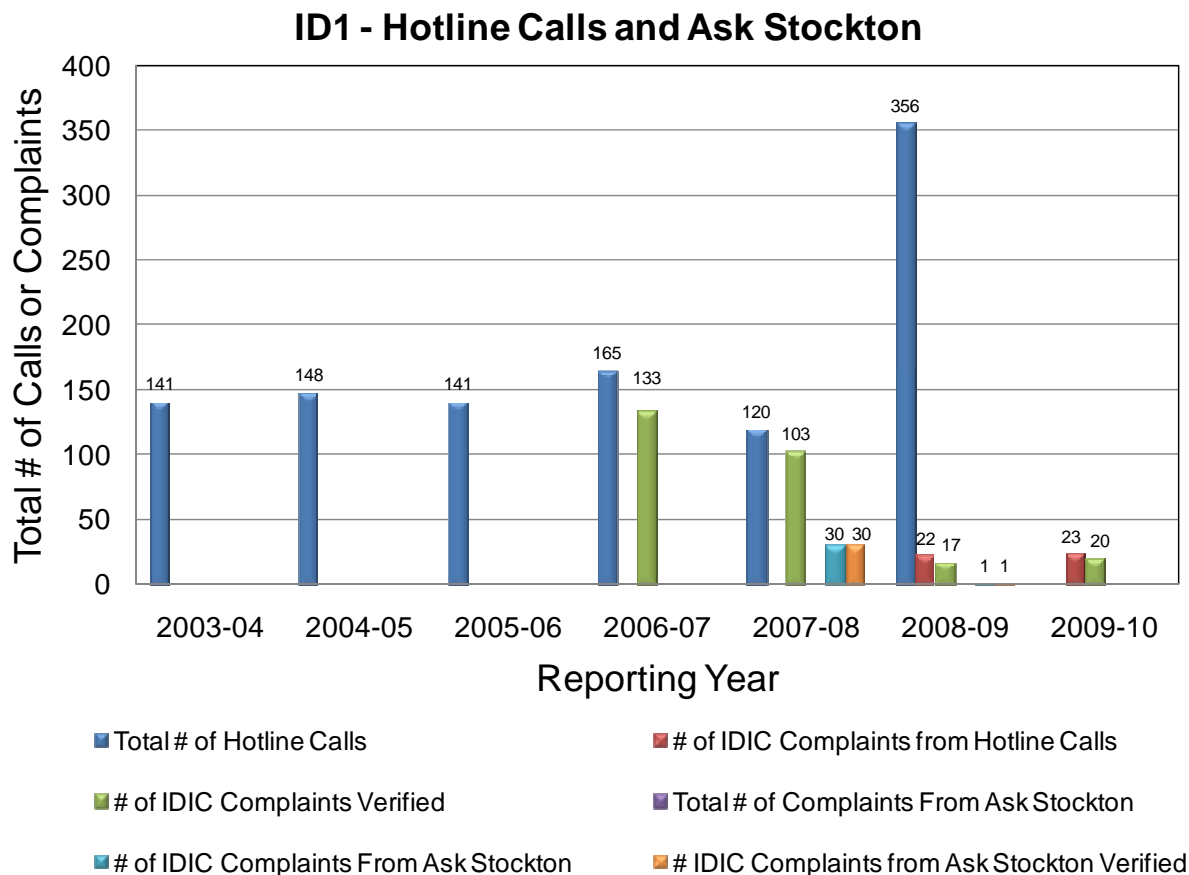
Following is an assessment regarding the effectiveness of the Illicit Discharges Program.

ID1 - Detection of Illicit Discharges and Illegal Connections

The City has facilitated the reporting of illicit discharges by establishing and maintaining a hotline number and a web-based public reporting system (Ask Stockton) and then widely advertising them as part of the public outreach program. This has been accomplished by including the hotline number and/or website in public education materials, on the City's Web site, and in the local telephone book. **(L1)**

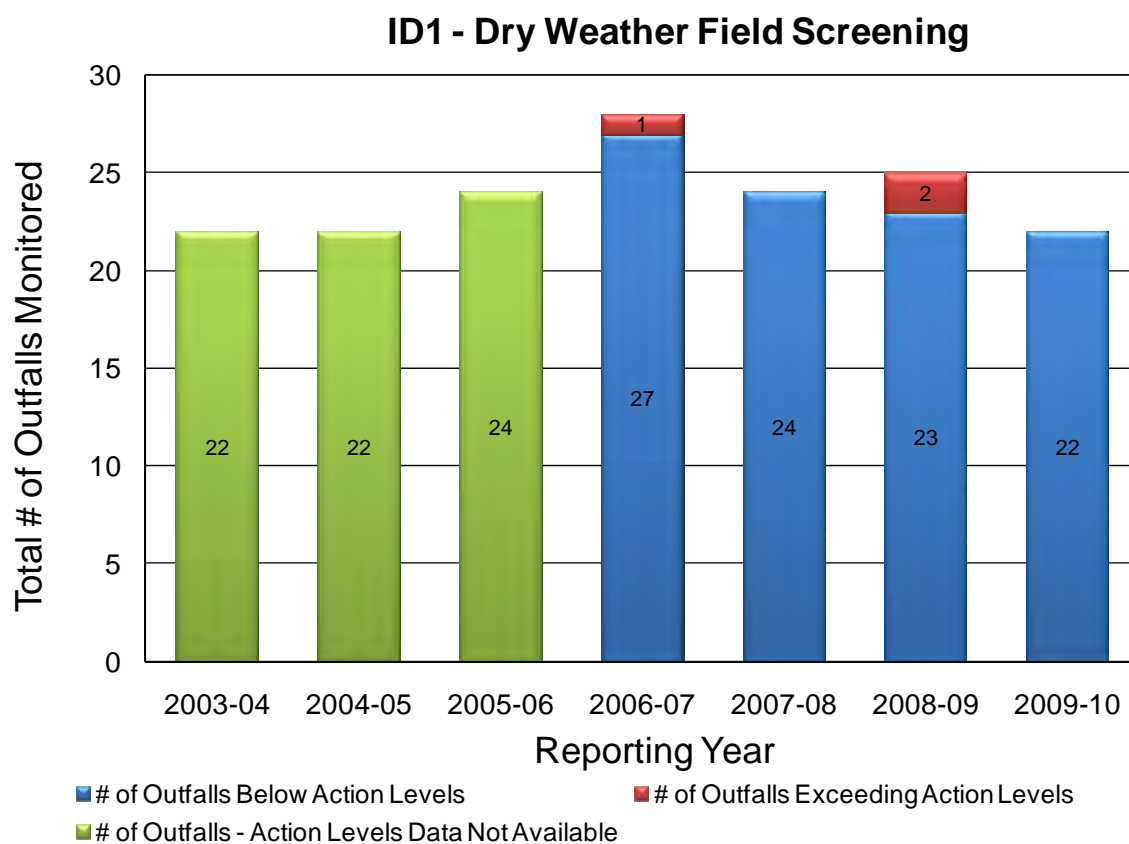
The public has become more aware of the hotline and Ask Stockton and have provided notifications/complaints through these two reporting mechanisms. **(L2)**

- Between 2003-2004 and 2007-2008, the City received and responded to a total of 715 hotline calls specifically regarding illegal dumping or illicit discharges. Since 2007-2008, the City has responded to and verified 140 hotline complaints of illegal dumping or illicit discharges.
- Since 2007-2008, the City has received and responded to 31 notifications/complaints of illicit discharges that were submitted via Ask Stockton.

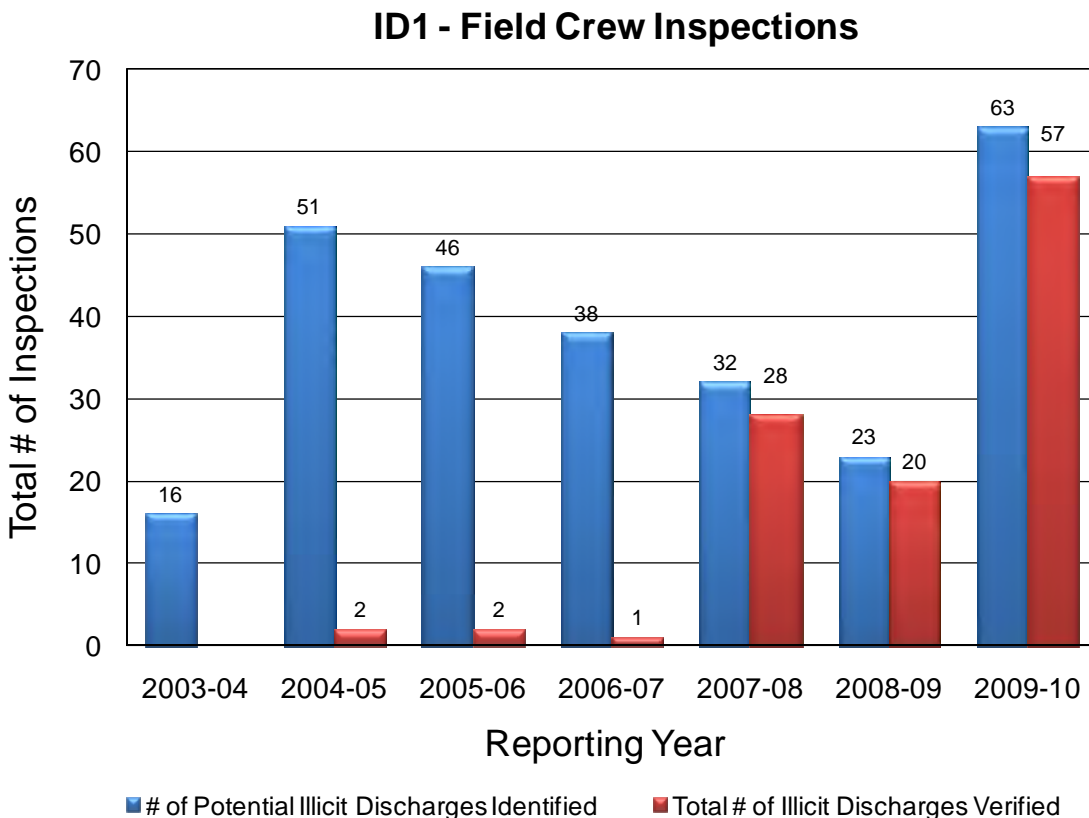


The City has facilitated the reporting of illicit discharges by coordinating with other departments and agencies. This has been accomplished by advertising the hotline number internally, conducting internal meetings, providing telephone numbers and flow charts, and reviewing internal forms. (L1)

The City has continued to monitor outfalls as a part of the dry weather field screening to identify dry weather flows and “hot spots” that may need additional source identification studies. Since 2006-2007, three (3) outfalls have exceeded the established action levels for triggering source identification studies. The source was determined to be groundwater in 2006-2007. In 2008-2009, the two (2) EC exceedances were found to be due to two different sources: water treatment by a Homeowner’s Association to a residential lake and groundwater infiltration. No action levels were exceeded during dry weather field screening in 2009-2010. (L1)



City field crews have been trained to identify potential illicit discharges while conducting routine maintenance activities in the field. Since 2003, 269 potential illicit discharges have been identified. Of the 63 potential illicit discharges identified in 2009-2010, 57 were verified as an illicit discharge and addressed. The field crews are more aware about what constitutes an illicit discharge and have progressed from reporting incidents that may not have been problematic to reporting illicit discharges that have been verified in the field and followed up on as appropriate. The success rate of the field inspectors increased from 87% to 90% between 2008-2009 and 2009-2010. (L3)



ID2 - Illegal Connection Identification and Elimination

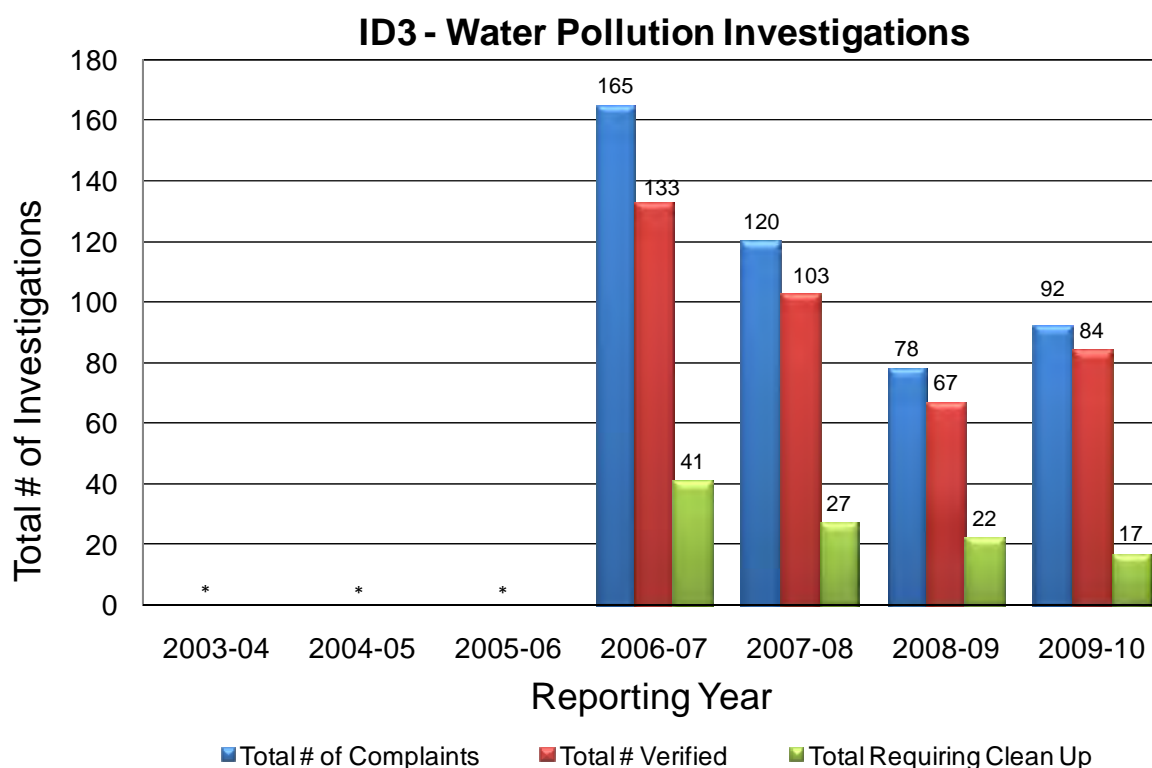
The City has a number of provisions that effectively prevent illicit discharges and illegal connections. First, all new development plans are reviewed for possible illegal connections, and it is also verified that no such connections exist during the construction phase (see Section 6). Second, City staff have been trained to identify illegal connections and illicit discharges in the field. To date, the City has identified and addressed 7 illegal connections (2 in 2004-2005, 1 in 2006-2007, 1 in 2008-2009, and 3 in 2009-2010). (L1)

ID3 - Investigation/Inspection and Follow Up

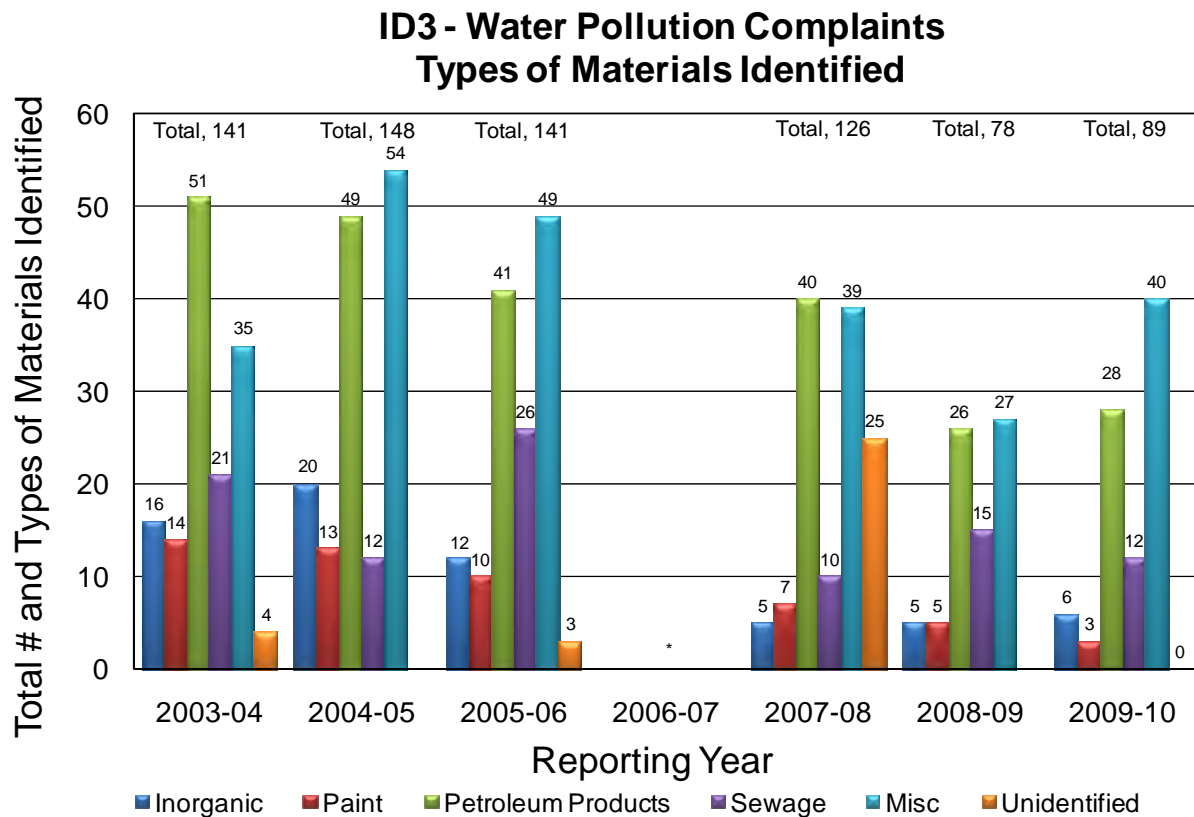
The City developed and maintained an Illicit Discharge Database and utilizes the information to identify and respond to areas that require focused attention. The City also maps the locations of the illicit discharges and illegal connections on a GIS-based map. (L1)

The City has responded to illicit discharges by establishing spill response procedures for non-hazardous materials and wastes, responding to the incidents within 21 calendar days, and ensuring that the incidents are cleaned up appropriately. Since 2006-2007, the City has responded to 455 complaints/notifications from all sources. Of those, 387 were verified and addressed, and 107 required cleanup. (L1)

Between 2006-2007 and 2009-2010, the total number of complaints has decreased by 28% (from 165 to 92), and the percentage of water pollution complaints verified has risen from 81% to 91%, indicating increased awareness both on the part of the public and City staff. (L2)



In addition to verifying water pollution complaints, since 2003-2004, City staff have worked to identify the types of materials involved in the illicit discharges or illegal connections. During the 2009-2010 reporting period, the City evaluated and optimized the waste categories it uses to categorize illicit discharges in order to minimize the number of illicit discharges described as miscellaneous or unidentified and more accurately characterize the pollutants and activities involved. (L1)



*Data not available.

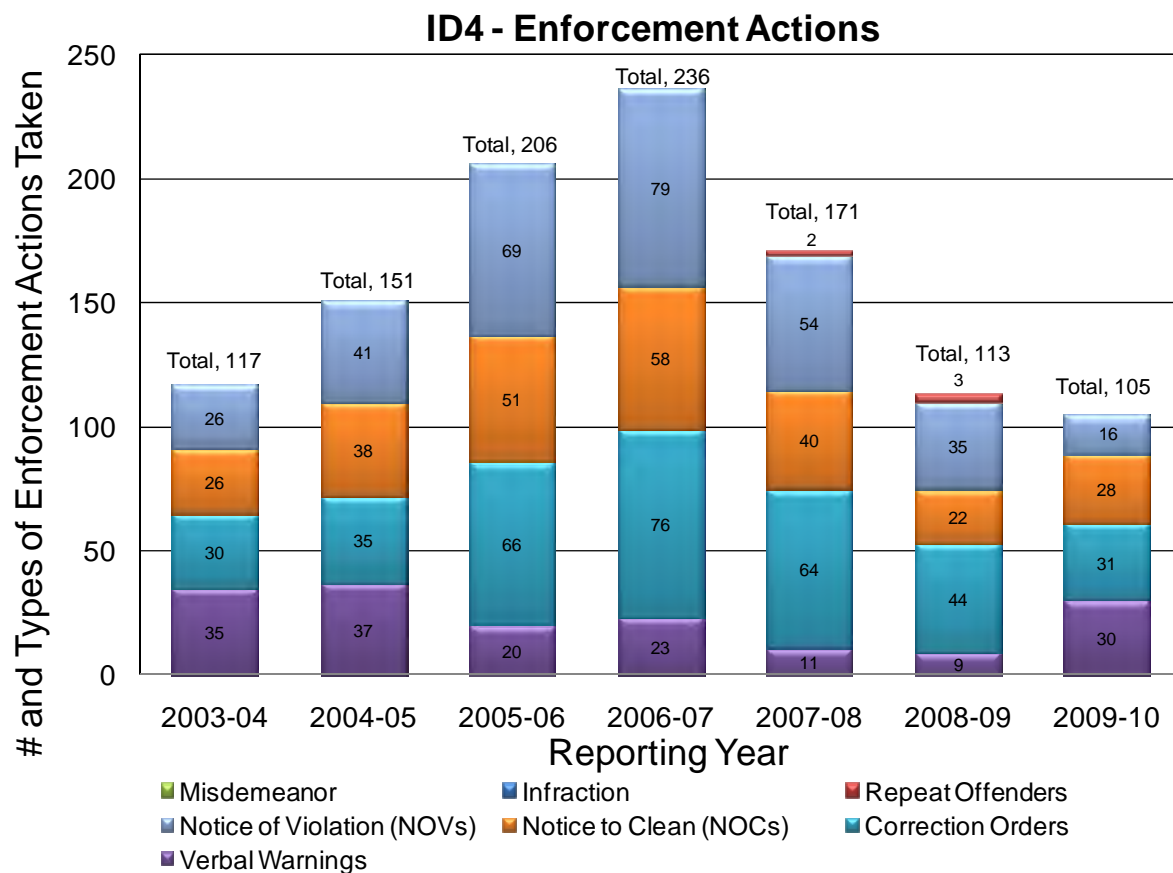
ID4 - Enforcement

The City enforced against illicit discharges/illegal connections and utilized progressive enforcement when necessary. Since 2003, the City has pursued 1,099 enforcement actions. The enforcement actions have included the following (L1):

- 165 verbal warnings
- 346 correction orders
- 320 notices of violation
- 263 notices to clean

Since 2006-2007, there have been 625 enforcement actions in response to 455 notifications/complaints of illicit discharges and illegal connections that have been received from all sources.

To date, no criminal enforcement has occurred.



2.9 ILLICIT DISCHARGES PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Illicit Discharges Program. In addition to the anticipated tasks that are identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, and determines if any additional program modifications are necessary in order to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that were identified during 2009-2010 include the following:

- **Training:** During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP. (due June 30, 2011)

Section 3

Public Outreach (PO)

3.1 OVERVIEW

The purpose of the Public Outreach Program Element is to inform the public (increase knowledge) regarding the impacts of urban stormwater runoff and introduce steps the public can take (change behavior) to reduce pollutants from everyday activities. In addition, helping the public understand the problems associated with urban stormwater runoff can help build support for the stormwater program.

The Public Outreach Program Element is designed to implement and evaluate a comprehensive short- and long-term public education campaign that will inform the community about how our actions may adversely impact urban stormwater discharges and, subsequently, our local water bodies.

3.2 CONTROL MEASURES

The City has developed several Control Measures to ensure that the public outreach program requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the SWMP.

The Public Outreach Program Control Measures consist of the following:

PO	Control Measure
PO1	Public Participation
PO2	Hotline
PO3	Public Outreach Implementation
PO4	Public School Education
PO5	Business Outreach
PO6	Effectiveness Assessment

The next section of the Annual Report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Public Outreach Program Performance Standards and implementation schedules.

3.3 PO1 – PUBLIC PARTICIPATION

The participation of the public in the implementation of the City's Stormwater Management Program is critical to a successful effort to protect the water resources. Therefore, active public participation is encouraged and supported by the City through a variety of mechanisms which are described in additional detail below.

3.3.1 Implement Storm Drain Marker Program

For the Storm Drain Marker Program, the City loans the supplies to volunteers and coordinates the stenciling activities for the citywide Make A Difference Day. By working with the citizen volunteers the City has been able to mark storm drain catch basins throughout the community

The City continued implementation of the Storm Drain Marker Program by soliciting volunteers to mark the storm drain catch basins throughout the year. The City solicited the volunteers through the following mechanisms:

- Local college contacts
- City Web site
- Newsletters
- Community events
- Community contacts

All of the catch basins installed since 2003-2004 have been required to be permanently imprinted in the sidewalk with the message "No Dumping – Flows to River" or "No Dumping – Flows to Delta". The City has 16,217 catch basins, all of which are stenciled or imprinted with the storm drain message. During 2009-2010, 2,647 catch basins were inspected or re-stenciled by Collections crew, and 176 catch basins were re-stenciled by volunteers.



City of Stockton Storm Drain Catch Basin Stencil

The total number of storm drain catch basins re-stenciled by volunteers is summarized in the table below (see also MO5).

Date	Volunteer Organization	Number of Volunteers	Number of Catch Basins Re-Stenciled
7/4/09	Student	1	107
7/21/09	Student	1	39
7/27/09	Student	1	30
Total		3	176

In addition to the volunteer efforts assisting the program with stenciling, as a result of the 2009-2010 stormwater pollution prevention inspections of commercial businesses, an additional 181 drains on private properties were stenciled by business owners.

3.3.2 Organize, Support, and/or Participate in Stream Cleanup Events

The City's stormwater program routinely partners with several groups for community stream cleanup events throughout the year. In Fiscal Year 2009-2010 these events included participation in California Coastal Cleanup Day as well as a local cleanup effort for the Calaveras River.

The City works with the various organized watershed or "Friends Of..." groups to participate in regular waterway cleanups. In Fiscal Year 2009-2010 this included the Friends of the Calaveras River. These events are now driven primarily by the volunteers themselves, with the City and County stormwater staff working as resources for the various watershed groups to help provide supplies (e.g., boots, gloves, trash bags) and community awareness for active participation from local residents' participation.

Many community groups have opted to participate in the annual California Coastal Cleanup Day event on the third Saturday in September. Last year's event (September 2009) resulted in 63 people in Stockton removing more than 1.5 tons of debris from Mosher Slough. The City of Stockton not only assisted in providing supplies such as dumpsters, gloves, and garbage for the event overall, but led the cleanup efforts at Mosher Slough. A total of 1,300 residents participated in the event in San Joaquin County.

These events are made even more successful by the fact that additional City Departments are now involved. Firefighter, Public Works, and Community Services crews now regularly work side-by-side with volunteers at these cleanup events.

A summary of the stream clean up event(s), the types of volunteer organizations and number of volunteers involved in these efforts is provided below:

Date	Clean-Up Location/Event	City's Role in Event	Volunteer Organization/Community Partner	Number of Volunteers Involved
April 2010	Calaveras River	Provided supplies – dumpsters, garbage bags, and disposable gloves for the volunteers	Friends of the Calaveras	120
September 2009	Duck Creek, Calaveras River, Five-Mile Slough, Little Johns Creek, Mokelumne River, Mormon Slough, Mosher Slough, San Joaquin River, and Walker Slough	Provided supplies – dumpsters, garbage bags, and gloves for volunteers use; assisted with advertising event; and provided site captains	California Coastal Cleanup Day ¹	1,300 ²
Total				1,420

Notes:

1. Since 1999, the County has been the California Coastal Commission's Inland Region Representative and has assisted in coordinating the annual California Coastal Cleanup Day.
2. This number is for all volunteers Countywide.

Total Volume of Trash/Debris Removed: The total number of dumpsters of trash/debris (in yards) was not available. A total of 22,000 pounds of trash/debris was collected Countywide.

A summary of the large items removed from the stream clean up event (*at Mosher Slough only*) is provided below:

Large Items	Estimated #
Tires	50
Shopping Carts	4



California Coastal Cleanup Day – Volunteers along Duck Creek



California Coastal Cleanup Day – Volunteer on the Calaveras River

3.3.3 Promote Used Oil and Household Hazardous Waste Programs

The City promotes the Used Oil and Household Hazardous Waste Programs on the City Web site, through distribution of Waste Reduction and Recycling Guides, the media, and the utility billing newsletter. The City directs its residents to the permanent household hazardous waste collection center operated by the County and advertises the center using a variety of mechanisms including the following:

- Web site
- Flyers
- Newsletter
- Television Ads
- Radio Ads
- Print Ads
- Utility Billing Inserts

The City promotes the County's used oil program on its Web site, through the distribution of Household Hazardous Waste Facility brochures, and in the City's utility billing newsletter.

A summary of the wastes that have been collected is provided below:

Type of Waste	Waste Collected 2008-2009	Waste Collected 2009-2010
Used Oil¹		
Certified Used Oil Collection Center	587,949	571,796
Household Hazardous Waste Facility	7,885	2,900 ⁴
Total (gallons)	595,834	574,696
Used Filters²		
Household Hazardous Waste Facility	4,500	4,172
Certified Used Oil Collection Center	22,487	155,770 ³
Total (units of filters)	26,987	159,942

1. With the City's new three-bin waste collection system, curbside used oil is now collected.

2. The filters were quantified in units, not pounds.

3. The number of used filters collected significantly increased in 09-10 for several reasons, including: a) San Joaquin County's Solid Waste initiated a used oil filter recycling campaign to incentivize and educate people that these materials could be recycled. b) there were more certified collection centers available in 09-10; and c) all of the collection centers are reporting the number of filters turned into their sites.

4. This value was converted from 23, 205 pounds using the conversion of 8 pounds/gallon.

A summary of types of wastes that were collected through local events (City and County) or through the permanent collection site (City) is provided below. Reporting period is from July 1, 2009 – June 30, 2010 and reflects wastes collected from both the City and the County.

Category	Type of Waste	Total Amount Collected (pounds)
Reuse	Reusable items	123,086
Reuse Subtotal		123,086
Recyclables	Latex paint	128,086
	Motor oil	23,205
	Oil filters	4,172
	Antifreeze	1,913
	NiCd batteries	1
	Household batteries	13,769
	Lead acid batteries (automotive)	23,440
	Propane (BBQ size)	3,114
	Fluorescent light tubes	20,613
	HID lamps	203
	Empty drums	8,905
	Mercury	32
	Oil based paint	258.782
	Flammable liquids (bulk)	95,135
Recyclables Subtotal		581,370
Incineration	Flammable liquids	7,040,
	Flammable solids	53,724
	Pesticide liquids	11,675
	Pesticide solids	7,185
	Inorganic acids	1,183
	Organic acids	1,365
	Inorganic bases	2,845
	Organic bases	3,671
	Neutral oxidizers	325
	Oxidizing bases	80
	Oxidizing acids	0
	Organic peroxides	228
	Aerosols	7,010
	PCB containing paints	0
	PCBs	2,670
	Reactives	0
	Compressed gasses	0
	Ammonium nitrate fertilizers	110
	Medical sharps	3,534
	Sulfur	0
	Fuses	419
	Other	991
Incineration Subtotal		104,055
Landfill	Asbestos	2,080
	Treated wood	6,000
Landfill Subtotal		8,080
Grand Total Collected (lbs)		816,591

a. This value is not a direct conversion (gallons to pounds) from the value for used oil in the preceding table; it differs because it is based on collection quantity reports and the HHW facility disposal records.

3.3.4 Coordinate with Household Hazardous Waste Program for Pesticide Disposal

As part of the Water Quality Based Programs, the Pesticide Plan aims to reduce pesticides entering urban runoff by implementing BMPs and Integrated Pest Management (IPM) to minimize pesticide use. In support of its Pesticide Plan, the City coordinates with the Household Hazardous Waste Program to ensure that pesticides are safely and properly disposed.

The City distributes information on the Household Hazardous Waste (HHW) Facility at all City-sponsored events. In addition to providing printed materials, staff members advise the public of proper disposal options and services offered by the HHW Facility.

3.3.5 Update City Website

One of the mechanisms through which the City supports active public participation is the City's Web site, which includes general stormwater information, pesticide disposal information, and stormwater information specific to summer activities and the rainy season. Web site materials updated during this reporting period are attached as **Appendix C-1**, Stormwater Outreach Materials, and included the following:

- Did the City update the Web site with general stormwater information (*by March 31, 2010*)?

Yes ☒

No ☐

General stormwater media pieces were posted on the City's Web site.¹

- Did the City update the Web site with pesticide disposal, IPM, and irrigation runoff information (Water Quality Based Programs Performance Standard) (*by June 30, 2010*)?

Yes ☒

No ☐

An IPM radio ad was posted on the City's Web site.

The Spring IPM Messaging spot provides tips for a healthy garden. Those tips include: introducing "beneficial" bugs into the garden, avoiding the use of excess fertilizers and pesticides, adjusting sprinklers to prevent runoff, properly disposing of leftover fertilizers and chemicals, composting and grass cycling, and planting native plants that are drought tolerant and more resistant to bugs.

As an additional component of the Water Quality Based Program, the City maintains and updates pesticide disposal information on the City Web site to inform the public of proper pesticide handling and disposal procedures.² Information is provided on the Web site regarding the Household Hazardous Waste Facility and the available services. Links for pollution prevention regarding specific activities are listed, including: In Your Home, In Your Garden, In Your

¹ <http://www.stocktongov.com/mud/>

² <http://www.sjgov.org/solidwaste/Pesticides%20&%20Fertilizers%20Disposal.htm>

Garage, On Your Boat, and Paints and Solvents. Print and radio advertisements promoted integrated pest management to reduce the use of pesticides and fertilizers.

- Did the City update the Web site with outreach and messaging on summer activities (i.e., swimming pool/irrigation discharge, disposal of motor oil) (*by June 30, 2010*)?

Yes ☒

No ☐

Outreach and messaging on summer activities were posted on the City's Web site.

- Did the City update the Web site with rainy season information (*by September 30, 2009*)?

Yes ☒

No ☐

Rainy season information was posted on the City's Web site.

3.4 PO2 – HOTLINE

The purpose of this Control Measure is to operate a public hotline number to facilitate public reporting of illicit discharges, illegal dumping, and other observed pollution problems. This Control Measure also ensures that through the hotline, complaint information is forwarded to the appropriate contacts for follow-up and/or investigation.

3.4.1 Maintain Hotline

The City maintains a hotline number (209-937-8341)³ that allows the public to report illegal dumping or illicit discharges into the storm drain system. Once a complaint is received, staff responds using the processes described within Section 2 of the 2009 SWMP. Additional summary information regarding the hotline is provided in Section 2 of this Annual Report.

A summary of the hotline calls received and verified is provided below:

Type of Problem/Request	Total Number of Calls Received
Clogged Catch Basins	0
Illegal Dumping or Illicit Discharges	23
Faded or Missing Catch Basin Stencils	0
General Stormwater Information	0
Total	23

3.4.2 Promote/Publicize Hotline

The City promotes the 24-hour hotline by including it within public/business education materials, listing it on the Web site and including it within the government pages of the telephone book. Additional summary information regarding the promotion of the hotline number is provided in Section 2 of the Annual Report. Additionally, the hotline was publicized in the November edition of the *Stockton Water News*, the monthly water utility billing newsletter insert (see **Appendix C-1**, Stormwater Outreach Materials).

³ This number is for the public to report flooding, clogged catch basins, or illegal dumping/illicit discharges. The City also maintains a number for general information (209-937-8791) and a number for general stormwater information or to report missing/faded catch basin stencils or to volunteer (209-937-4913). Data are not available for these additional numbers for 2009-2010.

3.5 PO3 – PUBLIC OUTREACH IMPLEMENTATION

The Public Outreach Implementation Control Measure provides that outreach be conducted with the residential community and general public to inform these audiences of the impacts of urban stormwater runoff and introduce steps they can take to reduce pollutants in stormwater runoff. Such outreach communicates to the City's residents and visitors the importance of stormwater quality protection and pollution prevention as it relates to the protection of the local water bodies.

An estimate of the total number of impressions made with the general public is provided in the table below.

Type of Outreach	Estimated Number of Impressions ¹
Distribution of Educational Materials	1,205
Conduct Mixed Media Campaigns	7,616,596
Participate in Community-Wide Events	3,700
Provide Community Relations	Not tracked ²
Provide Business Outreach	1,620
Total	7,623,121

Notes:

1. This table summarizes the totals from each performance standard and represents an estimated number of impressions. A final calculation for the total number of impressions is based on actual hand-outs distributed, circulation totals, listenership numbers, items mailed, estimated number of attendees contacted.
2. During the 2009-2010 reporting period, the City was not able to provide community relations by holding briefing sessions for community leaders, educators and public employees or coordinate with local organizations. However, extensive public outreach to convey important stormwater messages was conducted via the City's Web site and mixed media campaign.

3.5.1 Update/Conduct Public Opinion Survey

To better understand the level of awareness in the community, the City, in collaboration with the County, conducted a baseline public opinion survey in March and April 2003. The survey results established a baseline for assessing public perceptions and behaviors related to stormwater quality management. The survey also assisted the Permittees in assessing the overall effectiveness of the Public Outreach Program.

The survey results provided information for the development of the overarching campaign approach, which was formalized in a document entitled “Public Outreach Strategic Implementation Plan, July 2003”. This document was transmitted to the Regional Water Board in October 2003 as Appendix C-1 of the SWMP. The Plan is comprehensive and includes development, implementation, and assessment tasks so that public education objectives may be achieved over the life of the permit.

A follow-up public opinion survey was conducted in April and May 2005 to assess the changes in attitudes, perceptions and behaviors. The results of this survey were included as Appendix C-1 of the 2004-2005 Annual Report (“Public Opinion Survey Report Follow-Up 2005”). This study was implemented through a telephone survey of 401 heads of household in the Stockton Urbanized Area. The information obtained from the survey was used to guide the implementation of the City and County’s public awareness campaign for 2005-2006.

The City and County conducted a follow-up public opinion survey in December 2009 (**Appendix C-2**) to assess changes in public perceptions and behaviors related to stormwater quality management as compared to the survey data from the spring of 2007, 2005, and 2003. This study was implemented through a telephone survey of 400 heads of household in the SUA to quantitatively evaluate how residents perceive and relate to environmental issues associated with stormwater.

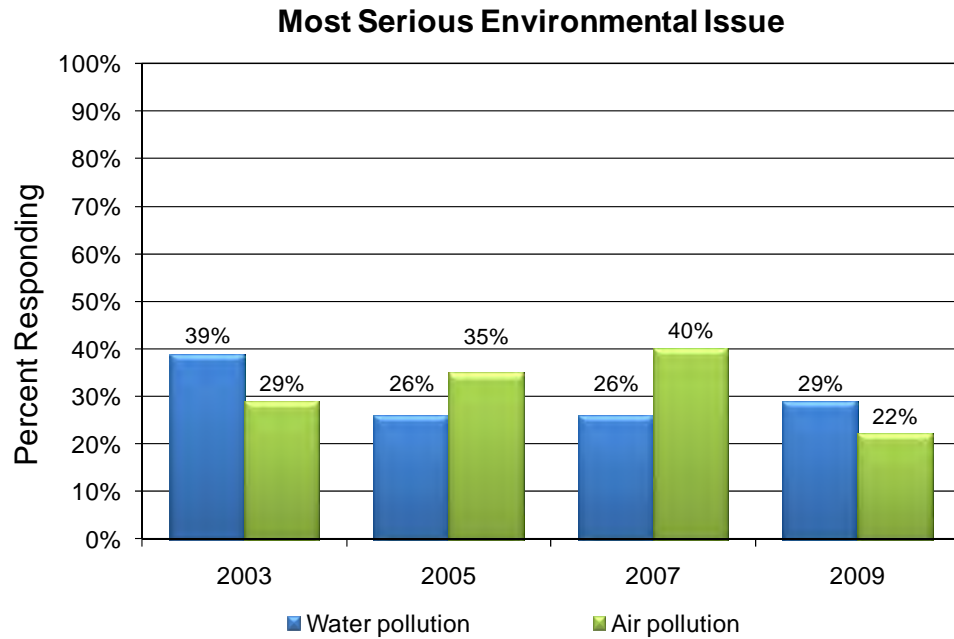
The survey provided information about the following issues:

- Perceptions of the seriousness and impacts of pollution;
- Understanding of major contributors to water pollution;
- Use patterns and disposal practices of pollution related products;
- Awareness of storm drains and the storm drain system;
- Willingness to participate in pollution prevention practices;
- Awareness of City and County stormwater programs; and
- Exposure to stormwater information.

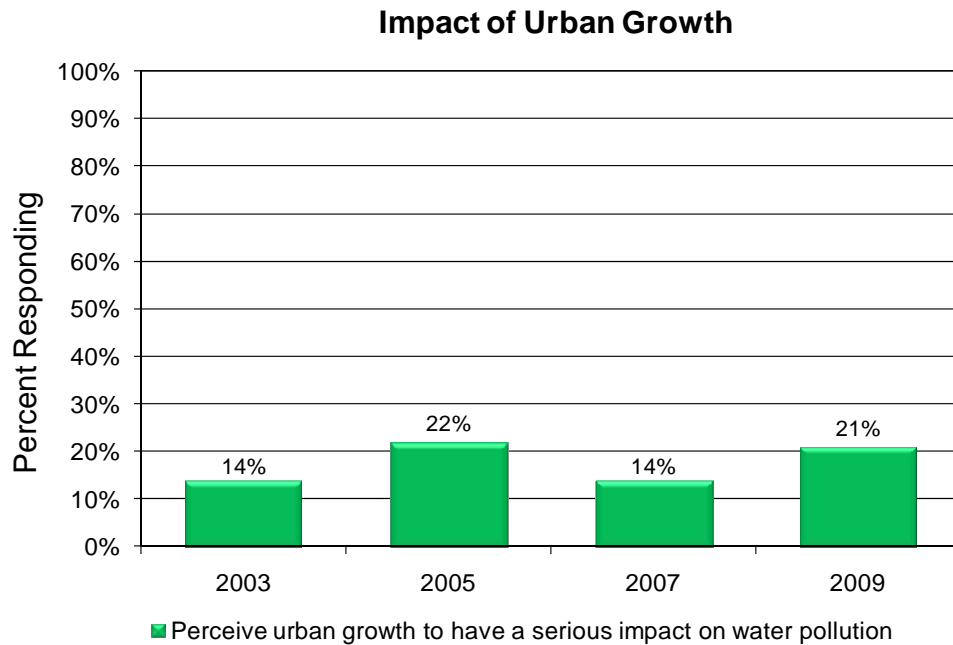
In addition, new questions were added to the survey to gain insight into residential application and purchasing preferences and practices related to pest control products.

Some of the key findings included the following:

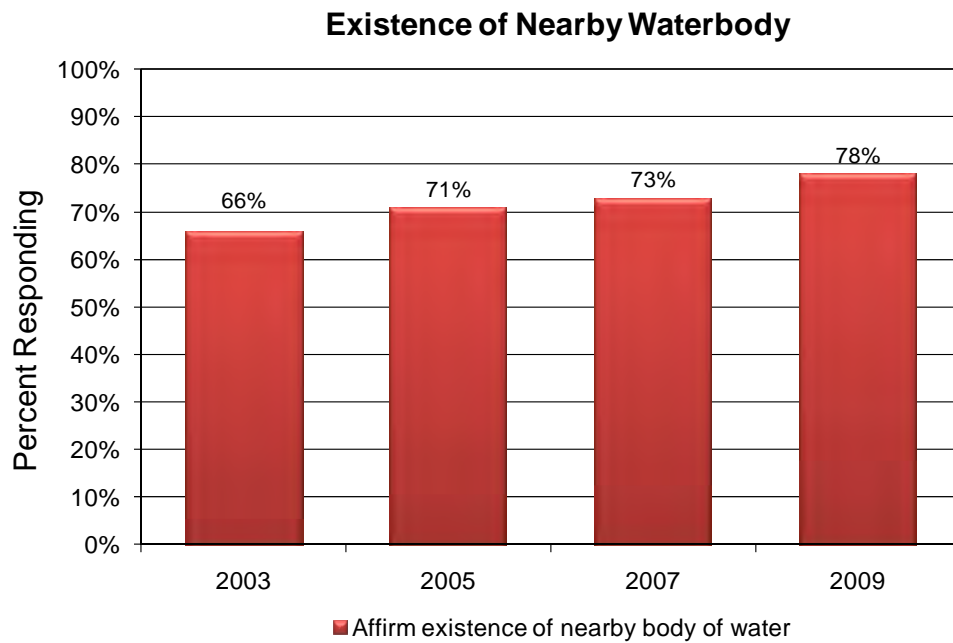
- Water pollution replaced air pollution as the most serious concern among a list of six environmental issues;



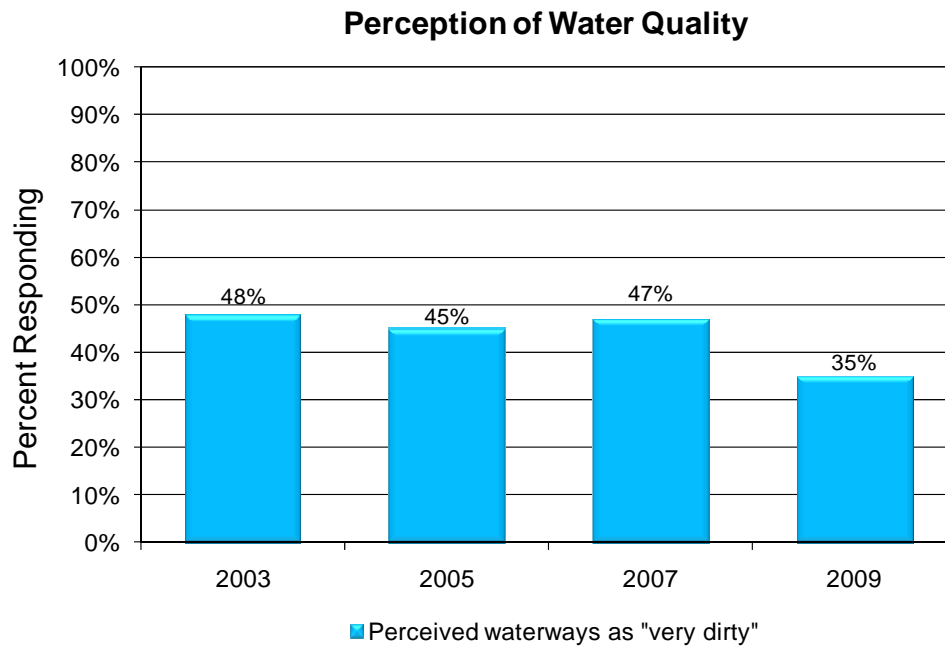
Perceptions of the seriousness of the impacts of urban growth slightly increased;



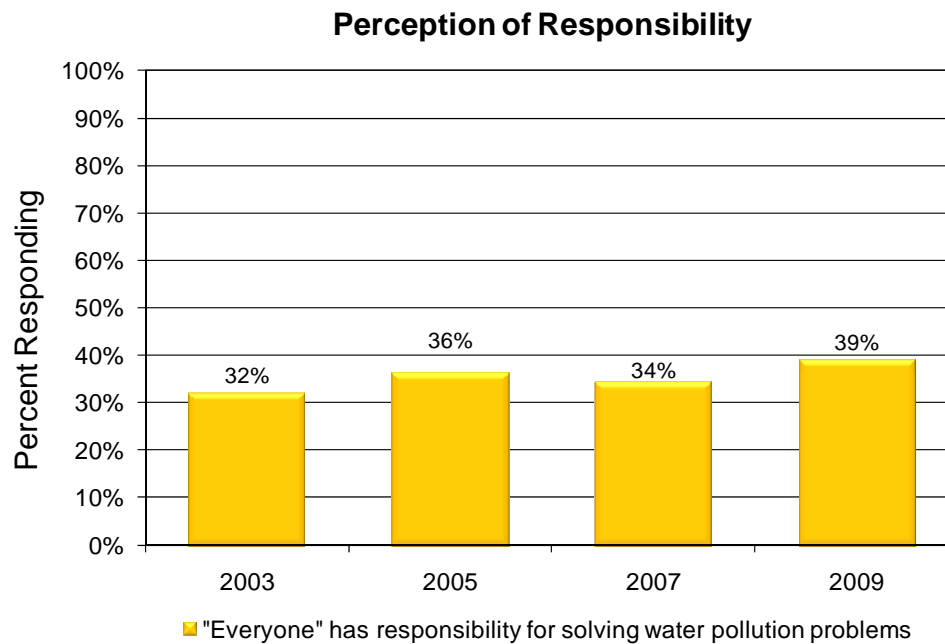
- An increasing number of respondents are aware that they are near a body of water;



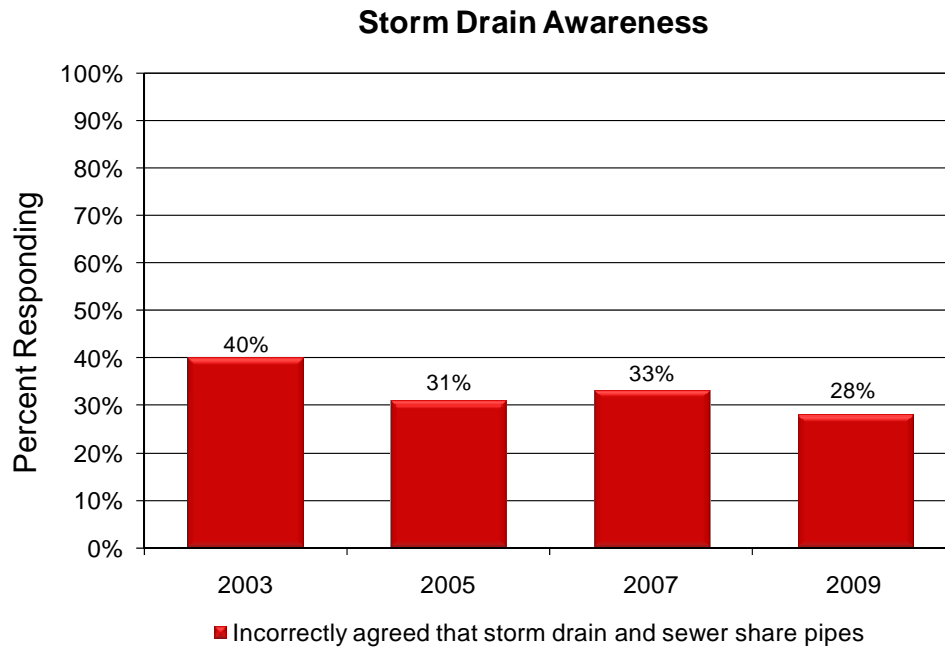
- There was a decrease in the respondents who perceived the waterways as “very dirty”;



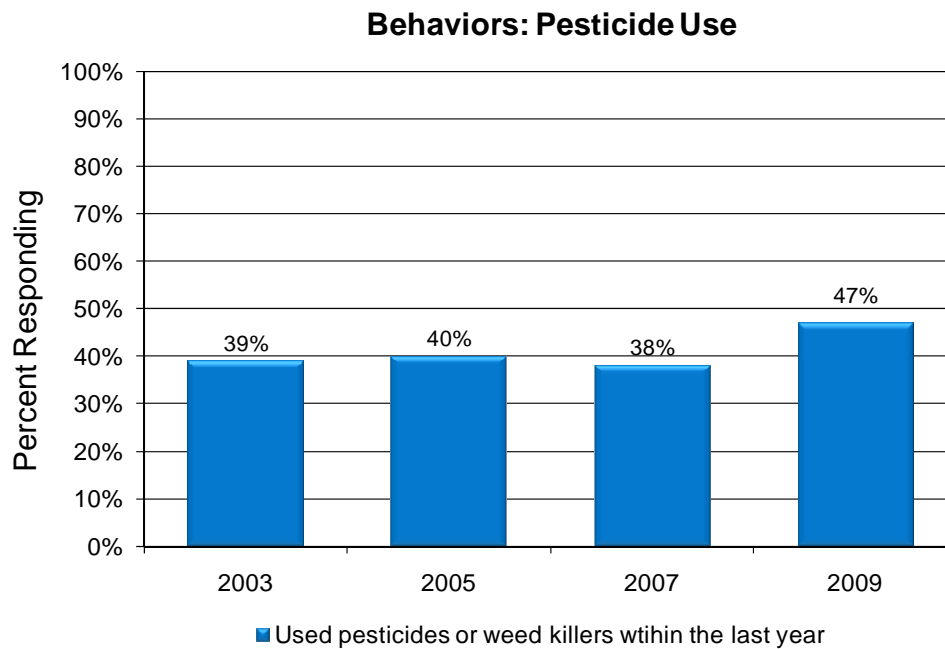
- There was a slight increase in the respondents who identified “everyone” as having responsibility for solving water pollution problems;



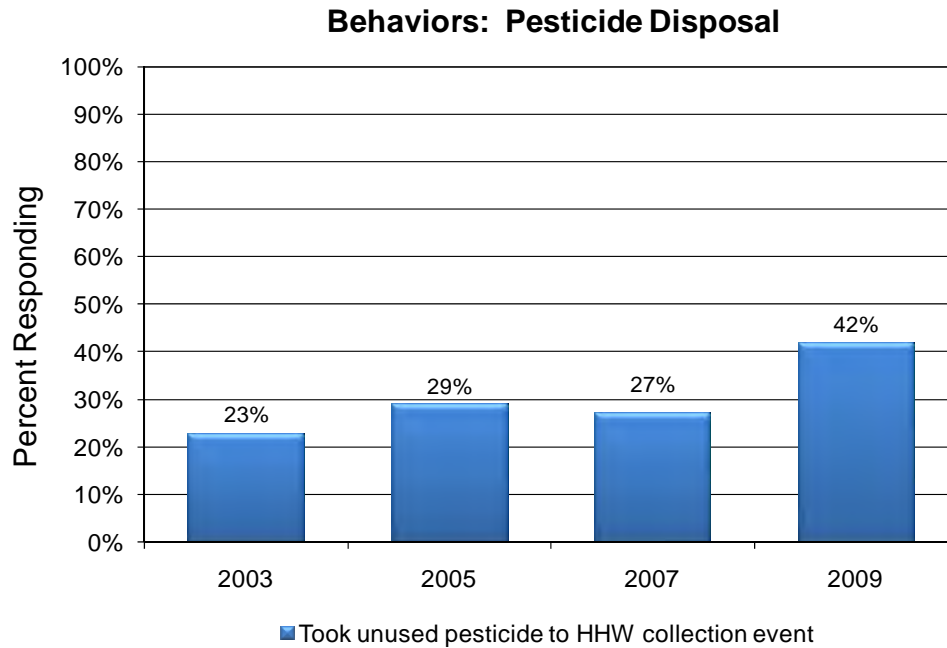
- The respondents understood that the storm drain system was separate from the sewer system;



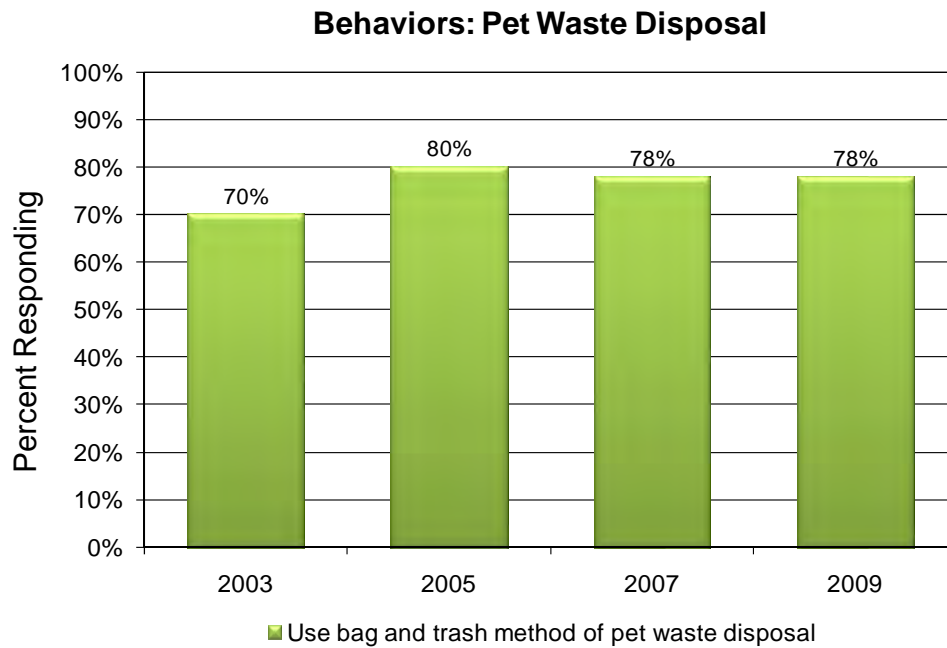
- There was an increase in the number who reported using pesticides within the last year;



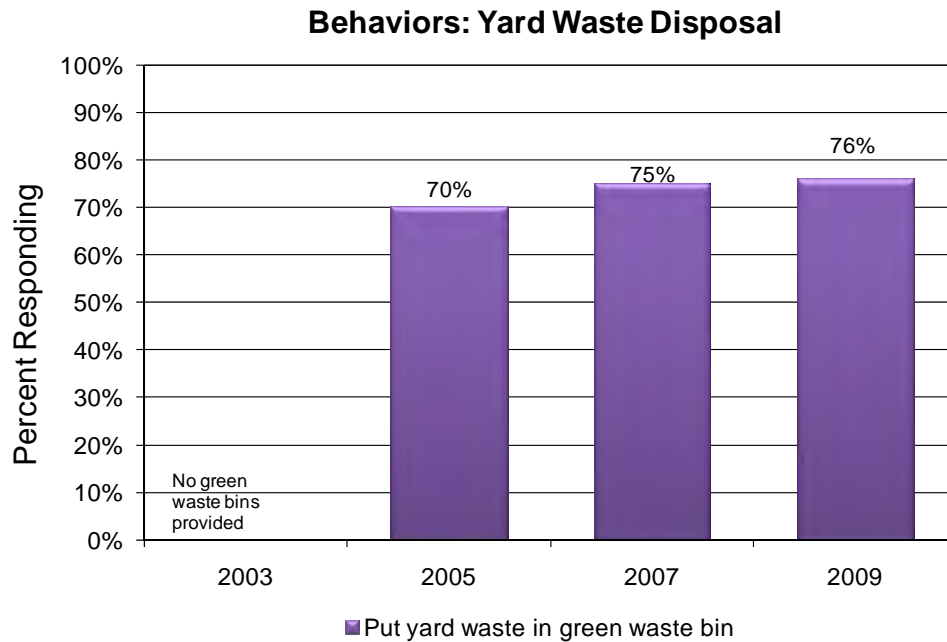
- There was an increase in the number who reported taking the leftover pesticides to a HHW collection event;



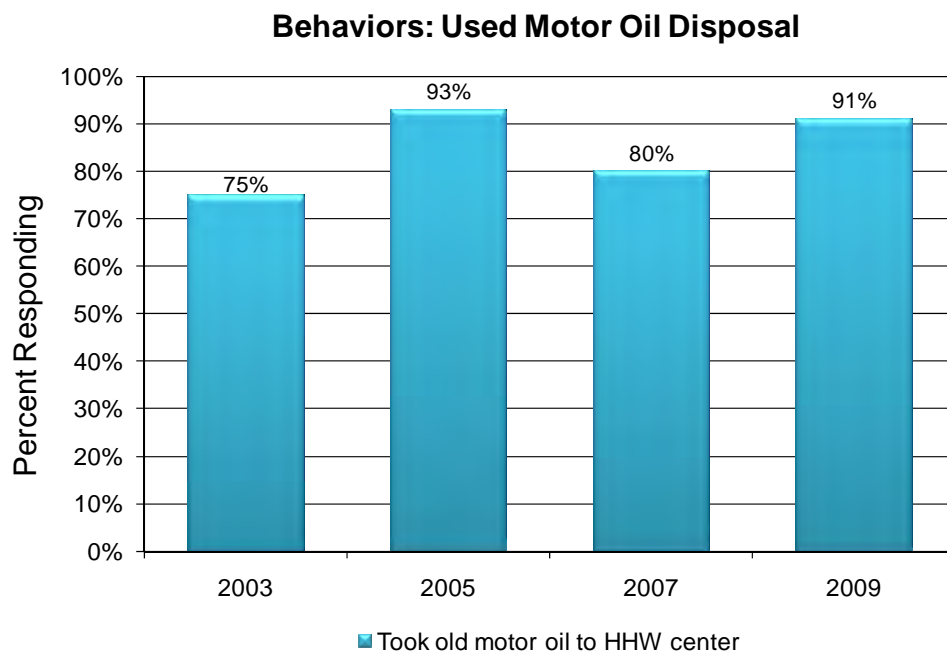
- The same number of respondents reported properly disposing of their pet waste;



- Residents maintained consistent reporting regarding the use of the green waste bins; and



- The vast majority of the respondents reported taking their used oil to a HHW center.



3.5.2 Identify and/or Create, Revise, and Distribute Educational Materials

A multi-media campaign has been developed to provide stormwater education and outreach. The campaign consists of print and radio advertising in both English and Spanish.

The City identified and/or created, revised, and distributed educational materials as needed. The educational materials are distributed through a number of mechanisms including:

- City Web site
- At civic locations
- At community events
- Mass mailings
- Utility Billing inserts
- Posted at community centers

In 2008-2009, the Stormwater Program worked with a marketing firm to create new stormwater brochures and a stakeholder's information packet. The brochure is a simple tri-fold targeted toward residents, while the packet contains four tiered information sheets for both residents and businesses. During the 2009-2010 reporting period, the City continued to utilize these brochures.

A summary of the educational materials distributed during the reporting period is provided below:

Name of Material	Target Audience/ Activity	Multi-Lingual?	Language	Source	# Distributed
Brochures					
County Household Hazardous Waste Consolidation Facility	General Public	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	English Spanish	San Joaquin County Solid Waste	100
Green Car Wash Program	Students Teachers Parents Principals General public	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	English	City	5
Clean Water, Clean Community	General public	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	English	City	100
Fact Sheets					
Our Water Our World IPM Fact Sheets	General Public.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	15 English 8 Spanish	IPM Regional-BASMAA	700
Other					
Discover Storm Water workbook	Children	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	English	Project WET	100
Top 10 Most Wanted Bugs in the Garden	Residential Gardeners	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	English	Our Water, Our World	100
Water Conservation Magnet	General Public	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	English	City	100
Total Distributed					1,205



Stormwater Program Educational Materials

3.5.3 Ensure Educational Materials Address Proper Disposal of Pet Waste

As a component of the Pathogen Plan, the City seeks to minimize pet waste entering urban runoff by educating pet owners about proper disposal of pet waste.

During the 2009-2010 reporting period, the City developed a new, draft brochure with language addressing proper disposal of pet waste. The brochure will be completed by December 31, 2010.

3.5.4 Develop Outreach Materials Targeting Pet Owners

- Did the City develop outreach materials specifically targeted at pet owners regarding the proper disposal of pet waste (Water Quality Based Programs Performance Standard) (*by June 30, 2010*)?

Yes ☒

No ☐

During the 2009-2010 reporting period, the City developed and included language addressing proper disposal of pet waste in the February 2010 *Stockton Water News*, the City's utility billing insert (see **Appendix C-1**). In addition, the City developed a new, draft brochure with language discussing the problem of pet waste pollution and possible actions pet owners can take to properly dispose of pet waste and help reduce pollution to local waterways. The brochure will be completed by December 31, 2010. When complete, the brochure will be posted on the City's web site and distributed at veterinary facilities, animal adoption agencies, and kennels.

3.5.5 Provide Pet Waste Outreach/Literature to Pet Owners and Animal Adoption Agencies

The City is continuing to develop and coordinate efforts with Animal Control and Pet Licensing to provide information on the proper disposal of pet waste.

Information regarding proper disposal of pet waste is included in pet license renewal mailers sent to pet owners each month.

During the 2009-2010 reporting period, the City developed a new, draft brochure with language addressing proper disposal of pet waste. The brochure will be completed by December 31, 2010. When complete, the brochure will be posted on the City's web site and distributed at veterinary facilities, animal adoption agencies, and kennels.

3.5.6 Implement Pet Waste Outreach Program

The City will implement the pet waste outreach program by providing outreach to/at businesses, events, and pet organizations.

- Did the City implement the pet waste outreach program by providing outreach to/at the following businesses, events, or pet organizations (Water Quality Based Programs Performance Standard)?

- Kennels (*during inspections, scheduled to begin Fiscal Year 2009-2010*)

Yes ☒

No ☐

Outreach was provided to kennels during inspections conducted during 2009-2010.

- Strut Your Mutt/Dog Day Afternoon (*if held, takes place during the summer; by September 30, 2009*)

Yes ☐

No ☒

Although Strut Your Mutt took place on August 22, 2009, the City was unable to provide outreach at this community event. However, the City did provide public outreach regarding pet waste via billing inserts and mixed media, as discussed above.

- Barkleyville Dog Park – During the 2008-2009 fiscal year, signage was posted at the park (see photo below).



Signage Posted at Barkleyville Dog Park in 2008-2009

- Other pet-related organizations/businesses (annually in August; by August 31, 2009)

Yes ☒

No ☐

The City provided outreach and literature on the proper disposal of pet waste in the February 2010 Stockton Water News utility billing insert. This mailer reached more than 46,000 utility customers, including pet-related organizations and businesses. A bilingual (Spanish-English) article also ran in the February 2010 edition of the Latino Times, which has a monthly readership of 60,000.

3.5.7 Develop Language for and Produce Pet Waste Signs

- Did the City develop language for and produce Pet Waste Signs to be installed at approximately 50 existing parks (Water Quality Based Programs Performance Standard) (by December 31, 2009)?

Yes ☒

No ☐

In the spring of 2010, stormwater program staff worked with the City's sign shop (Public Works Department) and Community Development to develop language for and produce new signs that remind the public to clean up and properly disposal of pet waste.



Example of Pet Waste Sign Developed and Installed in 2009-2010

3.5.8 Install Pet Waste Signs

- Did the City install Pet Waste Signs at approximately 50 existing parks (Water Quality Based Programs Performance Standard) (beginning January 1, 2010)?

Yes ☒

No ☐

During June 2010, stormwater program staff installed the new pet waste signs. A total of 44 signs were posted within 10 City parks with stormwater inlets that lead directly to local waterways.

The locations of these signs are summarized in the table below.

Park Name	Sign Location	# of Signs
Victory Park	Argonne Drive & Yale Avenue Argonne Drive & Columbia Ave Argonne Drive & Pershing Ave Pershing Ave - Main Park Entrance Pershing Ave & Picardy - corner Picardy Dr - by Fire Station Picardy Dr - museum parking lot Parcardy Drive & Yale Ave Monte Diabale Ave where splits to Picardy and Argonne	9
American Legion	Walnut St. entrance to park Stockton & Elm Sts SE corner of park - on Baker Street Baker Street and Baker Place Tuxedo Ave - near MUD pump station Tuxedo Ave and Yosemite Street	5
Louis Park	Boat Launch Boat Launch area - near doggie pop bag dispenser Shimizu Dr. - West side of park lot near picnic benches Shimizu Dr. - Parking lot entrance to park Shimizu Dr. - pathway entrance near horseshoe court Occidental Drive and Toyon Drive Occidental Drive pathway entrance Occidental Drive parking lot by handball/basketball court Monte Diablo Ave - parking lot in SE corner of park	10
Caldwell	Corner of Marisposa & Allston Way Along Allston Way - entrance to pathway leading Corner of Allston Way & Alpine Ave Pacific Avenue	4
Lafayette Square	Corner of Hunter Street & Worth Street Near Hunter St & fence by RR Tracks	2
Gleason	Corner of Church and California Sts. Corner of California & Sonora Sts Corner of Sonora & American Sts – walkway entrance	3
Columbus Square	Corner of Van Buren & Worth Street Corner of Lincoln and Worth Street	2
Liberty Square	Corner of Anderson and Stanislaus Sts Corner of Jefferson and Grant Sts	2
Union Square	Corner of Hazelton & Union Sts Corner of Scotts & Pilgrim Sts	2
Stribley	Corner of Della St & Hazelton Ave Along E. Hazelton Ave - pathway entrance Corner of E. Hazelton Ave & B St Visible from Marsh St - in park Corner of Della St & Marsh St - by community garden entrance	5
	Total	44

3.5.9 Implement Phased Installation and Maintenance of Pet Waste Bag Dispensing Stations

As a component of the Pathogen Plan, the City seeks to minimize pet waste entering urban runoff through installing and maintaining pet waste dispensing stations, which include pet waste bags, in City parks. During the reporting period, no new City parks were developed, and replacement of pet waste bags is on hold due to lack of budget. To meet the intent of this performance standard, the City will provide outreach to the public regarding the reuse of grocery bags for pick-up and disposal of pet waste and will include such language in outreach materials by June 30, 2011.

3.5.10 Track Installation of Pet Waste Bag Dispensing Stations

During the 2008-2009 reporting period, as part of the Water Quality Based Programs, the City tracked installation of pet waste bag dispensing stations. The City of Stockton entered into a Memorandum of Understanding with the Keep the Delta Clean Program to install pet waste bag dispensing stations. Through this partnership, the City installed ten (10) pet waste bag dispensing stations at various locations in parks and areas near waterways. Pet waste bag dispensing stations were installed in September 2008, as detailed in the 2008-2009 Annual Report.

3.5.11 Update Audiovisual Tools and Web Site

On an as-needed basis, the City updates the Web site audiovisual tools⁴ so that they remain current. The City is in the process of updating its Web site, including the public outreach sites. Please see **Appendix C-1** for some of the audiovisual tools that are available to the public.

3.5.12 Conduct Mixed Media Campaigns

The City conducted a mixed media campaign that consists of radio and government access cable channel public service announcements (PSAs), movie theater slides, print ads and signage. The mixed media campaign is the primary mechanism that is implemented in order to achieve the 800,000 impressions that are required.

A summary of the mixed media campaigns that were conducted for the general public is provided below. Please see **Appendix C-1** for some of materials used for the mixed media campaign.

Type of Outreach	Description	Number of Impressions Made
Utility Billing Newsletter Insert	August 2009 – Stormwater Ponds at Victory Park Project Update	46,000
Utility Billing Newsletter Insert	September 2009 – Stormwater Ponds at Victory Park Project Update	46,000
Utility Billing Newsletter Insert	October 2009 – Stormwater Ponds at Victory Park Project Update	46,000
Utility Billing Newsletter Insert	November 2009 – Being Storm Prepared	46,000
Utility Billing Newsletter Insert	December 2009 – Mercury Awareness	46,000
Utility Billing Newsletter Insert	January 2010 – Doing Home Repairs – Clean Up Properly	46,000
Utility Billing Newsletter Insert	February 2010 – Proper Pet Waste Disposal	46,000
Utility Billing Newsletter Insert	April 2010 – Stormwater Fee	46,000

⁴ <http://www.stocktongov.com/mud>

Type of Outreach	Description	Number of Impressions Made
Radio - Citadel: KJOY, KWIN, KATM, KHFF	English (Oct-Dec) – General Stormwater Pollution Prevention	1,203,510
Radio - Citadel: KJOY, KWIN, KATM, KHFF	English (Jan-Mar) – Doing Home Repairs- Clean Up Properly	1,203,510
Radio Website– Citadel KWIN-online streaming	Mar - Doing Home Repairs – Clean Up Properly	37,000
Radio – Entrevision KMIX, KCVR	Spanish (May) – Spring Gardening	129,800
Print – Central Valley Business Journal	English (Feb edition) – New General Construction Permit	80,000
Print – Central Valley Business Journal	English (May edition) – Green Car Washing	80,000
Print – The Record	English (June Sunday editions) – Green Car Washing	666,400
Print – The Record	English – New General Construction Permit Workshop	166,600
Print – Latino Times	English (Dec) – Doing Home Repairs – Clean Up Properly	60,000
Print – Latino Times	Bilingual – English & Spanish – (Feb) – Pet Waste Proper Disposal	60,000
Print – Latino Times	Bilingual – English & Spanish – (Apr) – Spring Gardening	60,000
Print – Latino Times	English (June) – Green Car Washing	60,000
Newspaper Website – The Record Online	English (June) – Green Car Washing	450,000
Television - Univision	Spanish cable television (Jan) – Being Storm Prepared	681,000
Television - Univision	Spanish cable television (Apr) – Spring Gardening	681,000
Television - Telemundo	Spanish cable television (Apr-May) – Spring Gardening	750,000
Television – Telemundo	Spanish cable television (May-June)- Green Car Washing	750,000
Television – Crossing TV	Hmong cable television (Mar-May) – Spring Gardening	50,625
Television – Crossings TV	Hmong cable television (June-Aug)- Green Car Washing	50,625
Theater – National Cinemedia	English (Feb – Apr) – Everything Goes Down Drain/leaves & oils	11,263
Theater – National Cinemedia	English (May-June) – Spring Gardening	11,263
Ball Park Wall Sign	Baseball Park Wall Sign – General Stormwater Pollution Prevention	6,000
Total		7,616,596

3.5.13 Participate in Community-Wide Events

The City participates in community-wide events throughout the year that provide outreach to the general public and co-sponsors neighborhood events. These efforts also include partnering with other organizations as appropriate, waste oil recycling, and household hazardous waste events.

A summary of the community-wide events is provided below:

Name of Event	Date(s)	City Role in Event	Target Audience or Activity	Total Number of Attendees	Number of Impressions Made
Stockton Port Game	7/24/09	Informational Booth	General Public/Local Residents	5,174	500
Black Family Day	9/7/09	Informational Booth	General Public/Local Residents	1,000	200
Family Day in the Park	9/19/09	Informational Booth	General Public/Local Residents	15,000	1,500
Cinco De Mayo Festival	5/2/10	Informational Booth	General Public/Local Residents	15,000	1,500
Total Number of Impressions					3,700



Staff Provide Bilingual (English/Spanish) Stormwater Pollution Prevention Information at the Cinco de Mayo Celebration.

During the 2009-2010 reporting period, the City also partnered with other Departments and agencies as a part of the stormwater outreach effort. The City partnered with the Stockton Area Water Suppliers (SAWS) to provide educational outreach to school-aged children (see **Section 3.6.1**). In addition, MUD Stormwater coordinated with Public Works and Community Development, both of whom helped design and install pet waste signs (see **Section 3.5.7**).

3.5.14 Provide Community Relations

In addition to the community relations that are established through the various outreach efforts that are undertaken, such as multi-media campaigns, mass mailings, web site postings, volunteer solicitation, editorial and media relations, and participation in community-wide events, the City also builds these relationships by holding briefing sessions for community leaders, educators and public employees as well as coordinating with local organizations.

During the 2009-2010 reporting period, the City was not able to hold briefing sessions for community leaders, educators and public employees or coordinate with local organizations. However, extensive public outreach to convey important stormwater messages was conducted via the City's Web site and mixed media campaign (see **Appendix C-1**).

The City also outreaches to and/or coordinates with local community and environmental organizations. A summary of the activities is provided below.

Organization	Coordination Activities
Friends of the Calaveras River	Development and Installation of 10 "Protect Our Waters" Signs

A "Protect Our Waters" sign was developed in conjunction with the Friends of the Calaveras River. A total of ten (10) signs were placed at five (5) bridges crossing the Calaveras River to remind residents that they cross the Calaveras River daily, and they have a responsibility to protect it. These signs were installed for public viewing on the north- and south-bound bridge crossings over the Calaveras River at Pacific Avenue, Pershing Avenue, El Dorado Street, and West Lane, as well as the University of the Pacific pedestrian bridge.



"Protect Our Water" Sign for the Calaveras River

3.5.15 Implement Pesticide Outreach Efforts

The City implemented pesticide outreach efforts for city staff, residents, retail stores, and pest control operators (PCOs) (Water Quality Based Program Performance Standard). Education and outreach efforts focus on the promotion of less toxic pest control methods and use of IPM. Efforts during the reporting period included the following:

- The City contracted all landscape maintenance and weed control services. All current maintenance specifications require the contractor to comply with City Manager Administrative Directive P&R-03, Pesticides, Herbicides and Fertilizers. Maintenance contracts that started on January 1, 2010, and all future contracts/contract specifications, will require that the contractor use IPM techniques and practices and least toxic methods of pest control to achieve the expected/specified results (see **Section 4**).
- IPM information and fact sheets are provided to residents through the City's partnership with the "Our Water Our World Program".
- Staff provides outreach at local hardware stores interacting directly with the public and discussing IPM.
- The City continues to promote IPM messaging through various media and expanded those efforts during the reporting period with the purchase of an electronic IPM kiosk. The kiosk is located in City Hall and provides residents with information on IPM, proper use and disposal of pesticides, pest identification, runoff, and water conservation. The kiosk also holds literature racks with additional fact sheets from the "Our Water Our World" Program. During the reporting period, IMP Kiosk located in City Hall was stocked with IMP brochures. Approximately 700 informational Our Water Our World IPM brochures were provided and taken by the public.
- Focused Spring Gardening IPM messaging ran on local area Citadel radio stations, Entrevision Spanish radio stations, and Spanish cable television stations, Telemundo and Univision, during the months of April, May, and June 2010. During these same months, Stockton's two local movie theaters ran an ad, and a bilingual (Spanish-English) print ad ran in the April 2010 edition of the Latino Times.



IPM Kiosk Located at City Hall

3.5.16 Conduct Periodic Pest Control Product Surveys

- Did the City conduct periodic surveys in conjunction with other regional programs regarding local or regional sales and use of residential and commercial pest control products (Water Quality Based Program Performance Standard) (by September 30, 2009 and September 30, 2011)?

Yes ☒

No ☐

The Permittees are required to conduct a survey of the regional sales of residential and commercial pesticides which are available for the public on a bi-annual basis (i.e. once every two years). This survey will allow the Permittees to identify potential pesticide use and impacts before they occur. The survey was developed during 2008-2009, and the first survey was completed during the 2009-2010 reporting year by December 2009.⁵

⁵ The survey design and protocols were submitted with the 2009 Annual Work Plan, and were included as an appendix in the 2008-2009 Annual Report.

The Permittees designed a three-part survey approach to address this requirement. The three components of the pesticide survey are as follows:

- Residential pesticide sales, assessed through shelf surveys of local retailers (completed November 2009);
- Residential pesticide use, assessed by pesticide-specific questions in a telephone Public Opinion Survey (completed December 2009); and
- Commercial pesticide use, assessed through collaboration with the County Agriculture Commissioner's office and Department of Pesticide Regulation (DPR). These records were obtained for 2008.

The approach and results of each of the three survey components are summarized in the 2009 Pesticide Survey Assessment, included in Section 9 of this report and as **Appendix I-1**. The major conclusions from the pesticide survey are shown below. The next survey will be completed by December 1, 2011.

Summary of main conclusions from the 2009 pesticide survey

Survey Component	Main Conclusions
Shelf Survey	<ul style="list-style-type: none">• Consumers are faced with a wide variety of options for pest and weed control and may not understand the differences between them.• Pyrethroids are the most prevalent type of pesticide available for home use.• Organophosphate pesticides are no longer widely available.• Less-toxic pesticides represent a significant portion of available products.
Residential Use Telephone Survey	<ul style="list-style-type: none">• The majority of residents uses pesticides regularly, and stores multiple pest control products in their home.• Residents' awareness of proper disposal methods for pesticides has increased, as a significantly higher percentage reported using household hazardous waste collection events in 2009 compared to previous years.• Residents tend to store pest control products for greater than a year, and often don't remember when products were purchased.
Commercial Use Assessment	<ul style="list-style-type: none">• Pyrethroids are among the most widely used commercial pesticides.• OP pesticides are applied commercially in San Joaquin County.

3.6 PO4 – PUBLIC SCHOOL EDUCATION

Presentations made to school-age children may be an effective outreach method because the children are asked to pass the pollution prevention information on to their families. This Control Measure provides public school districts, after school programs, day camps, and the Children's Museum within the City with outreach materials to educate school-age children about stormwater pollution.

The City recently evaluated the ability to interface and coordinate with school education programs on a regional or local level. The school outreach efforts over the 2002-2007 Permit term were successful; however, due to increased curriculum and testing requirements, stormwater program staff has found it to be progressively more difficult to gain access to schools in order to provide outreach to students. The City is continuing with the assembly program to reach a large number of students.

The City has reviewed the existing program and assessed the feasibility of alternative programs. As a result, the City concluded that the most consistent mechanism for reaching out to school-aged children within the City is through an interactive stormwater exhibit at the Children's Museum and the continued participation with the assembly programs with Stockton Area Water Suppliers (SAWS) to reach a large number of students.

3.6.1 Send Letters to Fifth Grade Teachers and Principals

- Did the City send letters to fifth grade teachers and principals inviting them to take part in the City's stormwater education program (*by September 30, 2008, September 30, 2009, September 30, 2010, and September 30, 2011*)?

Yes ☐

No ☒

During 2009-2010, the City did not send letters to 5th grade teachers and principals inviting them to take part in the City's stormwater education program. However, the City continued its partnership with the SAWS to make individual classroom stormwater presentations to students, reaching a total of 1,674 students this reporting period. The "Zun Zun Water Awareness Assembly" was presented to three elementary schools (Brookside, Podesta Ranch, and John Muir) in the Stockton water service region, during which the stormwater pollution prevention message was presented. In addition, one presentation was made to Stagg High School students at the invitation/request of their staff.

3.6.2 Reach Out to School Age Children Outside of School

- Did the City reach out to school age children outside of school by providing presentations through the Community Services Department's After School Program (*by March 31, 2010 and March 31, 2011*)?

Yes ☐

No ☒

During 2009-2010, the City did not reach out to school age children outside of school by providing presentations through the Community Services Department's After School Program. As of 2009, the Community Services Department was defunct, so this opportunity no longer exists. The City will continue to identify opportunities to reach out to school age children outside of school and to support the interactive display at the Children's museum.

3.6.3 Present at Day Camps

- Did the City present at Day Camps sponsored by the Community Services Department (*by March 31, 2010 and March 31, 2011*)?

Yes ☐

No ☒

During 2009-2010, the City did not present at Day Camps sponsored by the Community Services Department. As of 2009, the Community Services Department was defunct, so this opportunity no longer exists. The City will continue to identify opportunities to reach out to school age children outside of school and to support the interactive display at the Children's museum.

3.6.4 Develop Interactive Exhibit for Display at Children's Museum

- Did the City develop interactive exhibit for display at the Children's Museum (*by September 30, 2009*)?

Yes ☒

No ☐

During the 2009-2010 reporting period, the City completed design and development of an interactive stormwater exhibit that is displayed at the Children's Museum.

3.6.5 Implement Educational Signage and Displays Relevant to Stormwater Pollution

- Did the City implement educational signage and displays relevant to stormwater pollution at the Children's Museum (*begin by April 1, 2010*)?

Yes ☒

No ☐

During the 2009-2010 reporting period, the City completed construction of an interactive stormwater exhibit that is displayed at the Children's Museum. The display was completed at the end of June 2010, with an unveiling to the public in July 2010.



Educational Signage and Display at Children's Museum

3.7 PO5 – BUSINESS OUTREACH

Since commercial and industrial businesses can be sources of stormwater pollutants, this Control Measure ensures that business owners and operators are informed about stormwater quality and impacts on water resources. Efforts are primarily targeted at specific business types.

3.7.1 Conduct Business Workshops

The City conducted business workshops and/or held business specific events as required during the Permit term. The Energy and Clean Air Expo was held in December 2008, and a Got SWPPP? workshop was held in April 2009. In addition, the City held a Pre- and Post-Construction 101 workshop in conjunction with the San Joaquin Stormwater Quality Partnership.

3.7.2 Distribute Educational Material to Selected Businesses

The City distributes educational materials regarding stormwater pollution and BMPs, stormwater regulations, and penalties for noncompliance to a number of different types of businesses. Outreach is focused on the priority businesses identified in Section 5.

During the 2009-2010 reporting period, industrial and commercial facility inspections were conducted, and BMP Fact Sheets and general stormwater information were provided to these businesses (see **Section 5.5.2**). A total of 1,356 pieces of outreach material were distributed.

3.7.3 Ensure Business Workshops Address Mercury

- Did the City ensure business workshops address the proper handling and disposal of mercury-containing products (Water Quality Based Programs Performance Standard) (by June 30, 2009)?

Yes ☐

No ☒

Although the City did not specifically address the proper handling and disposal of mercury-containing products during business workshops held during the Permit term, general information regarding mercury in the environment is available on the City's stormwater Web site.⁶

The Stormwater Program provided information on mercury and mercury disposal to businesses during 2009-2010 as part of the Commercial and Industrial Business Program Inspections. The form for the industrial business inspections was modified to specifically inquire about and review the mercury management plan of each of the businesses inspected.

In addition, the City provided outreach regarding mercury awareness in the December 2009 edition of the *Stockton Water News* utility billing insert. This mailer reached more than 46,000 utility customers.

3.7.4 Revise Business-Specific Fact Sheets to Address Mercury

The City has not yet revised business-specific fact sheets to include proper handling and disposal of mercury-containing products (Water Quality Based Programs Performance Standard). In lieu of revising the business-specific fact sheets to include proper handling and disposal of mercury-containing products, the City will commit to distributing the materials developed by the County of San Joaquin's Household Hazardous Waste Facility for proper disposal of mercury-containing products during the next round of industrial and commercial inspections (2011-2012).

⁶ <http://www.stocktongov.com/mud/>

3.8 PO6 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Public Outreach Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Public Outreach Program, the assessment primarily focused on Outcome Levels 1-4.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the 2009 SWMP?
- Outcome Level 2 (L2) answers the question: Can the City demonstrate that the control measure/performance standard significantly increased the awareness of a target audience?
- Outcome Level 3 (L3) answers the question: Can the City demonstrate that the control measure/performance standard significantly modified the behavior of a target audience?
- Outcome Level 4 (L4) answers the question: Can the City demonstrate that the control measure/performance standard reduced the load from sources to the storm drain and/or receiving water?

The table below summarizes the effectiveness assessment that was conducted for the Public Outreach Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Public Outreach

Public Outreach	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
PO1 - Public Participation	C – Catch Basins Marked C – Stream Cleanup Events C – Used Oil and HHW Programs C – Coordination with Pesticide Plan C – Updated Web Site	C – Volunteers Participating	C – Volunteers Participating	C – Materials Removed/ Diverted
PO2 - Hotline	C – Maintain and Promote/Publicize Hotline	C – Calls to Hotline	N/A	N/A
PO3 - Public Outreach Implementation	C – Material Development and Distribution C – Coordination with Pathogen Plan C – Mixed Media Campaign C – Community-Wide Events C – Partnerships and Community Relations C – Coordination with Pesticide Plan	A	A	N/A
PO4 - Public School Education	C – Invite Schools to Participate C – Outreach to Children Outside School	A	N/A	N/A
PO5 - Business Outreach	C – Conduct Business Workshops C – Material Distribution	A	N/A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

N/A – This outcome level is not applicable for this control measure

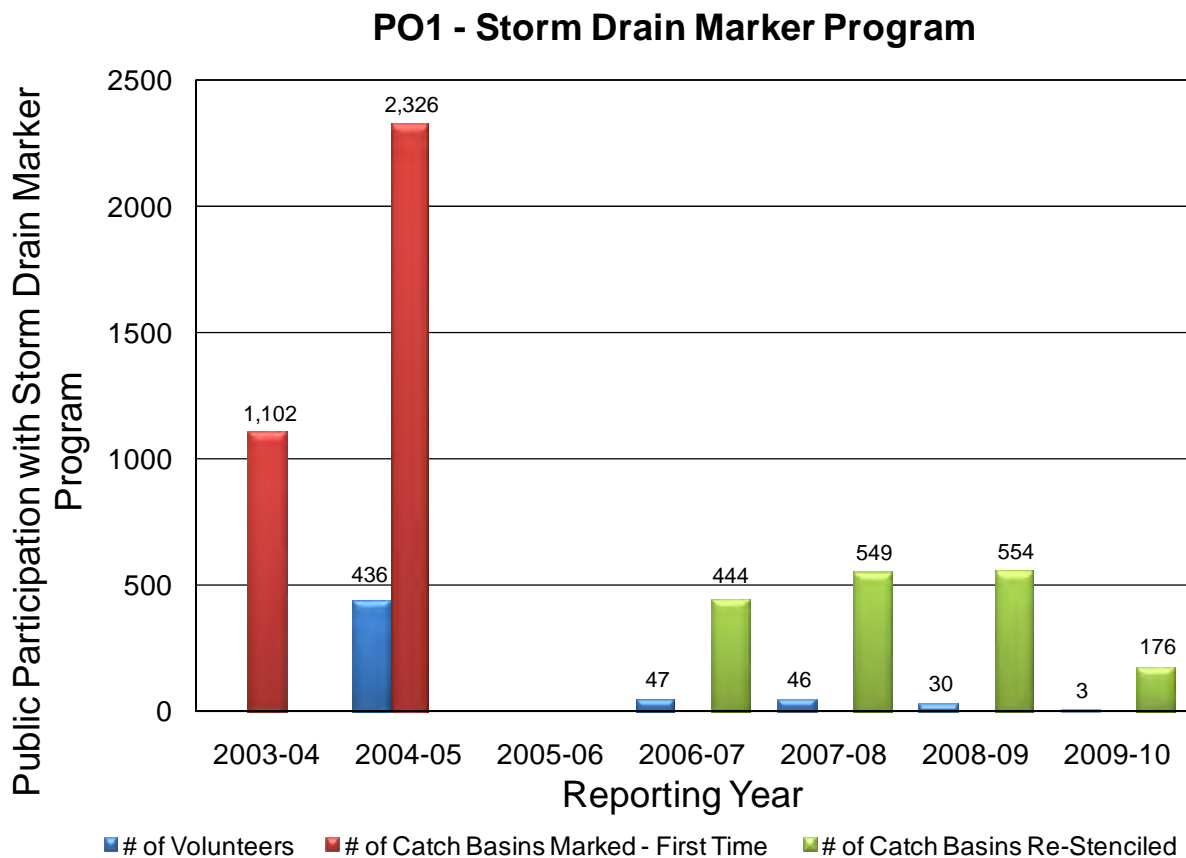
Following is an assessment regarding the effectiveness of the Public Outreach Program.

PO1 - Public Participation

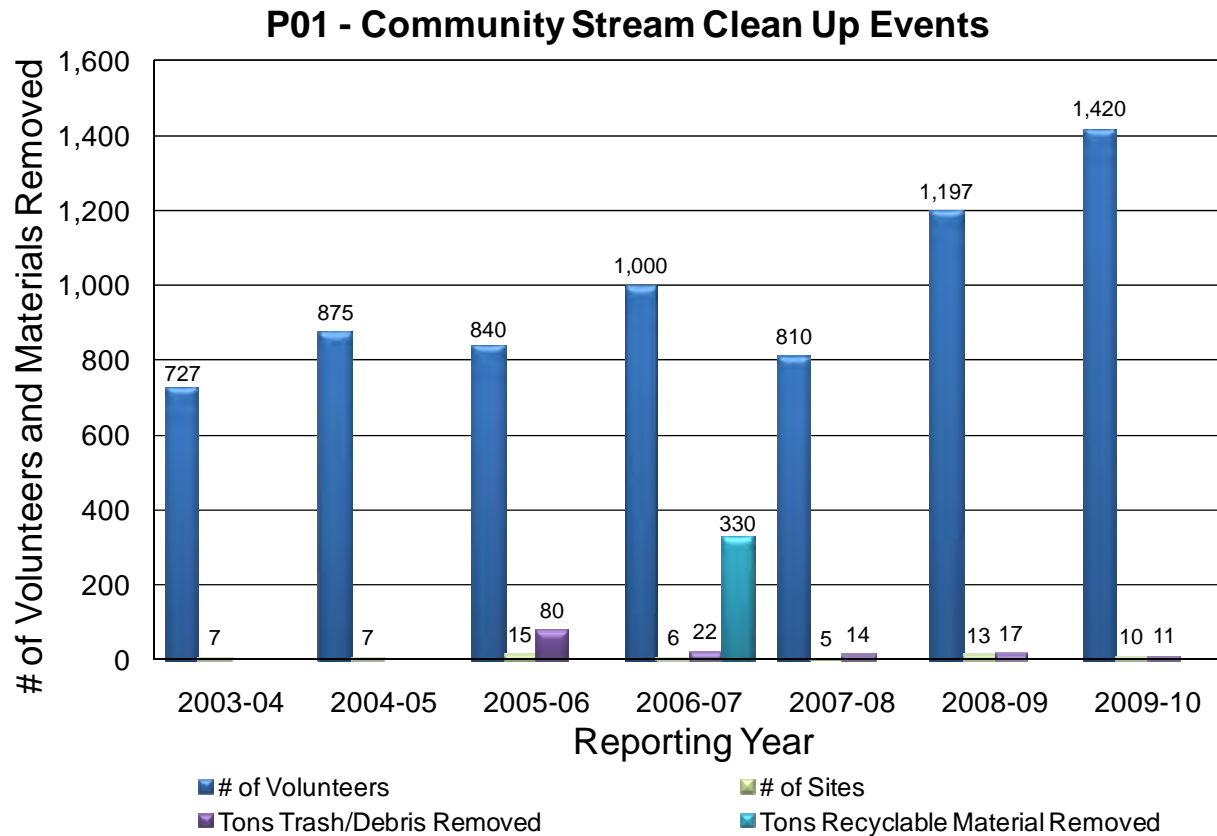
The City is outreaching to and involving the public in the implementation of the Public Outreach program. They are soliciting involvement in the program by advertising in the materials that are distributed, the website, newsletters, at community events, and distributing information at public counters. (L1)

The public is aware of the public education campaign and community events and are becoming more involved in the program. Materials are being removed from the local creeks and streams, thus reducing the amount of materials that would adversely impact the waterways. (L2, L3, L4)

- Storm Drain Marker Program - The City has 16,217 catch basins, all of which are stenciled or permanently imprinted with the storm drain message. Since 2003, 5,151 catch basins have been stenciled or permanently imprinted by volunteers. (Note: No catch basins were stenciled in 2005-2006.) This effort has been completed in part by more than 550 volunteers.



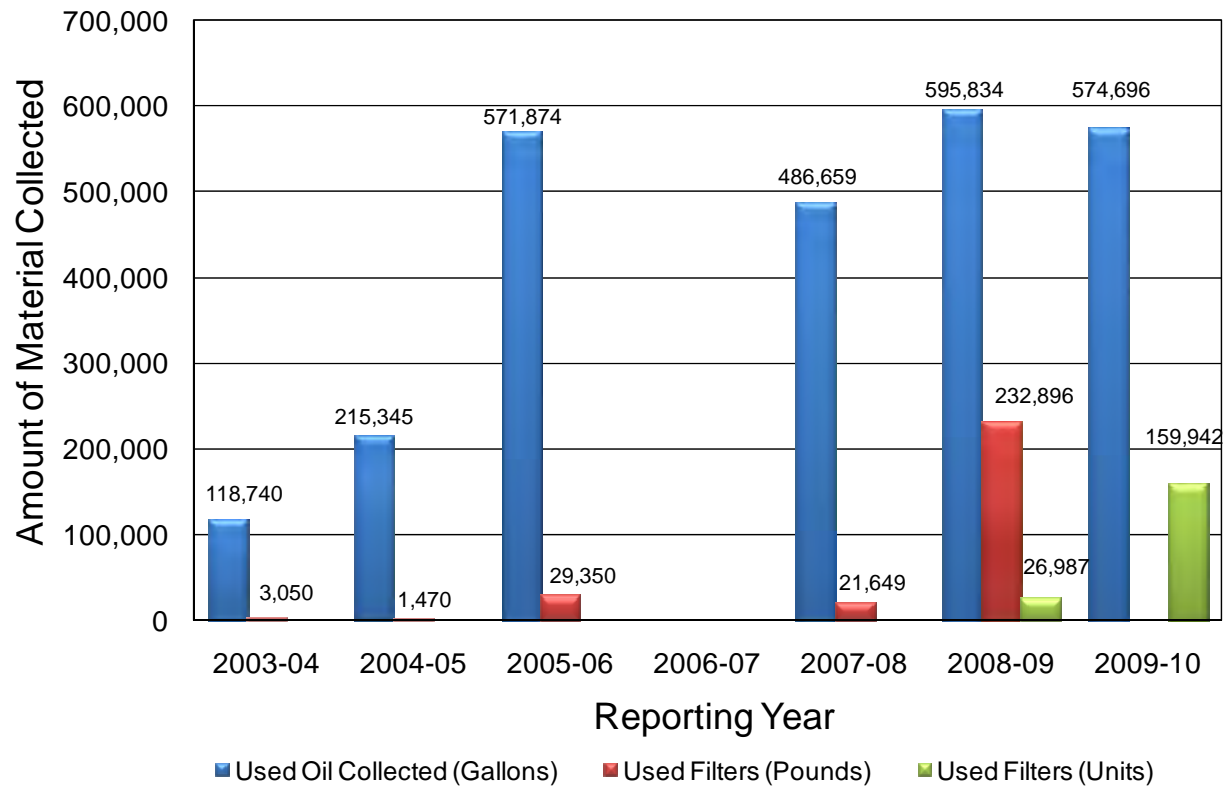
- Stream Clean-Up Events - Since 2003-2004, 6,869 volunteers have participated in local stream clean-up events, and an overall increasing trend in the number of volunteers has been apparent. As a result, more than 41 40-yard dumpsters and 10 20-yard dumpsters of trash and debris have been removed. During the past year, a total of 22,000 pounds of trash and debris was collected Countywide, and the waste removed included approximately 50 tires and 4 shopping carts.



The City has collected used oil and household hazardous waste for proper disposal, thus reducing the potential load of pollutants that could enter the storm drain system. **(L4)**

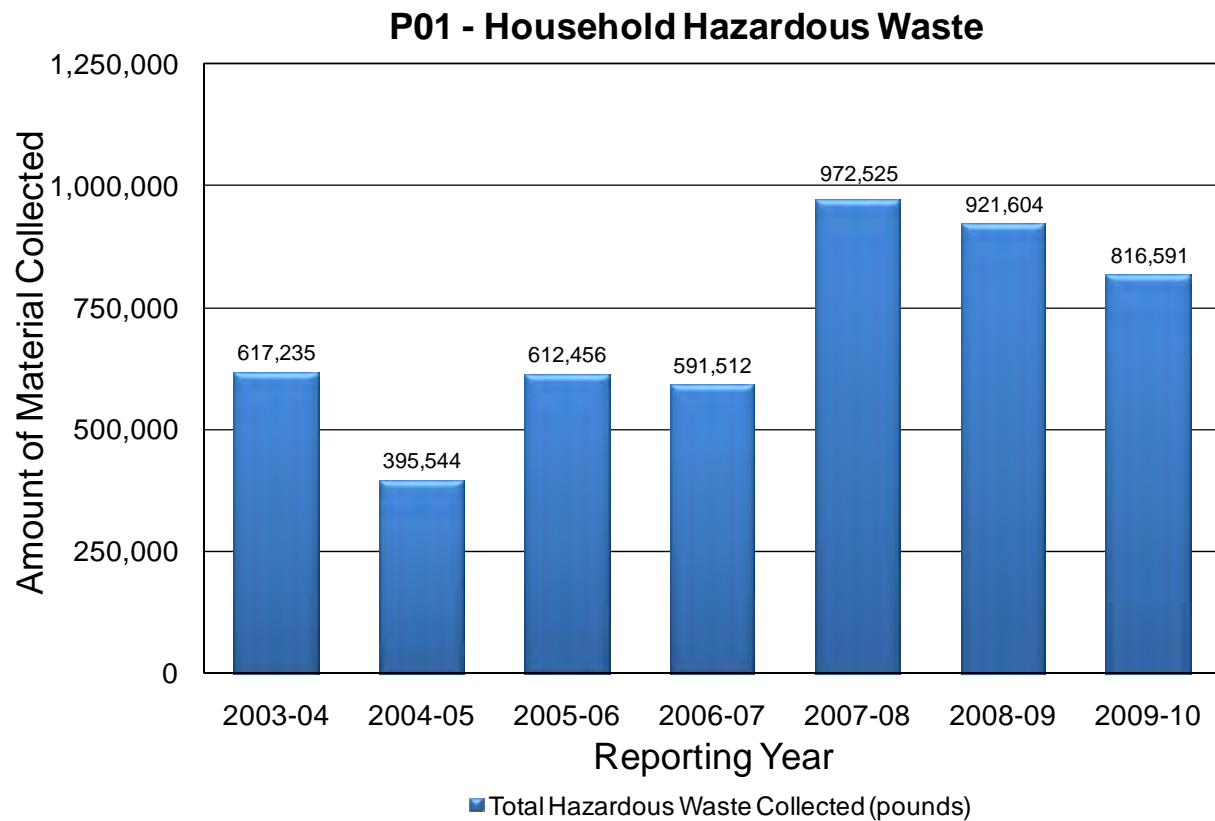
- Used Oil Collection Program – Since 2003, 2,563,148 gallons of used motor oil or motor oil products and 288,415 pounds and 159,942 units of used oil filters have been collected at the permanent collection facility, the certified used oil collection centers, or via the City's recently implemented curbside oil collection program.

P01 - Used Oil Collected



The City is raising awareness about household hazardous waste collection services. **(L1)**

- Household Hazardous Waste - The City collected household hazardous waste through the permanent collection facility. Since 2003, these efforts have resulted in nearly 5 million (4,927,467) pounds of hazardous waste being collected and disposed of properly.



The City is coordinating with the household hazardous waste program with the Pesticide Plan to ensure that pesticides are safely and properly disposed of. The key messages are provided through printed materials as well as the website. **(L1)**

The City has supported active public participation by periodically updating the City's Web site, which includes general stormwater information, pesticide disposal information, and stormwater information specific to summer activities and the rainy season. **(L1)**

PO2 – Hotline

The City is advertising the 24-hour hotline, the used oil program, and the household hazardous waste consolidation facility numbers and communicating the importance of proper disposal for used oil and household hazardous waste. The City is advertising the program through the website, the distribution of waste reduction and recycling guides, the media (public service announcements), and a utility bill newsletter. (L1)

The City is raising awareness about the 24-hour hotline and household hazardous waste consolidation facility numbers. (L2)

PO3 - Public Outreach Implementation

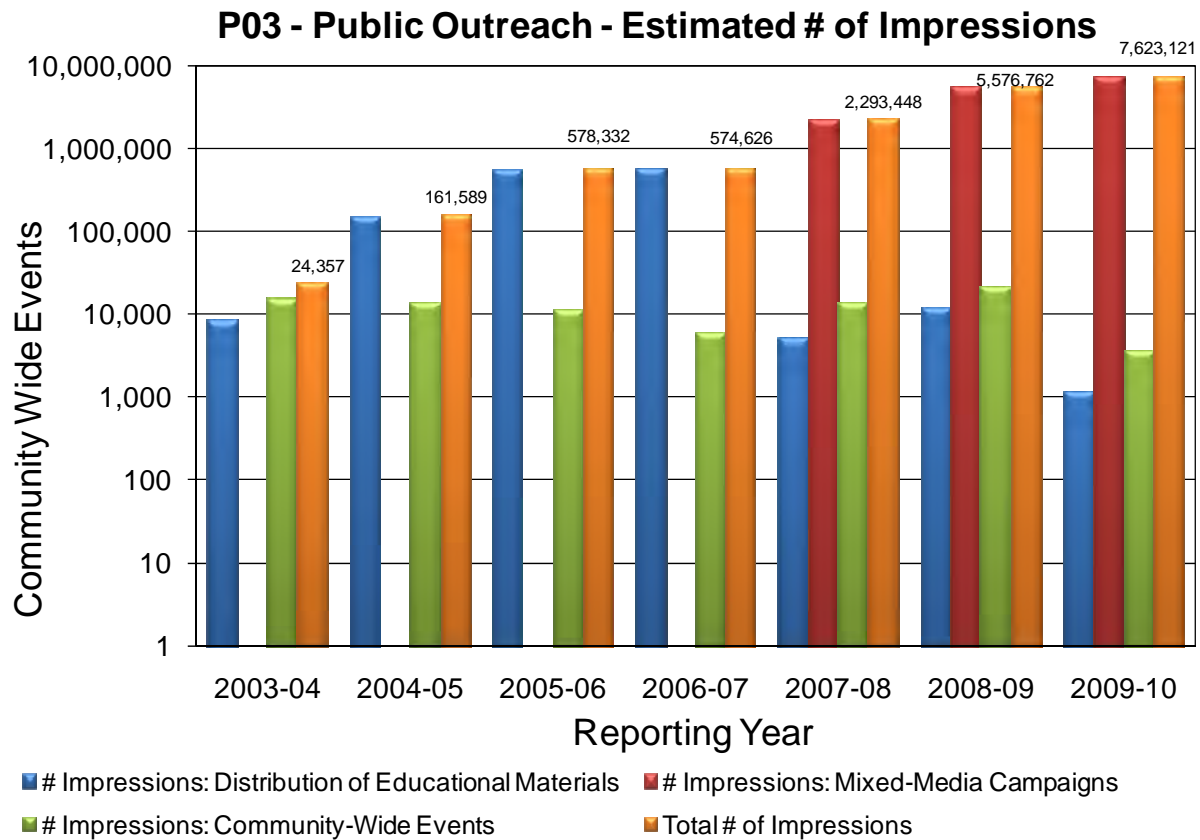
The City has developed and is implementing the public education and outreach program that provides key stormwater messages. (L1)

- General Outreach Efforts – The City has developed and is providing a variety of outreach pieces such as brochures and fact sheets, some of which are multi-lingual. The materials are provided at a number of venues including the City’s web site, civic locations, community events, and billing inserts. Through these efforts, more than 1.3 million pieces of outreach material have been distributed since 2003 (1,310,000 total pieces of outreach material).

The City has continued to work with the local media, the government access cable station, movie theatres, and utility bill newsletters to provide the public with more than 128 different stormwater-related articles or messages since 2003 (22 in 03/04; 15 in 04/05; 34 in 05/06; 11 in 07/08; 16 in 08/09, and 30 in 09/10).

- Mass Mailings – Since 2003, outreach has been provided to approximately 100% of the City residential units by conducting mass mailings of various outreach materials. In addition, in 2005-2006, quarterly waste management newsletters were mailed to all residents. In 2006 and 2008, AT&T phone books with a recycling guide and stormwater and hotline information insert were mailed to all residents.
- Community-Wide Events – The City has regularly attended community events since 2003-2004. Since that time, the City has outreached to the general public by sponsoring, organizing, and/or exhibiting at these events and providing information to an estimated 86,228 event attendees.
- Community Relations – Since 2007-2008, the City has provided community relations in the form of briefing sessions to more than 650 attendees. The City also has outreached to and/or coordinated with local community and environmental organizations.
- Partnerships – The City continues to partner with other City departments and agencies and form additional partnerships, such as that with the Stockton Area Water Suppliers (SAWS), so that resources and efforts can be shared.

As a result of these efforts, in 2009-2010, 7.62 million impressions were made. The City has greatly exceeded the requirement of 800,000 impressions every year since the beginning of the Permit term.



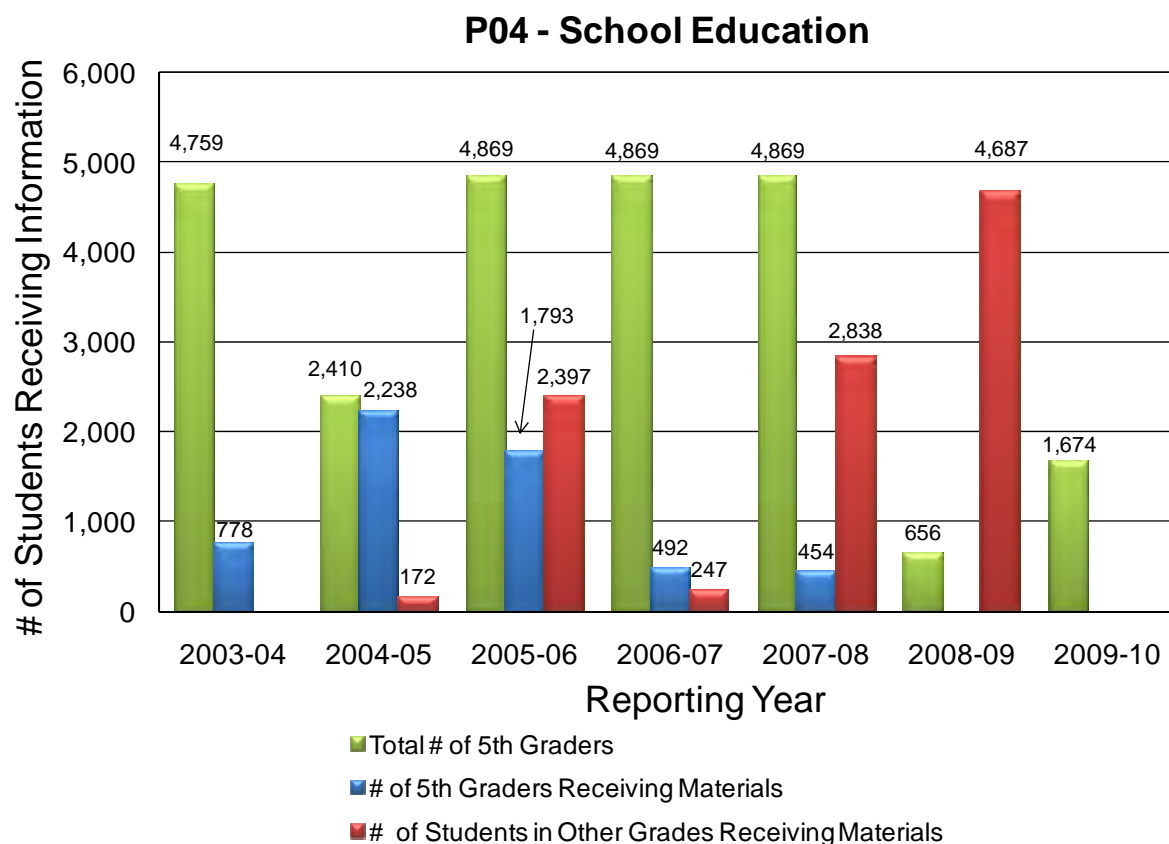
The City is implementing a pet waste outreach program in coordination with the Pathogen Plan to ensure that pet waste is properly disposed of. Since 2008-2009, the key messages have been provided through printed materials, the Stockton Water News utility billing insert, signage at the Barkleyville Dog Park and ten (10) City parks, and radio ads. The City has also provided pet waste outreach to/at businesses, pet-related events, and pet organizations. **(L1)**

During 2008-2009, the City installed a total of 10 pet waste bag dispensing stations at various parks through the Keep the Delta Clean program, as well as an additional 16 pet waste bag dispensing stations at five other parks. **(L1)**

PO4 - Public School Education

The City is outreaching to the schools, educators and school children (primarily 5th graders) and providing key stormwater messages. (L1)

- The City continues to partner with the Stockton Area Water Suppliers (SAWS) to make individual classroom stormwater presentations to 5th grade students, reaching 1,674 students this reporting period.
- During 2009-2010, the City also provided outreach by developing and installing an interactive stormwater pollution exhibit that is displayed at the Children's Museum.



PO5 - Business Outreach

The City is outreaching to the business community and providing key stormwater messages. (L1)

- Materials – Since 2003, the City has distributed educational materials to businesses regarding stormwater pollution and BMPs. As a result, approximately 5,552 pieces of educational materials have been distributed to industrial and commercial businesses. Materials are provided via the City's Web site, at community events, via utility billing inserts, and during industrial and commercial business inspections (see **Section 5**).

3.9 PUBLIC OUTREACH PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Public Outreach Program. In addition to the anticipated tasks identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, to determine if any additional program modifications are necessary to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that will be made to the Public Outreach Program during the next fiscal year include the following:

- **Develop Outreach Materials Targeting Pet Owners:** During 2009-2010, staff began the development of a new brochure on proper pet waste disposal. When complete, the brochure will be mailed to registered pet owners, as well as distributed at veterinary facilities, animal adoption agencies, and kennels. *(Change due date from June 30, 2010 to December 31, 2010)*
- **Implement Phased Installation and Maintenance of Pet Waste Bag Dispensing Stations:** The City will provide outreach to the public regarding the reuse of grocery bags for pick-up and disposal of pet waste and will include such language in outreach materials by June 30, 2011.
- **Revise Business-Specific Fact Sheets to Address Mercury:** In lieu of revising the business-specific fact sheets to include proper handling and disposal of mercury-containing products, the City will commit to distributing the materials developed by the County of San Joaquin's Household Hazardous Waste Facility for proper disposal of mercury-containing products during the next round of industrial and commercial inspections (2011-2012). *(Revised performance standard; change due date from December 31, 2009 to June 30, 2011)*
- **Reach Out to School Age Children Outside of School and Present at Day Camps:** As of 2009, the Community Services Department was defunct, so these specific opportunities no longer exist. During the remainder of the Permit term, the City will continue to identify opportunities to reach out to school age children outside of school and to support the interactive display at the Children's museum. *(Revised performance standards, due June 30, 2011 and June 30, 2012)*

Section 4

Municipal Operations (MO)

4.1 OVERVIEW

The City, as part of its normal operations, conducts a number of activities (e.g., catch basin cleaning, street repairs, street sweeping via a contract) that may generate or mobilize pollutants. The Municipal Operations Program Element comprises Control Measures that are designed to ensure that these operations and maintenance activities are performed using processes and procedures to minimize the pollutants generated and the potential for pollutants to enter the storm drain system.

4.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that the municipal operations related permit requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the SWMP.

The Municipal Operations Program Control Measures consist of the following:

Control Measures for the Municipal Operations Program Element

MO	Control Measure
MO1	Sanitary Sewer Overflow and Spill Response
MO2	New Development and Construction Requirements for Municipal Capital Improvement Projects
MO3	Pollution Prevention at City Facilities
MO4	Landscape and Pest Management
MO5	Storm Drain System Maintenance
MO6	Street Cleaning and Maintenance
MO7	Parking Lots Maintenance
MO8	Training
MO9	Effectiveness Assessment

The next section of the Annual Report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Municipal Operations Program Performance Standards and implementation schedules.

4.3 MO1 – SANITARY SEWER OVERFLOW AND SPILL RESPONSE

The Sanitary Sewer Overflow Emergency Response Plan (SSOERP) minimizes potential impacts to the receiving water from sanitary sewer overflows and spills. Sanitary overflow and spill response comprises four steps: investigation of complaints, containment, notification to appropriate agencies, and clean-up / mitigation. Follow-up to an overflow or spill may include procedures for containing and cleaning spills and leaks that enter the storm drain system.

4.3.1 Implement Sanitary Sewer Overflow Emergency Response Plan

The SSOERP attempts to prevent SSOs from entering the storm drain system and includes reporting information so that the responsible agencies are notified when these spills occur. The Environmental Control Division has a cooperative relationship with the MUD – Stormwater Management Program staff and informs them whenever a spill occurs and a cleanup is necessary. They also work together to collect and record related data. In the event of a private SSO or hazardous spill, communication of both parties is essential in resolving these incidents.

The City maintains a complaint hotline and responds to sanitary sewer overflow complaints and/or notifications in a timely manner. A summary of the sewer overflows is provided below.

Total Number of SSOs	Total Number of SSOs that Entered the <u>Storm Drain System</u>	Total Number of SSOs that Entered a <u>Receiving Water</u>
238	47	4

See **Appendix D-1** for a summary of reported SSOs, including locations, frequencies, total volume estimates, and the amount captured and returned to the sewer system.

4.3.2 Review/Revise Sanitary Sewer Overflow Emergency Response Plan

The most recent version of the SSOERP (March 2009) was included as Appendix B-1 to the 2009 SWMP; the SSOERP is reviewed and revised as changes occur. During the reporting period, no additional revisions were made.

The SSOERP was developed to address sewage spills and ensure that every report of an SSO is addressed by the appropriate personnel so that the impacts of the overflow on the storm drain system can be minimized. Although the SSOERP identifies and outlines the necessary actions and BMPs that should be employed to address SSOs, it is recognized that best professional judgment always needs to be used in the field to address unique issues that arise with every spill. For SSOs, MUD has primary responsibility for responding to, cleaning up, and reporting the spills.

The SSOERP includes reporting information so that the responsible agencies are notified when these spills occur. In addition, the City's current program to limit infiltration of seepage from sanitary sewers uses a combination of inspecting sanitary systems to ensure proper construction, televising existing storm drain lines, reporting by experienced maintenance personnel, and dry weather field screening. During the construction phase, regular inspection ensures verification of leak testing, no cross connections, and televised final checks of construction quality when necessary.

4.4 MO2 – NEW DEVELOPMENT AND CONSTRUCTION REQUIREMENTS FOR MUNICIPAL CAPITAL IMPROVEMENT PROJECTS

The New Development and Construction Requirements for Municipal Capital Improvement Projects Control Measure provides protocols to be followed in the design and construction phases of capital projects undertaken by the City. In essence, the City will follow the Development Standards and Construction Program Element requirements for all capital improvement projects (CIP), and obtain coverage under the General Construction Permit for projects greater than or equal to one acre in size.

4.4.1 Review CIP Designs to Ensure Specifications and Notes are Included

The City requires that all CIPs be reviewed by Municipal Utilities Department Engineering staff to ensure that the Construction BMPs and Stormwater Quality Control and Criteria Plan (SWQCCP) standards are incorporated during the design stage.

During the reporting period, Municipal Utilities Department Engineering staff reviewed all CIPs to ensure that the Construction BMPs and SWQCCP standards (when applicable) were incorporated during the design stage.

4.4.2 Require Submission of NOI for CIP Projects Greater than or Equal to One Acre

The City requires that CIP projects 1 acre or greater obtain coverage under the Construction General Permit.

The following table summarizes information regarding NOIs:

Total Number of Active Public Construction Sites	Total Number of Active Public Construction Sites ≥ 1 acre	Total Number of Active Sites that Submitted an NOI
3	2	2

4.4.3 Ensure CIP Priority Projects are Developed in Conformance with the SWQCCP

If a CIP meets the criteria as a priority project as defined within the SWQCCP, the CIP is developed so that it conforms with the new development standards. During the 2009-2010 reporting period, only one (1) of the three (3) CIPs was a priority project.

A summary of the CIPs reviewed during the reporting period is provided below.

Total Number of CIP that are Priority Projects	Total Number of CIP Priority Projects in Compliance with the SWQCCP
1	1

Summary of Approved Control Measures for CIP Projects

Type of Control Measure	Total Number Approved During the Reporting Period
General Site Design Control Measures (G1 – G4)	4
Site-Specific Source Control Measures (S1 – S8)	1
Treatment Control Measures (T1 – T13)	1
Total Projects¹	1

NOTE:

1. Total CIP priority projects reviewed and approved for SWQCCP requirements.

4.4.4 Improve Interdepartmental Communication to Facilitate Accurate Recordkeeping and Reporting

The City improved interdepartmental communication to facilitate accurate recordkeeping and reporting of data. During the reporting period, the Stormwater Program Manager held routine meetings with City staff responsible for management of Capital Improvement Projects.

4.5 MO3 – POLLUTION PREVENTION AT CITY FACILITIES

The Pollution Prevention at City Facilities Control Measure addresses pollutants entering the storm drain system from City-owned facilities (e.g., corporation yard). To further the framework provided by this Control Measure, Facility Pollution Prevention Plans (FPPPs) will be developed and maintained for the City's facilities. The FPPPs include a site description and identify BMPs that address potential sources of pollutants to the storm drain system as well as procedures for addressing spills that may occur onsite.

4.5.1 Assess Facilities to Determine if They Require Coverage under the General Industrial Permit

The City's corporation yard is the only facility that meets this criterion. This facility previously held its own General Industrial Permit and was released from this requirement by the RWQCB at the end of 2006-2007. The corporation yard is now covered by the Permit requirements.

4.5.2 Modify SWPPP for Corporation Yard and Other Facilities into an FPPP

The City has not yet modified the SWPPP for the Corporation Yard and other facilities into an FPPP. This document is in progress, and many elements (e.g., maps, BMPs) have been updated. This performance standard was due to be completed by *June 30, 2010, but it will be completed by June 30, 2011.*

4.5.3 Implement SWPPP (FPPP) for Corporation Yard and other Facilities

The City has developed and has been implementing BMPs for a wide variety of activities at the corporation yard, including material storage control, vehicle maintenance, spill control, and illicit discharges. The equipment wash area is currently plumbed to the sanitary sewer. Corporation Yard staff continues to monitor storm events and implement BMPs onsite. No formal submittal of monitoring data is required for the facility; however, this information is kept onsite and is used to verify effectiveness of the BMPs implemented.

The City's Corporation Yard follows written storm drain maintenance procedures (Storm Drain, Catch Basin, and Filter Insert Maintenance Procedures, included as Appendix D-2 of the 2008-2009 Annual Report). The procedures include the following:

- All paved surfaces will be kept clear of debris
- Corp Yard to be swept 2 times per month with 10 foot clearance around catch basins
- Cover materials stockpiles
- Annually, change filters on September 1; inspect and clean filters on November 1, January 1, and March 1

Corporation Yard staff continues to maintain a map for trash and recycling bins/containers at the site and provide staff with a list of recyclable items. In addition, during the 2009-2010 reporting period, the Corporation Yard obtained an updated map of storm drain catch basins and a map of hazardous materials/waste storage & spill kits available onsite. Staff plans to add more spill kits and provide training.

During the 2009-2010 reporting period, Corporation Yard staff purchased 10 Flo-gard catch basin inserts to more securely hold filters in place during maintenance activities, and staff installed traditional filters in all other catch basins. Staff plans to install 24 additional Flo-gard catch basin inserts during the 2010-2011 reporting period. In addition, as funding becomes available, staff plans to install cameras and DVRs to monitor use of the trash/recycling bins, the wash rack, and other areas with the potential to discharge to the storm drain system.

The Facilities Maintenance Manager has shared with Project Managers and the Senior Facilities Maintenance Supervisor several BMPs for pressure washing City facilities. The Senior Facilities Maintenance Supervisor is aware of the requirements to not allow pressure washing wash water to discharge to the storm drain system.

4.5.4 Update FPPP on an Annual Basis

- Did the City update the FPPP on an annual basis (*by December 31, 2010*)?

Yes ☐

No, not required to be completed until December 31, 2010 ☒

4.5.5 Review CIP Projects for Compliance with General Stormwater Requirements

The City reviews CIP project lists to identify those projects for new or existing municipal facilities that have vehicle or equipment wash areas. The wash areas are required to be either self contained (through the implementation of BMPs) or connected to a clarifier or alternative pre-treatment device and plumbed to the sanitary sewer. During the 2009-2010 reporting period, no projects meeting this requirement were designed or planned.

4.5.6 Develop BMP Fact Sheets for Non-Emergency Fire Fighting Flows

The City developed a fact sheet identifying the BMPs that must be incorporated for non-emergency fire fighting flows (i.e., those from controlled or practice blazes during training exercises). Fire department activities are not generally considered significant sources of stormwater pollution, but some activities can result in the discharge of water containing pollutants that pose a threat to both human health and the quality of receiving waters if it enters the storm drain system. The two main types of fire department activities that pose potential problems are:

- Emergency Fire Fighting Flows and
- Non-Emergency Fire Department Activities

Although the Permit recognizes that emergency fire fighting flows (i.e., flows necessary for the protection of life or property) can enter the storm drain system, fire department personnel should follow general BMPs in order to minimize the impact of fire fighting flows to the environment. During the 2008-2009 reporting period, the City developed procedures and BMPs addressing emergency and non-emergency fire fighting flows, entitled, "Emergency and Non-Emergency Fire Department Procedures" (Appendix D-4 of the 2009 SWMP).

4.5.7 Distribute BMP Fact Sheets for Non-Emergency Fire Fighting Flows

The City of Stockton Fire Department routinely updates Standard Operating Procedures (SOPs) for training and proper handling of non-emergency fire fighting flows. During the reporting period, the Stormwater Program worked collaboratively with training staff from the Fire Department as part of a work group to update the SOPs, and the updated SOPs are included as part of the Fire Department's routine training program.

4.5.8 Develop Procedures to Address Emergency Events

During the reporting period, the City developed procedures to address emergency events and included them within the *City of Stockton Spill Response Procedures (Appendix B-1)*. An emergency event is considered to be a severe, natural or manmade disaster within the City, including any of the following:

- Earthquakes
- Floods
- Major power outages
- Major fires
- Radiological accidents/attacks
- Chemical accidents/attacks
- Biological accidents/attacks
- Terrorist attacks

In the case of an emergency event, issues related to human health and safety will be prioritized. Once these issues have been addressed, the Stockton Fire Department will notify and coordinate with MUD to address any spills or runoff that are related to the emergency event and ensure the protection of water quality.

4.6 MO4 – LANDSCAPE AND PEST MANAGEMENT

The Landscape and Pest Management Control Measure ensures that the discharge of pollutants from the City's use and storage of fertilizers and pesticides is reduced to the MEP. Among other things, the BMPs promote the use of integrated pest management (IPM) and retention and planting of native plant species requiring less water and chemical augmentation to remain healthy. By choosing less toxic and non-chemical landscaping methods, the City will serve as a positive example to citizens and prevent adverse impacts on the local water bodies.

4.6.1 Implement Pesticide and Fertilizer Application Protocol

The Water Quality Based Program aims to reduce pesticides entering urban runoff by implementing BMPs and IPM to minimize pesticide use. In support of its Pesticide Plan, the City developed and began to implement protocols for routine and non-routine use of pesticides and fertilizers. In general, the City follows these procedures:

- Chemicals are stored in a central facility, meeting OSHA, HAZMAT, and County Agricultural Commissioner's requirements by providing secure storage and spill control.
- Landscaping is performed to maintain a healthy landscape, and a regular fertilizer program ensures healthy turf.
- Pesticides are used as a last resort, conforming to a sound integrated pest management program.
- To maximize the benefit of applications, all chemicals are applied at the minimum dose while avoiding runoff and wind drift.
- Native plants and trees are used whenever possible to reduce water needs while promoting resistance to disease and pests.

In August 2008, the parks maintenance functions were transferred to Public Works. Maintenance of the golf courses remained under the Parks and Recreation Department, subsequently renamed Community Services. As of July 1, 2009, all park landscape maintenance tasks are contracted. Contract specifications call for parks to be fertilized two (2) times a year with an all purpose fertilizer that has broadleaf and crabgrass control, unless conditions indicate that another fertilizer should be used.

During the reporting period, the City implemented the pesticide and fertilizer application protocol (Parks and Recreation Department Landscape Management Procedures, Landscape Maintenance BMP MO-1) at park sites, landscaped medians, and golf courses.

The following table summarizes information regarding the implementation of the **fertilizer protocols**:

	Total Number of Acres Treated with Fertilizers	Total Pounds of Nitrogen Applied	Total Pounds of Phosphorous Applied
2007-2008	340 acres (Golf Courses) 8 acres (Parks)	415 pounds (Golf Courses) 59 pounds (Parks)	100 pounds (Golf Courses) 29 pounds (Parks)
Last Year 2008-2009	N/A ¹	N/A ¹	N/A ¹
This Year 2009-2010	8 acres (Parks) ²	5168 pounds (Golf Courses) ²	408 pounds (Golf Courses) ²

Note:

1. Due to staffing changes within the City's Parks and Recreation Department during the 2008-2009 reporting period, data regarding application of fertilizers and pesticides are not available for that year.
2. The acreage for golf courses treated with fertilizers, as well as information regarding fertilizer application at parks, was not available from the contractors for 2009-2010. In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses.

The City implemented a pesticide application protocol for the detention basins maintained by the City's Storm Drainage Maintenance Assessment Districts. The Assessment Districts' basin maintenance is outsourced and completed under a contract with Odyssey Landscape, Inc. The City's contract with Odyssey Landscape specifies that the contractor shall use less toxic pesticide alternatives in accordance with IPM techniques and practices. In addition, any pesticide determined to cause cancer, birth defects, mutations, or other severe chronic health effects is banned from use. The contractor is required to supply a written pest control recommendation by a licensed pest control adviser for each material to be used at each site—for approval by the City of Stockton—and to keep a log of all chemicals and their quantities applied.

4.6.2 Implement IPM Program

The City has developed and implemented an IPM program that requires the use of less toxic or non-toxic approaches to pest management. These efforts support the Pesticide Plan, which focuses on public outreach and IPM to protect water quality and promote safe, and minimal, pesticide use.

The following table summarizes information regarding the implementation of the IPM program.

	Total Number of Acres Under the IPM Program
2007-2008	340 (Golf Courses) 623.4 (Parks)
Last Year 2008-2009	388 (Golf Courses) 646 (Parks)
This Year 2009-2010	N/A ¹

Note:

1. This information was not available from the contractors for 2009-2010. In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses.

During 2009-2010, the City contracted all landscape maintenance and weed control services. All current maintenance specifications require the contractor to comply with City Manager Administrative Directive P&R-03, Pesticides, Herbicides and Fertilizers. Maintenance contracts that started on January 1, 2010, and all future contracts/contract specifications, will require that the contractor use IPM techniques and

practices and least toxic methods of pest control to achieve the expected/specified results. Contractors are encouraged to consult the University of California Agricultural and Natural Resources State Wide Integrated Pest Management Program¹ to determine the most effective and least toxic methods of pest control.

The specific alternatives to pesticides that were employed by the contractors as a part of the implementation of the IPM program were not available from the contractors for 2009-2010. In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses.

4.6.3 Develop Formal Document Describing IPM-Related Policies and Procedures

During the 2009-2010 reporting period, the City worked to formalize IPM protocols within an administrative directive. The *City Manager Administrative Directive P&R-03* (P&R-03) establishes standard procedures for the administration and use of pesticides, herbicides and fertilizers on City rights-of-way and at City-owned facilities. During 2009-2010, a draft update to P&R-03 was prepared to specify that each department using regulated pesticides, herbicides and/or fertilizers will ensure that employees and/or contractors utilize IPM and alternatives to pesticides whenever applicable. A supplementary IPM Guide refers to IPM policies in greater detail. Contract language was developed to specify that contracted pesticide applicators will utilize IPM. The draft administrative directive and IPM Guide is included as **Appendix I-2**. In 2010-2011, these protocols, along with the IPM protocols, will be utilized by City staff, as well as by contractors hired by the City.

4.6.4 Maintain and Expand Internal Inventory on Pesticide Use

The Water Quality Based Program aims to reduce pesticides entering urban runoff by implementing BMPs and IPM to minimize pesticide use. To evaluate its municipal pesticide use over time, the City will maintain and expand its internal inventory on pesticide use and continue to track pesticide use by the Department of Public Works.

A summary of total pesticide use (by active ingredient, when available) at City parks, golf courses, and detention basins is provided below.

Brand Name of Product(s) & EPA Number	Name of Active Ingredient	Total Amount of Active Ingredients Applied in 2007-2008 (pounds)	Total Amount of Active Ingredients Applied in 2008-2009 (pounds)	Total Amount of Material Applied in 2009-2010 (pounds)
	2,4-D,2-ethylhexyl	N/A	N/A	21.42
	Azoxystrobin	4	N/A	11
	Bensulide	6	N/A	N/A
	Chlorophenoxy	N/A	N/A	1.5
	Chlorothalonil	30	N/A	61.5
	Dicamba	3	N/A	N/A

¹ www.ipm.ucdavis.edu

Brand Name of Product(s) & EPA Number	Name of Active Ingredient	Total Amount of Active Ingredients Applied in 2007-2008 (pounds)	Total Amount of Active Ingredients Applied in 2008-2009 (pounds)	Total Amount of Material Applied in 2009-2010 (pounds)
Turf Supreme 16-6-8 plus Trimec, 2217-643-7001	<ul style="list-style-type: none"> • 2,4-dichlorophenoxyacetic acid; • (+)-(R)-2-(2 methly-4-chlorophenoxy) propionic acid; • Dicamba: 3,6-dichloro-o-anisic acid 	N/A	N/A	5,800
	Diquat dibromide	15	N/A	145
Dimension.25 w/DG PRO	Dithiopyr	N/A	N/A	4,856
	Ethephon	N/A	N/A	64.4
Fusilade	Fluazifop-P-butyl	N/A	N/A	0.5
	Fludioxonil	N/A	N/A	2.5
	Flumioxazin	N/A	N/A	15
	Flutolanil	N/A	N/A	49.7
<ul style="list-style-type: none"> • Round-up Pro, 524-475 • Round-up, 524-308 • Quali-Pro, Glyphosate T&O, 63220-6 • Ranger Pro, 524-517 • Prosecutor Professional Max, 100-1169 • Prosecutor Pro, 524-536-10404 	Glyphosate	60	N/A	1,900
	Imidacloprid	N/A	N/A	1.895
	Indoxacarb	N/A	N/A	0.188
	Iprodione	6	N/A	N/A
	Lambda-cyhalthrin	N/A	N/A	0.1
	Mefenoxam	N/A	N/A	1.875
	Monosodium methanearsonate	8	N/A	N/A

Brand Name of Product(s) & EPA Number	Name of Active Ingredient	Total Amount of Active Ingredients Applied in 2007-2008 (pounds)	Total Amount of Active Ingredients Applied in 2008-2009 (pounds)	Total Amount of Material Applied in 2009-2010 (pounds)
	MSMA	N/A	N/A	3.75
	Myclobutanil	4.5	N/A	
Pre M AquaCap, 241-416-10404	Pendamethalin	0	N/A	157
	Pentachloronitrobenzene	N/A	N/A	102
	Potassium salt of propionic acid	5	N/A	N/A
	Prodiamine	N/A	N/A	15.75
	Propiconazole	3.5	N/A	1.625
	Propionic Acid	N/A	N/A	3.125
	Quinclorac	N/A	N/A	5.625
	Thiophanate-methyl	60	N/A	N/A
Turflon Ester, 62719-258	Triclopyr, butoxyethyl ester	N/A	N/A	1.688
	Trifloxystrobin	N/A	N/A	1.5
	Trinexapac-ethyl	N/A	N/A	0.845
Turflan, 17545	<i>Not available</i>	N/A	N/A	0.38
	Total	205	N/A	13,225

Note:

1. For the 2009-2010 reporting year, the brand name of the material used, its EPA number, and the amount of material applied in pounds are reported for most pesticides. These data are consistent with how contractors report pesticide use to the San Joaquin County Agricultural Commissioner.

4.6.5 Implement Landscaping Standards

In 2003-2004, the City reviewed and modified the landscaping standards to promote planting and retention of native species and minimization of water use, pesticides, fertilizers, and herbicides. The City continues to implement the Landscaping Standards (Stockton Municipal Code Sections 16.56.040 and 16.72.240). The Landscaping Standards contain language that addresses water conservation and reduction of herbicide and pesticide use by means of appropriate plant selection and usage.

4.7 MO5 – Storm Drain System Maintenance

The Storm Drainage System Maintenance Control Measure provides for the long-term performance and integrity of the City's storm drain system. The City prioritizes catch basins for cleaning based on the required level of maintenance, and all catch basins are marked with a storm drain message, whether stenciled or permanently imprinted. This Control Measure includes special event requirements to prevent debris accumulation in catch basins and storm drains.

4.7.1 Implement Storm Drain System Mapping

The City's Municipal Utilities Department implements an aggressive maintenance program for the storm drain system, including main lines, catch basins, and catch basin laterals. Records are maintained for numbers of catch basin grates and laterals unplugged, main lines unplugged, catch basins cleaned, catch basin laterals cleaned, main lines cleaned, and lines televised.

The City's GIS data were created in 1993 and have been maintained at MUD since then by entering new storm drain lines from improvement plans. The data are stored in the Geodatabase GIS format in a SQL Server database. The City began a storm drain mapping project using GIS during fiscal year 2007-2008. As of 2009-2010, all storm drain lines are indicated on the GIS mapping software (ArcMap by ESRI). The City has continued to map and document all storm facilities using this mapping software. When the field crews find errors they notify City staff so the data can be corrected. The database is periodically updated with the latest information regarding new additions to the system.

4.7.2 Review/Revise Prioritization for Catch Basin Cleaning

The City maintains the storm drain system, including all catch basins, and has established maintenance procedures for catch basins and pumps. The maintenance procedures include protocols for the prioritization of catch basins, inspection and cleaning protocols, and general information on recordkeeping of the waste that is removed.

As of June 30, 2010, the City has a total of 16,217 catch basin laterals, 16,217 catch basins, and 131.34 miles of lines (this reflects only those that are City-maintained). Of the 16,217 catch basins, 13,024 are low priority catch basins that discharge to a storm pump station and 3,193 are catch basins that discharge to direct outfalls. Catch basins are cleaned if they are at 40% capacity. Catch basins that drain to receiving waters (without the use of a pump) are inspected annually and cleaned as necessary. All pump stations are cleaned out every other year, regardless of their priority; priority for cleaning is determined by the amount of debris at each station.

The table following is a summary of the City's prioritization:

Priority	Relevant Conditions	Inspection & Cleaning Frequency	Number of Catch Basins/Pump Stations
A (High)	Catch basins that discharges directly to waters of the state (direct outfalls)	Inspect annually prior to rainy season and clean if >40% debris accumulation	3,193
B (Medium)	Pump stations	Inspect annually, clean every other year	77
C (Low)	Catch basins that discharge to a pump station	Inspect every five years; more routine inspection if incident, complaint, or local flooding occurs. Clean if >40% debris accumulation	13,024
		Total Number of Catch Basins	16,217

4.7.3 Maintain and Annually Update Catch Basin Database

The City maintains and annually updates its catch basin database, which identifies catch basins and drainage areas. Catch basin cleaning is also tracked using work orders created by the database. The database information can be exported to GIS as needed.

4.7.4 Implement Catch Basin Maintenance Program

The City regularly cleans a number of catch basins annually regardless of catch basin prioritization. All clogged and partially clogged catch basins are cleaned first and prior to the wet season. During the current reporting year, the City cleaned a total of 1,241 catch basins. This total includes the high priority catch basins which are inspected once prior to the wet season (between August and October), as well as the low-priority catch basins, which were inspected and cleaned as necessary.

The following table summarizes the inspection and cleaning of high priority catch basins:

Total Number of High Priority Catch Basins Inspected Annually	Total Number of High Priority Catch Basins Cleaned
2,253	361

The following table summarizes information regarding overall storm drain system maintenance activities:

	Last Year 2008-2009	This Year 2009-2010
Total Length of Channel/Pipe Cleaned (linear feet) ¹	122,741	53,768
Total Amount of Material/Debris Removed From Catch Basins (tons)	9	15

Notes:

1. Total Length of Channel/Pipe Cleaned = All M41436 & M41428

4.7.5 Implement Pump Station Maintenance Program

The City developed maintenance procedures for pump stations. The procedures include protocols for pump station inspection and cleaning and general information on recordkeeping of the waste that is removed. The city has implemented the pump station maintenance program. The City inspects the pump stations annually and cleans them as necessary (a minimum of once every two years).

The following table summarizes the inspection of pump stations during fiscal year 2009-2010:

Total Number of Pump Stations	Total Number of Pump Stations Inspected
77	11

The following table provides a summary regarding overall pump station maintenance activities:

	Total Number of Pump Stations Cleaned	Total Amount of Material/Debris Removed (tons)
Last Year 2008-2009	35	884.70 (wet)
This Year 2009-2010	12	181.03

Note: Debris removed for 2009-2010 on wet tonnage, not dried debris as in 2007-2008. The City did not haul out any waste for disposal during the 2008-2009 reporting period.

4.7.6 Develop Maintenance Procedures and Prioritization for Cleaning Detention Basins

The City developed maintenance procedures and prioritization for cleaning detention basins as part of the Water Quality Based Programs. Throughout the winter and spring of 2009, City staff completed the development and release of a comprehensive bid for the routine inspection and maintenance of the City's five storm detention basins operated under maintenance assessment districts. A bid was released on April 24, 2009 with two sealed bids received and opened. A three-year contract was awarded on June 9, 2009 to the local firm, Odyssey Landscape Company, Incorporated.

The contract scope of work includes vector control, weed abatement, rodent control, slope dressing, erosion control, mowing, ripping, discing or grading basin bottom, trash and debris pick-up and removal, cleaning of basin structures, and sedimentation relocation. The contractor performed an initial extensive clean out of each of the basins during the summer of 2009, and thereafter performed quarterly inspections and routine maintenance as needed during the following periods: between September 1st and September 30th of each year; between December 1st and December 30th of each year; between March 1st and March 31st of each year; and between June 1st and June 30th of each year, for a total of 13 site visits during the contract period.

The contract specifies the use of less toxic pesticide alternatives in accordance with the IPM techniques and practices and requires advance notification and approval of the City prior to the application of any weed abatement and/or pest control substances. Also included in this maintenance contract is the ProLogis Park at Duck Creek extended detention basin. Construction is expected to be completed late Summer 2010. It is anticipated that operation and maintenance will be turned over to the Assessment District at the time construction is completed. It is anticipated that Odyssey Landscape will perform the first inspection and maintenance on the basin in September 2010.

4.7.7 Implement Detention Basin Maintenance Program

The City maintains a total of five detention basins located in the industrial sectors of south Stockton. These basins were developed prior to the development and implementation of water quality control measures and are therefore designed for flood control. These basins are maintained by an outside contractor, Odyssey Landscape. During the 2009-2010 reporting period, each of these basins was inspected and maintained three times. A total of 2,012 cubic yards of trash and debris was removed from these basins.

The Stockton Consolidated Storm Drainage Maintenance Assessment District No. 2005-1 maintains two additional basins (Riverbend and Morada) developed to provide water quality control functions as well as flood control. During the 2009-2010 reporting period, each was inspected and maintained a total of four times. A total of 83 cubic yards and 50 pounds of trash and debris was removed.

A summary of detention basin inspections is provided below.

Total Number of Detention Basins	Total Number of Inspections Conducted After Significant Storms	Total Number of Regular Inspections Conducted
Flood Control Detention Basins: Arch Road Industrial, Stockton Airport Business Center, Western Pacific, Charter Way, and Stockton Airport Gateway (5)	0	15
Water Quality and Flood Control Detention Basins: Riverbend, Morada	0	8

The amount of trash, debris, and sediment removed from the forebays and detention basins is summarized below. Note that the total amount is not segregated between forebays and detention basins.

	Total Amount of Trash, Debris, and Accumulated Sediment Removed from the Forebays and Basins (tons) ¹
Last Year 2008-2009	Not reported
This Year 2009-2010	Flood Control Detention Basins: 2,012 cubic yards ¹ Water Quality and Flood Control Detention Basins: 83 cubic yards + 50 pounds

Note:

1. Tonnage was not available for 2009-2010.

4.7.8 Implement Notification Procedures for ID/IC and Missing Catch Basin Markers or Illegible Stencils

Catch basins are marked with a storm drain message that is either permanently imprinted or stenciled in the curb above the catch basin. Volunteers stencil catch basins through the Public Outreach Program Element (see PO1), and municipal staff are also responsible for stenciling and/or marking the catch basins with missing or faded stencils.

In 2003-2004, the City developed and implemented a protocol so that responsible staff can be notified of and respond to the following:

- Illegible inlet stenciling or missing markers (to be re-stenciled in 180 days)
- Evidence of illicit connections or discharges as discovered by municipal field crews (respond within 2 business days)

All of the catch basins installed since 2003-2004 have been required to be permanently imprinted in the sidewalk with the message "No Dumping – Flows to River" or "No Dumping – Flows to Delta". The City has 16,217 catch basins, all of which are stenciled or imprinted with the storm drain message. During 2009-2010, 2,647 catch basins were inspected or re-stenciled by Collections crew, and 176 catch basins were re-stenciled by volunteers.

4.7.9 Include Special Event Use Provisions in Special Use Permits

Periodically, special events occur at City owned and operated facilities (including parks). The City requires large events (as well as large venues) to address trash and debris removal, including containerization and street sweeping as appropriate. This process occurs through the Public Works Solid Waste Department. Because the intent of this performance standard is appropriately addressed through this process, the City will not update the MUD Directive (Appendix B-5 of the 2009 SWMP) to include Special Use Provisions for proper management of trash and litter.

During the reporting period, a total of five (5) large events were required to address trash and debris removal:

- Stockton Asparagus Festival
- Cinco de Mayo
- Earth Day
- California Coastal Clean-Up Day
- Family Day at the Park

Additional information is provided in **Appendix D-2**.

4.7.10 Treatment Feasibility Study

The City and County were required by the second term Permit to evaluate the feasibility of diverting dry weather discharges from the storm drainage system to the City's Regional Wastewater Control Facility (RWCF) or, alternatively, to provide treatment of dry weather discharges using BMP treatment controls. Using a prioritization process, each outfall in the storm drain system was analyzed to determine the feasibility for dry weather discharge diversion opportunities. The prioritization effort is summarized in the table below.

Watershed	Outfall Name	Outfall ID	Outfall Type	Treatment Option	Prioritization Score
Recommended for 10% design assessment					
5-Mile Creek	Swenson & 5-Mile Creek P.S.	5M-27	Pump	Diversion	51
Calaveras River	Brookside & I-5 P.S.	CR-40	Pump	Diversion	53
	Sutter & Calaveras River P.S.	CR-45	Pump	Diversion	49
	Holman & Calaveras River P.S.	CR-48	Pump	Diversion	46
Mosher Slough	Mariner & Mosher Slough P.S.	MS-13	Pump	Diversion	53
	Kelly & Mosher Slough P.S.	MS-14	Pump	Diversion	49
San Joaquin River	Eighth Street & San Joaquin River P.S.	SJ-61	Pump	Diversion	47
Walker Slough	Turnpike & Walker Slough P.S.	WK-64	Pump	Diversion	50

The Treatment Feasibility Study Report describing these efforts was submitted to the Regional Water Board in April 2006. Based on the results of the Treatment Feasibility Study, the City prepared four preliminary design reports during the 2008-2009 reporting period for the prioritized outfalls in the order of prioritization.

The name of the CIP Project that the City is currently designing to divert the feasible portion of summer flows into sanitary sewer is called "Connection of Storm Pump Station to Sanitary System, Project No. M04016".

There were initially four stormwater pump stations selected based on the April 2006 Treatment Feasibility Study and the March 2006 "Feasibility of Discharging Stormwater Summer Flows to the Sewer System" report prepared by CXS Consulting, Inc.

The four selected Pump Stations were as follows:

- Alexander & 14-Mile Slough Pump Station
- Swenson & 5-Mile Creek Pump Station
- Mariner & Mosher Slough Pump Station
- Kelly & Mosher Slough Pump Station

The City's design consultant, Peterson-Brustad, Inc., submitted a Draft Pre-Design Report in June 2009, as well as a Pre-Design Report, Revision 2, in August 2009. The August 2009 Pre-Design Report was included as Appendix D-3 of the 2008-2009 Annual Report and contains proposed retrofit details as well as the proposed operations.

Following review of the June 2009 Draft Pre-Design Report, it was decided that both the Alexander & 14-Mile Slough Pump Station and Kelly & Mosher Slough Pump Station should be removed from the scope of this project. The Alexander & 14-Mile Slough Pump Station receives only overflows from the Quail Lake sub-division. The runoff flowing through this lake is treated through natural, physical, and biological processes. Therefore, it was not necessary to divert the subject flows into the sanitary system. In the case of Kelly & Mosher Slough Pump Station, it was determined that there was not enough capacity in the existing 12" sanitary pipe to safely divert the summer flow from this pump station. Replacing the existing pipe with a larger one was not considered to be cost effective.

Therefore, the City decided to add the Stockton Airport Business Center Pump Station from the existing list of feasible pump stations in place of the two eliminated above. This pump station is included in the August 2009 Pre-Design Report.

Watershed	Outfall Name	Outfall ID	Outfall Type	Treatment Option	Prioritization Score
Little John Creek	Stockton Airport Business Center P.S.	LJ-80	Pump	Diversion	43

In April 2010, Peterson-Brustad, Inc., the City's design firm completed the design of this project. It consists of three outfalls: Swenson & 5-Mile Creek Pump Station, Mariner & Mosher Slough Pump Station, and Stockton Airport Business Center Pump Station. The project was advertised and received three bids on May 13, 2010. On June 29, 2010, the City authorized the construction of this project, and it is anticipated to start in mid September 2010.

The four remaining outfalls—Sutter & Calaveras River Pump Station, Holman & Calaveras River Pump Station, 8th St. & San Joaquin River Pump Station, and Turnpike & Walker Slough Pump Station—will be considered for the next fiscal year.

4.8 MO6 – STREET CLEANING AND MAINTENANCE

The Street Cleaning and Maintenance Control Measure ensures that City streets are maintained and cleaned to reduce pollutants to the MEP. In conducting the Control Measure, the City designates the streets or segments of streets based on the required level of maintenance. Street sweeping requirements and street maintenance materials control are also components of this Control Measure. The City maintains a long-term contractual relationship with two major waste haulers to conduct this work effort.

4.8.1 Implement Street Sweeping Program

The City implements a street sweeping program. Current and future streets and parking lots in the downtown area are swept three times each week. Residential, Industrial, Commercial and Open Space streets are swept every other week on the day after collection. Street sweeping is a component of the 15-year franchise agreements between the City of Stockton, Republic (formerly Allied Waste) and Waste Management, Inc., and is sub-contracted out to Universal Sweeping.

The following table summarizes the street sweeping activities conducted during the reporting period:

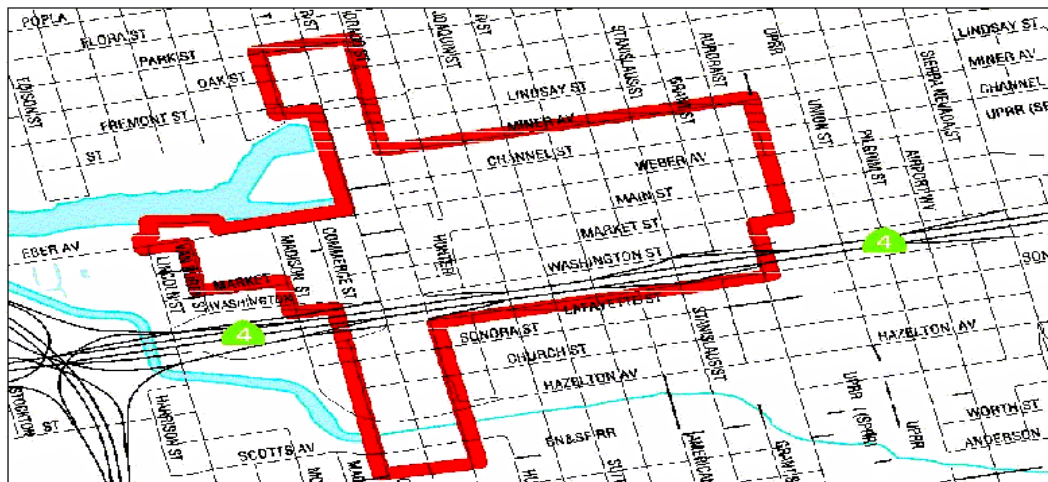
	Total Miles Swept	Total Amount of Debris Removed by Street Sweeping (tons)	Total Amount of Green Waste Collected (tons)
Last Year 2008-2009	45,853	5,122	43,998
This Year 2009-2010	47,794	5,445	75,775

4.8.2 Review/Revise Prioritization of Streets for Street Sweeping Program

At the time the first term permit was drafted, the City swept with its own staff and equipment. Due to lack of funding, sweeping was minimal; streets often were only swept once a month. The Regional Water Board incorporated the concept of prioritization so that the City could prioritize sweeping locations and frequency to adequately address specific areas of the City.

The City currently has 15-year franchise agreements Allied Waste and Waste Management, Inc. which re responsible for street sweeping (see Exhibit H, Street Sweeping and Leaf Collection, included as Appendix D-4 of the 2008-2009 Annual Report). The frequency was set as noted above in the franchise agreements in June 2004, and sweeping services are provided on a much more frequent basis than before the franchise agreements were implemented. Since then, prioritization has no longer been necessary.

The downtown street sweeping area is depicted below.



DOWNTOWN STREET SWEEPING AREA

January 18, 2004



Street Sweeping is Conducted Every Other Week in Residential Areas

4.8.3 Implement Green Waste Collection Program

As part of the Water Quality Based Programs, the City maintains a program to pick up leaves in certain problem areas twice each fall and implemented a revised solid waste and recycling program on June 1, 2004. Among other things, the program provides residents with several 90-gallon wheeled carts to use for green waste collection rather than having them place loose green waste in the street for pickup. In addition to weekly green waste collection, residents are provided with additional green waste services (e.g., Christmas tree collection, leaf service during “Leaf Season”) at no additional charge. Additional green waste carts are available, upon demonstrated need, at no additional charge.

During the reporting period, the City continued to implement the green waste collection program through its 15-year franchise agreements with waste haulers, Waste Management and Allied Waste.

4.8.4 Update Maintenance Staff Guide – Road Maintenance and Small Construction BMPs

During the 2009-2010 reporting period, the City updated its *Maintenance Staff Guide – Road Maintenance and Small Construction BMPs* to refer primarily to California Stormwater Quality Association (CASQA) BMPs that are available online (see **Appendix D-3**). This approach was used to ensure that BMPs remained up to date and in accordance with CASQA recommendations.

4.8.5 Implement Maintenance Staff Guide – Road Maintenance and Small Construction BMPs

The *Maintenance Staff Guide – Road Maintenance and Small Construction BMPs* details BMPs for a wide variety of maintenance activities, including road maintenance and small construction. The *Maintenance Staff Guide* was originally developed in 2004-2005, and the City continues to implement the BMPs. Public Works – Operations and Maintenance has an established pavement maintenance program that addresses the removal and proper disposal of pavement material, paint residue, and other construction waste. A street sweeper is permanently assigned to each road crew to facilitate daily clean-up of debris, at a minimum, with more frequent clean-up activities conducted as needed.

During the 2009-2010 reporting period, the *Maintenance Staff Guide – Road Maintenance and Small Construction BMPs* was updated, and the updated version has been distributed to City staff.

4.9 MO7 – PARKING LOTS MAINTENANCE

The Parking Lots Maintenance Control Measure ensures the City's parking lots and structures are kept clear of debris and excessive oil buildup is prevented. This Control Measure consists of a schedule of inspections and cleaning of the parking lots and structures. The City maintains a long-term contractual relationship with two major waste haulers, Waste Management and Republic (formerly Allied Waste), to conduct this work effort.

4.9.1 Implement BMPs for Parking Lot Cleaning

The City maintains several parking lots. A Parking Lot Cleaning BMPs Fact Sheet (included as Appendix D-7 to the 2009 SWMP) was developed and is currently implemented by the City.

All parking lots are monitored and cleaned to prevent excessive oil or debris build-up as needed. City-owned parking lots are swept bi-weekly by the sweepers contracted with the City's contracted waste haulers to control litter. During the reporting period, MUD Stormwater worked collaboratively with the City's Central Parking District to contract with Fleetwash to clean the parking structure surfaces and clean out sand filters that collect oily waste from these parking structures.

4.9.2 Inspect City-Owned Parking Lots Annually

The City's Central Parking District is responsible for operations and maintenance of city-owned parking lots and parking structures. A summary of the city-owned parking lots and parking structures is provided below.

- 5 parking structures in the downtown area
- 15 flat parking lots in the downtown area
- 16 park sites throughout the City
- North Police Department facility

4.10 MO8 – TRAINING

Training is important for the implementation of the Municipal Operations Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

Areas of Focus for the Municipal Operations Program Element Training

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none">• Maintenance crews• Road crews• Street sweepers• Parking Facilities crews• Waste Pickup• Parks & Rec crews• Pesticide/fertilizer applicators• Contract/lease staff involved in above activities	<ul style="list-style-type: none">• Classroom• Field demos• Tailgate sessions	<ul style="list-style-type: none">• Overview of stormwater management• BMPs for municipal operations	<ul style="list-style-type: none">• Pesticide applicators must also attend annual pesticide application classes

4.10.1 Conduct Training

- Did the City conduct Fixed Facility Operations training for key staff involved in the MO program (by June 30, 2009 and June 30, 2011)?
Yes ☐
No, not required to be conducted until June 30, 2011 ☒
- Did the City conduct Field Program Operations training for key staff involved in the MO program (by June 30, 2009 and June 30, 2011)?
Yes ☐
No, not required to be conducted until June 30, 2011 ☒

Although training was not scheduled to be conducted during the 2009-2010 reporting period, City staff attended a training session entitled “Storm Water Regulations” that was hosted by the CWEA San Joaquin Chapter.

A summary of the training sessions attended is provided below.

Date of Training	Title of Training Module	Number of Attendees	Staff Positions Trained	Trainee City Departments or Divisions
9/6/2009	Storm Water Regulations	5	Collections System Supervisor, Senior Collections System Operator, Collections System Operator	Environmental Control

4.11 MO9 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Municipal Operations Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Municipal Operations Program, the assessment primarily focused on Outcome Levels 1-4.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the 2009 SWMP?
- Outcome Level 2 (L2) answers the question: Can the City demonstrate that the control measure/performance standard significantly increased the awareness of a target audience?
- Outcome Level 3 (L3) answers the question: Can the City demonstrate that the control measure/performance standard significantly modified the behavior of a target audience?
- Outcome Level 4 (L4) answers the question: Can the City demonstrate that the control measure/performance standard reduced the load from sources to the storm drain and/or receiving water?

The table below summarizes the effectiveness assessment that was conducted for the Municipal Operations Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Municipal Operations

Municipal Operations	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
MO1 - Sanitary Sewer Overflow and Spill Response	C – Implementation of SSORP C – Review/Revise SSORP	N/A	N/A	N/A
MO2 - Construction Requirements for Municipal Capital Improvement Projects	C – Reviewed CIP Designs C – Require Submission of NOI C - Ensured CIP Priority Projects are Developed in Conformance with the SWQCCP C - Improved Interdepartmental Communication	N/A	C – NOIs submitted	N/A
MO3 - Pollution Prevention at City Facilities	C – Assessed Facilities C - Implemented SWPPP/ FPPP for Corporation Yard C – Reviewed CIP Projects C – Developed/Distributed BMP Fact Sheets for Non-Emergency Fire Fighting Flows C – Developed Procedures to Address Emergency Events	N/A	N/A	N/A
MO4 - Landscape and Pest Management	C – Landscape and Pest Management Protocols C – Developed Formal IPM Policies Document	N/A	N/A	A

Municipal Operations	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
MO5 - Storm Drain System Maintenance	C – Storm Drain Maintenance Program C – Pump Station Maintenance Program C – Detention Basin Maintenance Program C – Treatment Feasibility Study	N/A	A	C – Materials Removed
MO6 - Street Cleaning and Maintenance	C – Street Sweeping Program C – Updated Maintenance Staff Guide	N/A	N/A	C – Materials Removed
MO7 - Parking Lots Maintenance	C – Parking Lot Maintenance	N/A	N/A	N/A
MO8 - Training	C – Staff Attended Training	A	A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

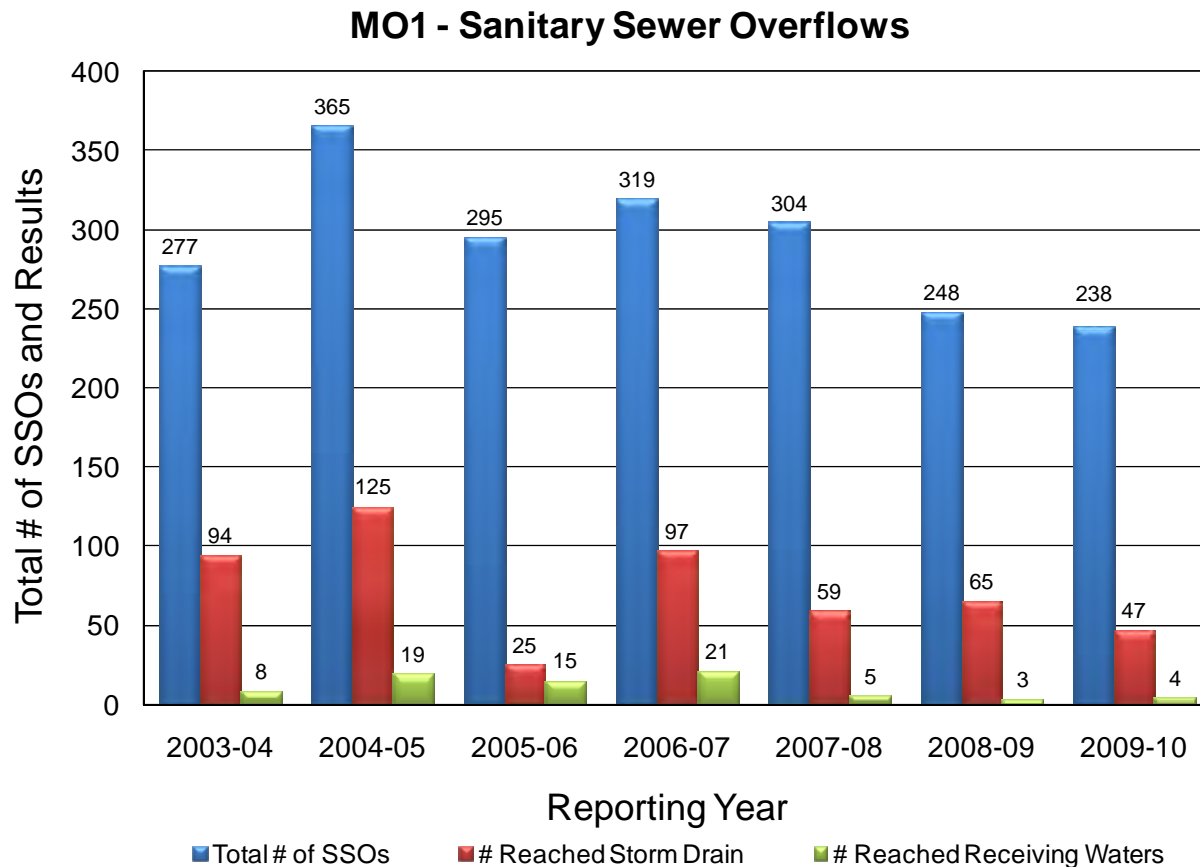
N/A – This outcome level is not applicable for this control measure

Following is an assessment regarding the effectiveness of the Municipal Operations Program.

MO1 - Sanitary Sewer Overflow and Spill Response

The City developed and continues to implement the sanitary sewer overflow response plan, respond to sanitary sewer overflows and, when possible, prevent the spills from entering the storm drain system and/or the receiving waters. The City will also review and revise the SSORP as needed. **(L1)**

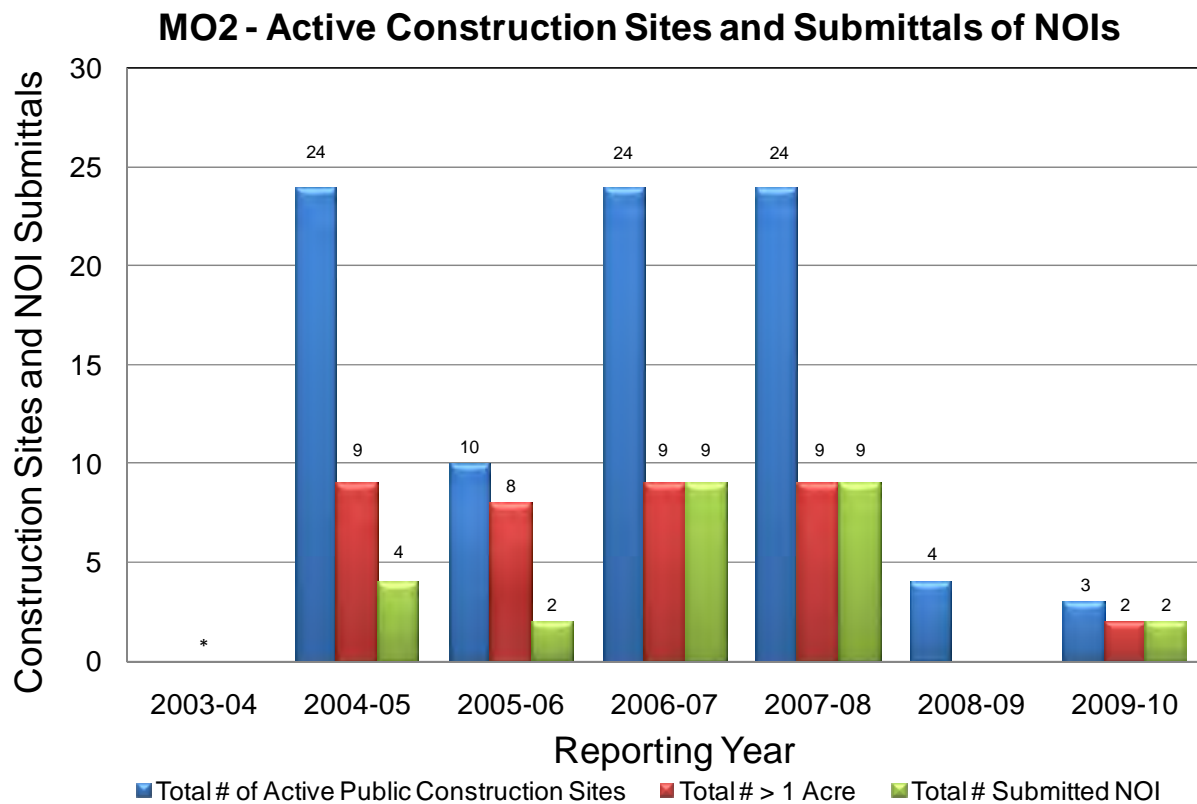
- Since 2003, 2,046 SSOs have occurred and were responded to by the City. Of the 2,046 spills, 512 reached the storm drain system and 75 of them reached a receiving water. In general, a downward trend has been observed in the total number of SSOs per year.



MO2 – Construction Requirements for Municipal Capital Improvement Projects

City staff have reviewed the capital improvement projects (CIPs) to ensure that the construction BMPs and new development standards have been incorporated during the design stage. (L1)

The City also requires that CIP projects greater than or equal to one acre obtain coverage under the General Construction Permit. Staff are aware of this requirement and have, over time, obtained coverage for the projects as needed. (L3)



*Data not available.

The City has also improved interdepartmental communication to facilitate the reporting process for municipal operations. (L1)

MO3 – Pollution Prevention at City Facilities

The City routinely assesses their facilities to determine if they require coverage under the General Industrial Permit. **(L1)**

For the City owned and operated facilities that do not require coverage under a State General Permit, but have potential stormwater-related issues, the City develops and implements a stormwater pollution prevention plan or an equivalent document. **(L1)**

The City developed and distributed procedures and BMPs addressing emergency and non-emergency fire fighting flows. **(L1)**

The City developed and distributed procedures to address emergency events. **(L1)**

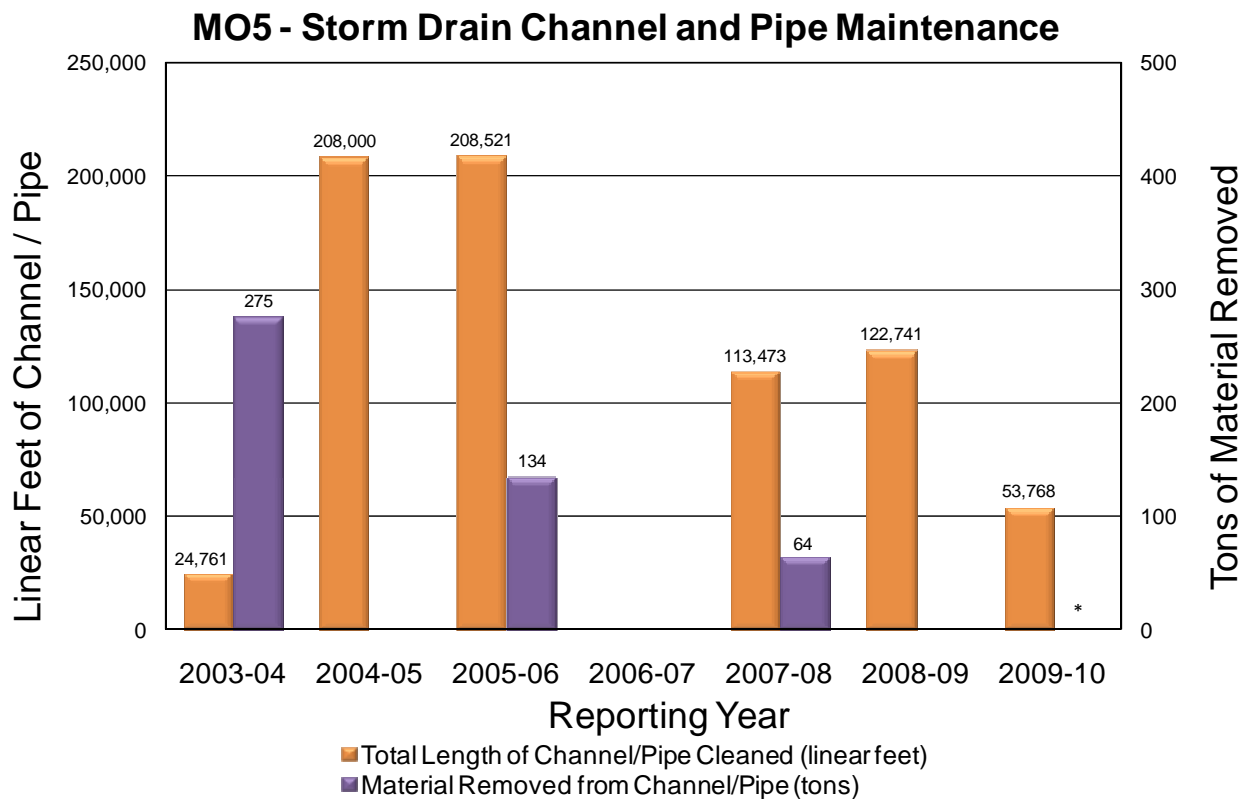
MO4 – Landscape and Pest Management

The City staff involved in landscape and pest management are responsive to the stormwater program requirements and have developed and are implementing standard protocols for the application of fertilizers and pesticides. **(L1)**

- The City continues to have contractors abide by standardized fertilizer and pesticide applicator protocols.
- In 2003-2004, the City reviewed and revised the landscape standards to promote the planting and retention of drought-tolerant and native species and to minimize the use of water, fertilizers, pesticides, and herbicides. The City continues to implement the landscape standards.
- During 2009-2010, the City formalized the IPM protocols.

MO5 – Storm Drain System Maintenance

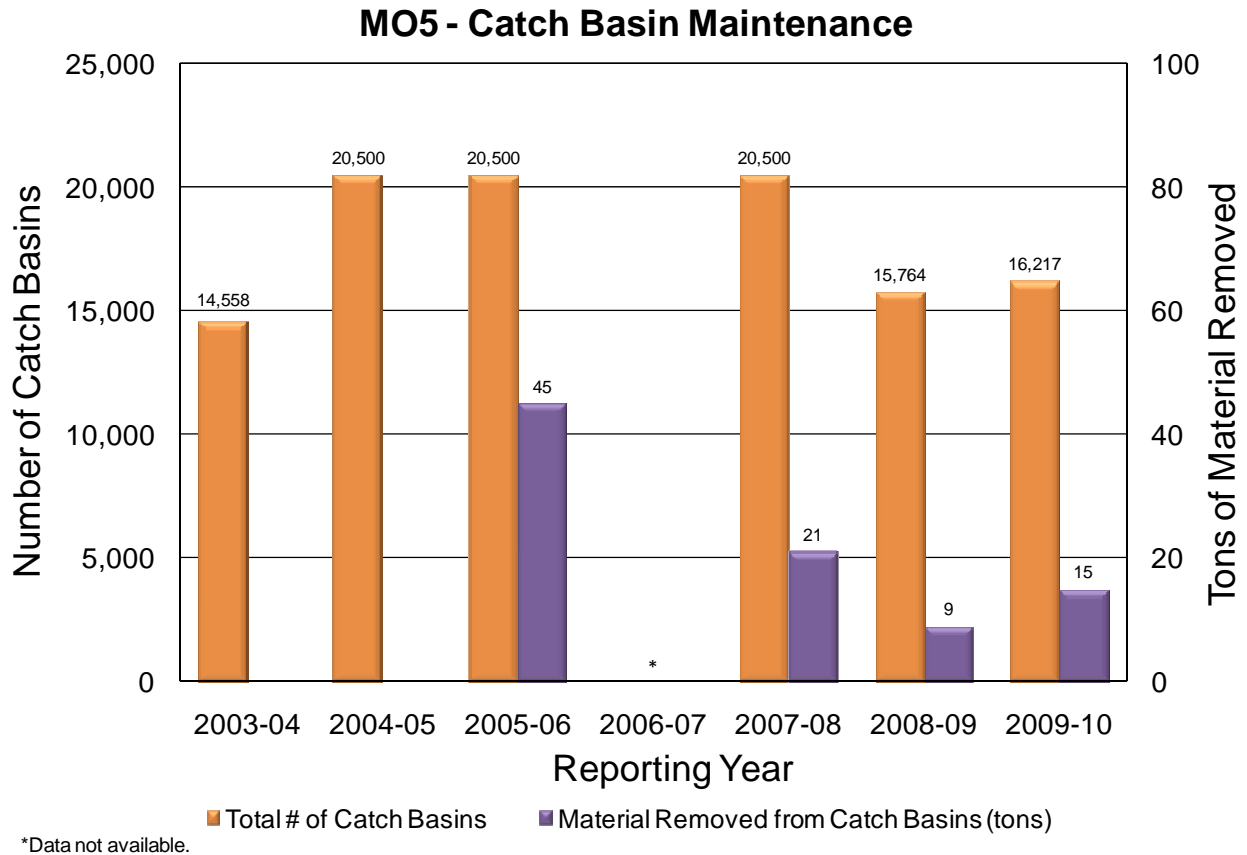
City staff remains responsive to the stormwater program and continues to implement the programs to maintain the storm drain system. (L1)



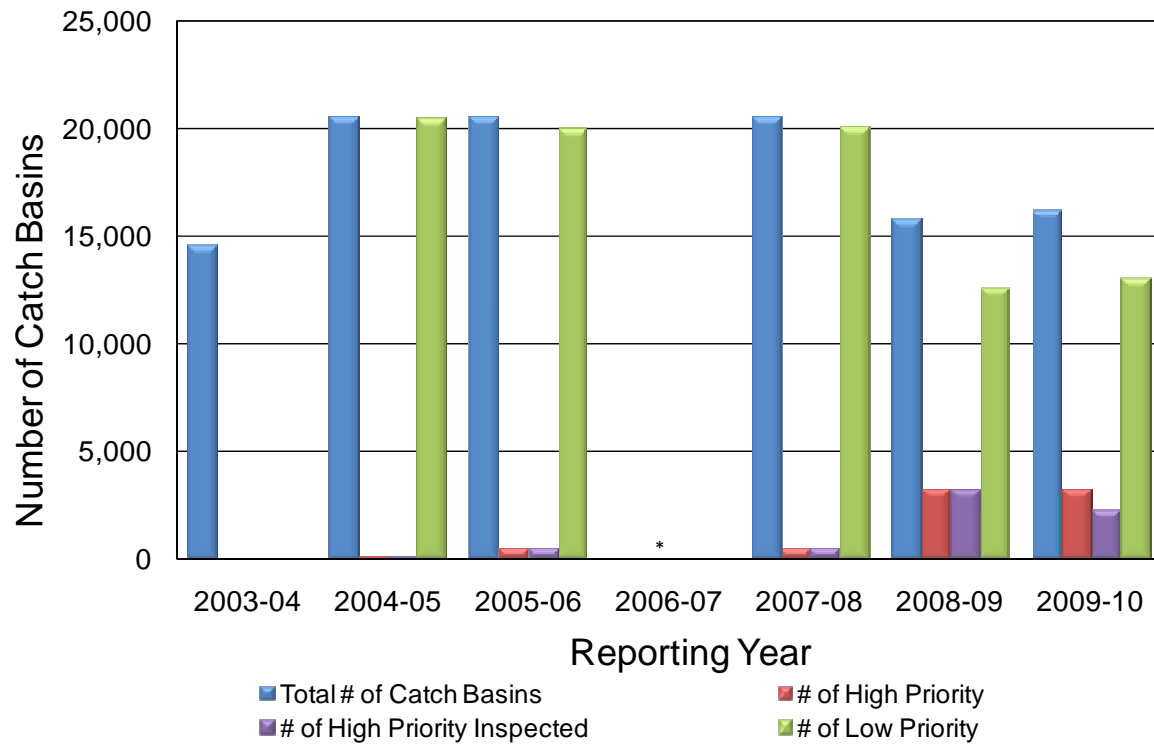
* Data not available for 2009-2010 FY.

The City continues to utilize the catch basin database to assist in the maintenance of catch basins. **(L1)**

- Catch Basin Maintenance – The City prioritized catch basins during 2009-2010 and identified 3,193 high priority, 77 medium priority, and 13,024 low priority basins. The 77 medium priority basins consist of pump stations. The City regularly cleans a number of catch basins annually regardless of prioritization. During the current reporting year, the City inspected 2,253 high priority catch basins and cleaned a total of 361 high priority catch basins. Since 2005, approximately 90 tons of materials have been removed from catch basins. Data are not available for 2006-2007.



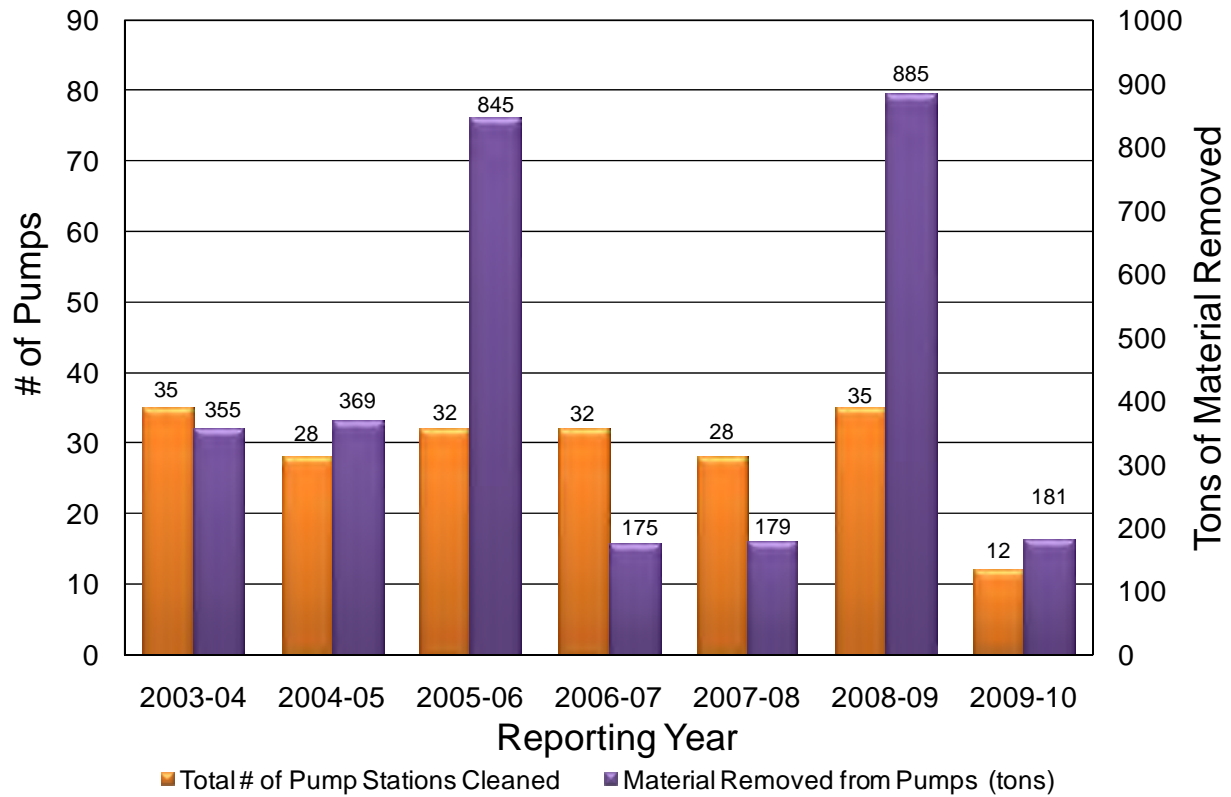
M05 - Catch Basin Prioritization and Inspection



*Data not available.

- Pump Station Maintenance – The City has inspected pump stations annually and removed approximately 2,989 tons of mud and debris since 2003.

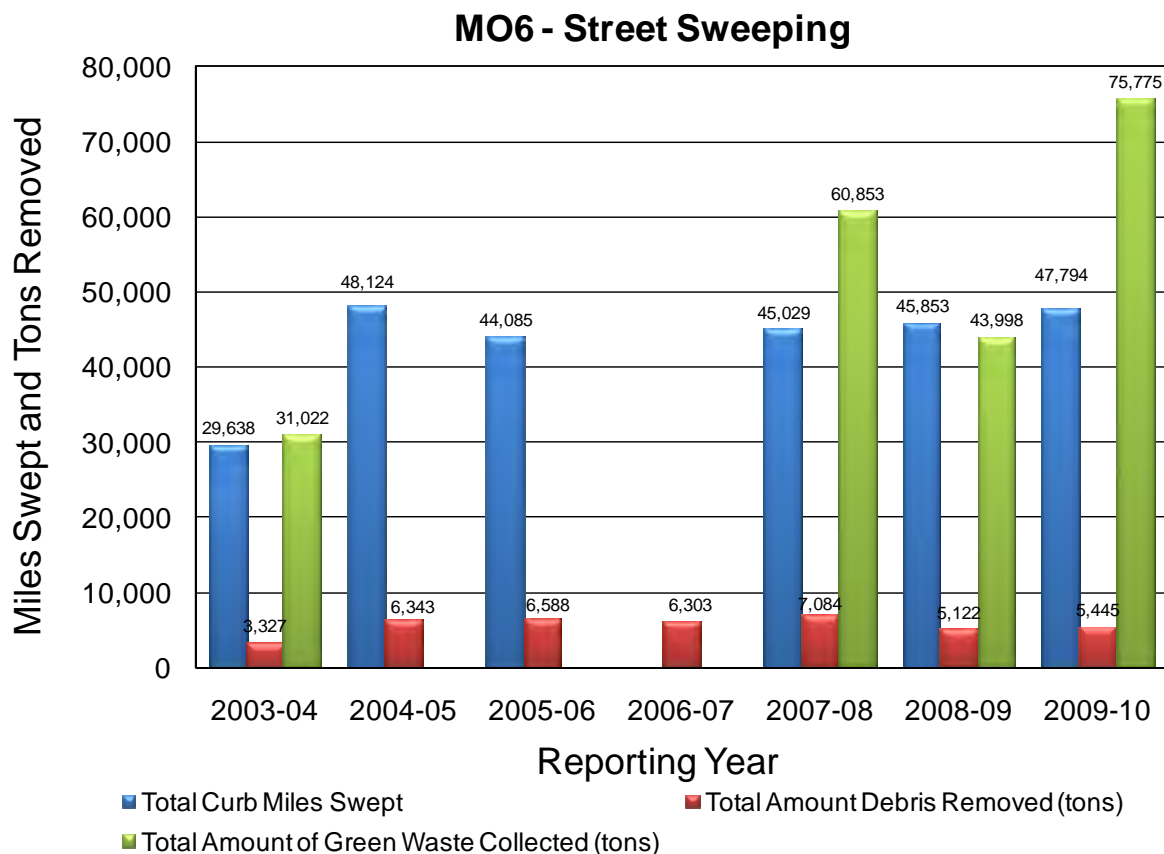
MO5 - Pump Station Maintenance



MO6 – STREET CLEANING AND MAINTENANCE

The street sweeping program is effectively removing material from the streets that may otherwise end up in the catch basins and/or storm drain system. **(L1 and L4)**

- Since 2003, approximately 40,212 tons of debris has been removed and properly disposed of through the street sweeping program. In addition, approximately 135,873 tons of green waste has been collected and disposed of as a part of the green waste program. Not all data are available for 2006-2007.



- During 2009-2010, the City updated and continued to implement the Maintenance Staff Guide – Road Maintenance and Small Construction BMPs.

MO7 – PARKING LOTS MAINTENANCE

All City-owned parking lots in the permit area have been identified (36 total in 2009-2010). **(L1)**

MO8 – TRAINING

Key City staff participated in a local training class on stormwater regulations to enhance their understanding of the stormwater program. **(L1)**

4.12 MUNICIPAL OPERATIONS PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Municipal Operations Program. In addition to the anticipated tasks identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, to determine if any additional program modifications are necessary to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that will be made to the Municipal Operations Program during the next fiscal year include the following:

- **Modify SWPPP for Corporation Yard and Other Facilities into an FPPP:** This performance standard was due to be completed by June 30, 2010, but it will be completed by June 30, 2011.
- **Implement Pesticide and Fertilizer Application Protocol:** In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses. This performance standard is due by June 30, 2011.
- **Implement IPM Program:** In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses. This performance standard is due by June 30, 2011.
- **Implement IPM Program:** In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses. This performance standard is due by June 30, 2011.
- **Include Special Event Use Provisions in Special Use Permits:** This process occurs through the Public Works Solid Waste Department. Because the intent of this performance standard is appropriately addressed through this process, the City will not update the MUD Directive (Appendix B-5 of the 2009 SWMP) to include Special Use Provisions for proper management of trash and litter.

Section 5

Industrial and Commercial (IC)

5.1 OVERVIEW

The purpose of the Industrial and Commercial Program Element is to effectively prohibit unauthorized non-stormwater discharges and reduce pollutants in stormwater runoff from industrial and commercial facilities to the MEP. The program for industrial and commercial facilities is accomplished by tracking, inspecting, providing outreach, and ensuring compliance at industrial and commercial facilities identified as potentially significant sources of pollutants in stormwater. Due to the similarities in the industrial and commercial programs, the two programs have been combined into one Program Element. In addition to program similarities, the industrial and commercial land uses within the City are, in general, located in close proximity to each other, often in the same watersheds or sub-watersheds.

5.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that the industrial and commercial businesses program requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the Permit requirements.

The Industrial and Commercial Businesses Program Control Measures consist of the following:

Control Measures for the Industrial and Commercial Program Element

IC	Control Measure
IC1	Facility Inventory
IC2	Prioritization and Inspection
IC3	Industrial/Commercial Outreach
IC4	Enforcement
IC5	Training
IC6	Effectiveness Assessment

5.3 IC1 – FACILITY INVENTORY

The Facility Inventory Control Measure addresses the need to develop and maintain a complete database of industrial and commercial facilities that have a significant or potential to impact water quality. Information for the database is primarily obtained from new business licenses and sanitary sewer hook-up permits. The inventory provides the basis for prioritization of facilities within the City and serves as a repository for all outreach, inspection, and notices for each facility.

5.3.1 Perform Internal Audit of Database

The City reviews the commercial and industrial database prior to the start of each inspection round.

5.3.2 Maintain and Annually Update the Industrial and Commercial Facility Inventory

The City maintains an inventory of industrial and commercial facilities, including those covered under the state Industrial General Permit that are within its jurisdiction. The City utilizes information provided by the Regional Water Board, Business License, and County Health to obtain current facility numbers prior to scheduled inspections. These data were compiled during the 2009-2010 inspection round, which was completed by June 30, 2010. The inventory is attached as **Appendix E-1**.

A summary of the information tracked by the inventory/database is provided below.

	Current Inventory ¹	Total Number of Facilities To Be Inspected
Industrial Facilities	121	121
Commercial Facilities (Significant Sources)	1,235	1,235

NOTES:

1. These are the most recent data based on inventory numbers determined after the completion of the last round of inspections during 2009-2010.

A summary of the Commercial Facilities (Significant Sources) by category is provided below.

Category	Current Inventory
Auto Body Shops	47
Auto Dealers	61
Auto Repair Shops	217
Dry Cleaners/Laundromats	33
Equipment Rentals	14
Kennels	7
Nurseries	10
Restaurants	766
Retail Gasoline Outlets	64
Other ¹	16
Total	1,235

Note:

In 2009-2010, a total of 16 Auto Washing & Detailing facilities were inspected.

5.3.3 Map Industrial and Commercial Facilities

Although the City does not map the industrial and commercial facilities on an annual basis, it does utilize information provided by the Regional Water Board, Business License, and County Health to obtain current facility numbers, addresses, and other identifying information prior to scheduled inspections. These data are included in the inventory, attached as **Appendix E-1**.

5.3.4 Develop a Mobile Business Pilot Program

During the 2009-2010 reporting period, the City developed a mobile business pilot program for one mobile business category deemed to be a potentially significant source and included all mobile business within this category in the inventory.

The category chosen for the pilot program was carpet cleaners. The *Mobile Business Pilot Program: Carpet Cleaners Implementation Strategy* (**Appendix E-2**) identifies how the various components of the carpet cleaner pilot program (pilot program) will be implemented. The strategy addresses inventory, inspections, outreach/education, and enforcement. The carpet cleaner inventory (Attachment A of **Appendix E-2**) includes carpet cleaners located within the San Joaquin County area—those most likely to operate within the jurisdictions of the City and Phase I area of the County.

5.3.5 Implement a Mobile Business Pilot Program

Since the mobile business pilot program was developed later in the 2009-2010 fiscal year, the City has not yet begun implementing the program. During 2010-2011, the City will implement the pilot program for carpet cleaners. Implementation will include the following:

- Verification of the information in the inventory by calling each business to verify that each is in business and provides carpet cleaning services in the Stockton Urbanized Area (SUA). Missing addresses, phone numbers, and other information will also be obtained.
- Conducting mailings of outreach material and a request to complete a self-certification form, as described within the *Mobile Business Pilot Program: Carpet Cleaners Implementation Strategy* (**Appendix E-2**).

5.4 IC2 – PRIORITIZATION AND INSPECTION

The Prioritization and Inspection Control Measure establishes procedures for prioritizing industrial and commercial facilities within the City for inspection as well as the inspection requirements associated with the site visits. The inspections ensure that the facility operator has pertinent educational materials, the operator complies with the City ordinances, and unauthorized non-stormwater discharges do not occur. Inspection of facilities covered under the state Industrial General Permit also ensure that the operator has a current Waste Discharge Identification (WDID) number, the SWPPP is available on site, and the operator is effectively implementing BMPs in compliance with City ordinances.

5.4.1 Prioritize Facilities

The City prioritizes all industrial facilities and the significant sources for commercial facilities (e.g. auto body shops, nurseries, kennels, etc.) as high priority and inspects each facility twice during the five-year Permit cycle. If the City encounters a new industrial or commercial facility that may pose a threat to water quality, the City will evaluate the business using the evaluation criteria and ranking system that has been developed.

A summary of the prioritizations is provided below. The information is current as of June 30, 2010.

Category	Total Number of Facilities Prioritized As High	Total Number of Facilities Prioritized As Low
Industrial Facilities	121	0
Commercial Facilities ¹	1,235	1,235

5.4.2 Evaluate the Prioritization Criteria and Incorporate Exceedances of Water Quality Benchmarks as Criteria for Prioritizing Industrial Facilities

The City evaluated the prioritization criteria (see technical memorandum, *Industrial Facility Prioritization Criteria*, **Appendix E-3**) and incorporated exceedances of the water quality benchmark data as criteria for prioritizing the industrial facilities.

During the 2009-2010 reporting period, the City of Stockton used benchmark data provided by the Regional Water Board for 2007-2008 and 2008-2009 to prioritize the industrial inspections. Facilities that received multiple compliance inspections due to violations or BMP issues—or that had benchmark exceedances during both years, based on reports received from the Regional Water Board—were prioritized so inspections for these facilities were completed first. A total of 35 industrial facilities met this criteria and were inspected before the remaining 86 industrial facilities.

5.4.3 Inspections

The City ordinance allows authorized officers to enter any property or building to perform inspections. On refusal to allow inspection by the owner, tenant, occupant, agent or other responsible party, the City may seek an Administrative search warrant.

In order to ensure that the inspectors conduct thorough and consistent inspections, industrial and commercial checklists have been developed. City industrial inspectors receive proper training to adequately assess facilities and offer assistance in suggesting remedies. City ordinances and City Attorney's Office also provide the proper legal backing for inspections and any necessary enforcement.

Review/Revise the Industrial Inspection Checklists as Needed

The industrial inspection checklist was reviewed and revised prior to the 2009-2010 inspections. The revised checklist is provided as **Appendix E-4**.

Review/Revise the Commercial Business-Specific Inspection Checklists as Needed

Prior to the 2009-2010 commercial facility inspections, the City reviewed the kennel-specific checklist and determined that critical areas within kennel facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan (i.e., pathogens) are inspected. In addition, general updates were made to the commercial inspection checklists. The commercial checklists used during 2009-2010 are provided as **Appendix E-5**.

Prior to the next round of inspections (2011-2012), the City will review/revise the commercial business-specific checklists as needed to ensure that critical areas within facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan are inspected. In particular, vehicle maintenance and repair and restaurant and food service facility checklists will be reviewed/revise to include mercury information and conformance to Universal Waste Rule standards, and the nursery checklist will be reviewed/revise to include an IPM-related item (Water Quality Based Programs Performance Standard).

Revise Industrial and Commercial Inspection Evaluation Checklists to Include Mercury Handling and Disposal Procedures

During the 2009-2010 reporting period, the City revised the industrial inspection checklist to include two questions pertaining to mercury (Water Quality Based Programs Performance Standard) (**Appendix E-4**). During the industrial inspections, the following questions were asked:

- Does the business have a mercury management, reduction, and elimination plan?
- Are mercury-containing devices present which show evidence of leakage, spillage, or damage that could cause leaks?

The City has not yet revised the commercial inspection evaluation checklists to include discussion of mercury-containing products, along with proper handling and disposal procedures. The City will work to complete this revision prior to the next round of inspections.

Inspect High Priority Industrial and Commercial Facilities Twice during Permit Term

- Did the City continue to inspect high priority industrial and commercial facilities twice during the Permit term (*for each facility, first inspection during the 2009-2010 fiscal year and second inspection during the 2011-2012 fiscal year*)?

Yes ☒

No ☐

During the 2009-2010 reporting period, all commercial and industrial facilities that were still in business and inspected during the last round of inspections were re-inspected during this round. The City will continue to inspect high priority industrial and commercial facilities twice during the Permit term. If the inspection reveals that there is no risk of exposure of the commercial/industrial activities to stormwater at a facility, the facility may be dropped from the high priority list. At least one year will elapse before the second inspection. A summary of the high priority industrial and commercial facility inspections conducted during the reporting period is provided in the tables below.

High Priority Industrial Facility Inspection Summary (2009-2010)

Inspection Cycle	Total Number of Industrial Facilities Requiring Inspection ¹	Total Number of Industrial Facilities Inspected		Inspection Results		
		By <u>City</u>	By <u>RWQCB</u>	Number of Facilities with SWPPPs On Site	Number of Facilities Adequately Implementing BMPs	Number of Facilities in General Compliance with Stormwater Control Requirements
First Cycle 2009-2010	121	121	4	98	94	94
2010-2011	N/A	N/A	N/A	N/A	N/A	N/A
Second Cycle 2011-2012	N/A	N/A	N/A	N/A	N/A	N/A

High-Priority Commercial Facility Inspection Summary (2009-2010)

Category	Total Number of Commercial Facilities Requiring Inspection	Number of Commercial Facilities Inspected	Inspection Results	
			Number of Facilities Adequately Implementing BMPs	Number of Facilities in General Compliance with Stormwater Control Requirements
Auto Body Shops	47	47	38	38
Auto Dealers	61	61	53	53
Auto Repair Shop	217	217	186	186
Dry Cleaners/Laundromats	33	33	33	33
Equipment Rentals	14	14	14	14
Kennels	7	7	7	7
Nurseries	10	10	8	8
Restaurants	766	766	724	724
Retail Gasoline	64	64	61	61
Other ¹	16	16	14	14

Note:

In 2009-2010, a total of 16 Auto Washing & Detailing facilities were inspected.

The commercial facilities considered to be temporary or intermittent sources are not significant sources of pollutants in stormwater. The City inspects these facilities on an as-needed basis. An inspection is performed only if (1) there is a complaint filed; (2) a phone call is received regarding the discharge of potential pollutants into storm drain from these facilities; or (3) City field staff identifies a suspicious discharge.

During the 2009-2010 reporting period, the number of illicit discharges from temporary or intermittent commercial sources was not tracked. During 2010-2011, the City plans to utilize the updated waste categories, as described in Section 2, to specifically track illicit discharges from these commercial sources. The City updated the waste categories it uses to categorize illicit discharges. Under the new system, each illicit discharge is tracked by facility type, activity causing the illicit discharge, and updated waste categories. The facility types that will be tracked incorporate subcategories of commercial facilities, including those considered to be temporary or intermittent sources, as listed below:

- Automotive washing and detailing
- Carpet cleaners
- Commercial pesticide applicators
- Concrete pouring contractors
- Concrete cutting contractors
- General building contractors
- Landscape installation / maintenance contractors
- Painting contractors
- Portable toilet rental and maintenance
- Pressure washers
- Street sweepers
- Swimming pool contractors
- Swimming pool maintenance
- Other

Evaluate the Feasibility of Developing a Compliance Rating System

During the 2009-2010 reporting period, the City evaluated the feasibility of developing a compliance rating system to track the effectiveness of the program and to assist inspectors in defining compliance. The City has determined that it will not develop a compliance rating system because it considers the current program to be effective, and such a system is not anticipated to significantly enhance the effectiveness of the program. The City will continue to implement the current industrial and commercial program, which includes progressive enforcement and the tracking of any enforcement actions taken against specific businesses.

Conduct Follow-up Inspections as Necessary

When facilities are deemed out of compliance, the City conducts follow-up inspections as necessary in order to bring the facility into compliance.

A summary of the follow-up inspections conducted during the reporting period is provided in the table below.

Category	Total Number of Facilities Requiring Follow-Up Inspections	Total Number of Facilities In Compliance Post-Follow-Up Inspection
Industrial Facilities	27	27
Commercial Facilities	97	97

Identify how Inspections May Be Conducted for the Mobile Business Category

During the 2009-2010 reporting period, the City identified how inspections may be conducted for the mobile business category identified in IC1, carpet cleaners (**Appendix E-2**). Inspections of carpet cleaner businesses are challenging because they are often smaller operations lacking a fixed facility location. In addition, the services are provided in many different locations. Thus, a mandatory, regional self-certification program will be implemented to cost-effectively and comprehensively address this requirement and send a consistent message to carpet cleaners regarding the regulations and best management practices (BMPs). The City will follow up with particular businesses if they are not responsive to the City's request for completing a self-certification form.

5.5 IC3 – INDUSTRIAL/COMMERCIAL OUTREACH

The Industrial/Commercial Outreach Control Measure requires industrial and commercial businesses to reduce pollutants in stormwater discharges and effectively prohibits unauthorized non-stormwater discharges to the storm drain system. Although the City may provide guidance to facility operators on appropriate Source and Treatment Control BMP selection and application, the selection of specific BMPs to be implemented is the responsibility of the discharger.

5.5.1 Review/Revise BMP Fact Sheets for High Priority Facilities

In order to assist the industrial and commercial facilities in selecting and implementing the appropriate types of BMPs, the City developed BMP Fact Sheets for the high priority industrial and commercial businesses. The BMP Fact Sheets are made available on the City's website.¹ Business-specific BMP Fact Sheets for the following businesses are attached as **Appendix E-6** and will be reviewed and revised as needed prior to the next round of inspections:

- Auto Body Shops
- Auto Dealers
- Auto Repair Shops
- Dry Cleaning
- Equipment Rental
- Kennels
- Nurseries
- Restaurants
- Retail Gas Outlets

Additional media materials were distributed to the public, including businesses, as described within **Section 3 (Appendix C-1, Stormwater Outreach Materials)**.

During the next round of inspections (2011-2012), the City will work with its inspectors to ensure that facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan (i.e., pesticides, pathogens, mercury) receive guidance. For example, since there is a Pathogen Plan, kennels will receive a kennel-specific BMP Fact Sheet that identifies BMPs that would reduce the pollutants of concern from being discharged (Water Quality Based Programs Performance Standard).

¹ <http://www.stocktongov.com/MUD>

5.5.2 Distribute BMP Fact Sheets During Inspections

The City distributes BMP Fact Sheets to the facility owners/operators as a part of the inspection procedures. Industrial and commercial facility inspections were conducted during the 2009-2010 reporting period, and BMP Fact Sheets and general stormwater information were provided.

The number of fact sheets distributed at high priority industrial and commercial facilities is summarized in the table below.

Category	Total Number BMP Fact Sheets Distributed	
	2008-2009	2009-2010
Industrial		
Industrial Facilities	N/A	121
Commercial		
Auto Body Shops	N/A	47
Auto Dealers	N/A	61
Auto Repair Shops	N/A	217
Dry Cleaners/Laundromats	N/A	33
Equipment Rentals	N/A	14
Kennels	N/A	7
Nurseries	N/A	10
Restaurants	N/A	766
Retail Gasoline Outlets	N/A	64
Other	N/A	16

Note:

In 2009-2010, a total of 16 Auto Washing & Detailing facilities were inspected.

5.5.3 Target Outreach Efforts as Needed

Although the City has decided not to develop a compliance rating system (see IC2), during the 2009-2010 reporting period, the City provided outreach to high priority facilities, as described in Sections 5.5.1 and 5.5.2.

5.5.4 Identify BMPs and Develop an Outreach/Education Strategy for the Mobile Business Category Identified in IC1

During the 2009-2010 reporting period, the City identified BMPs for the mobile business category identified in IC1, carpet cleaners, and developed an outreach/education strategy.

In order to assist carpet cleaners in selecting and implementing the appropriate types of BMPs, a Carpet Cleaner BMP Fact Sheet was developed (Attachment C to **Appendix E-2**).

Outreach to carpet cleaners will take several forms, including distribution of BMP Fact Sheets, outreach via carpet cleaner associations and suppliers, and outreach to homeowners. The goal of this multi-faceted approach is to increase carpet cleaners' awareness of water quality issues and promote compliance with regulations.

In addition, the City and County will contact the inventoried carpet cleaners by mail and request that they fill out the Self-Certification Form. This approach will ensure that the Permittees provide outreach to the inventoried carpet cleaners, since educational materials will also be provided as part of the mailing. The mailing will include the following items:

- Cover letter that provides background information on stormwater quality, the purpose of the mailing, and what is required to be completed;
- Business license applications for both Permittees—when necessary for particular businesses—with an explanation of:
 - Business license requirements, per the Permittees' Municipal Codes; and
 - Business license application process;
- Self-Certification Form; and
- Carpet Cleaning BMP Fact Sheet.

5.5.5 Implement Outreach Efforts to Mobile Businesses

Although the City did not begin implementing outreach efforts to mobile businesses during the 2009-2010 reporting period, this will begin during 2010-2011 as described in the *Mobile Business Pilot Program: Carpet Cleaners Implementation Strategy* (**Appendix E-2**).

5.6 IC4 – ENFORCEMENT

The Enforcement Control Measure outlines the progressive levels of enforcement applied to industrial and commercial facilities that are out of compliance with local ordinances and establishes the protocol for referring apparent violations of facilities subject to the Industrial General Permit to the Regional Water Board. The Enforcement Control Measure has been developed to address specific legal authority issues related to industrial and commercial facility discharges and should be implemented in coordination with the City's efforts to maintain adequate legal authority for the Stormwater Program in general.

5.6.1 Implement the Progressive Enforcement and Referral Policy

The City has a progressive enforcement and referral policy so that the enforcement actions match the severity of the violation and include distinct, progressive steps. Options are available for progressive, corrective actions for repeat offenders. Enforcement actions are taken in accordance with the *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive) (**Appendix B-8**). Inspections are performed to assess compliance with City stormwater ordinances. Noncompliance may include non-submittal by an industrial facility of an NOI, failure to implement BMPs, or other violation of City ordinances.

The number and types of enforcement actions taken are summarized below.

	Administrative Remedies				Legal Action
	Verbal Warnings	Notice of Noncompliance	Administrative Compliance Orders	Cease and Desist Orders	Type (Misdemeanor, Infraction, Etc.)
Total Number	34 (industrial) 97 (commercial)	24 (industrial)	0	1 (industrial)	0

Total number of enforcement actions taken during this reporting period: 156

Number of repeat offenders identified: 0

5.6.2 Track Enforcement Actions Using the Industrial/Commercial Database

During the reporting period, the City tracked all enforcement actions taken within the industrial and commercial inspection results. Currently, the City does not have a specific database for tracking enforcement actions taken against industrial and commercial facilities.

5.6.3 Implement Procedures for Responding to Regional Water Board-Based Complaints

The City implements procedures for responding to complaints forwarded by the Regional Water Board to ensure inspections occur within two business days. Inspections initiated in response to complaints will determine, at a minimum, if the facility is out of compliance with City stormwater ordinances.

The City has (and will continue to) worked closely with the Regional Water Board when a facility is identified as requiring a compliance inspection.

5.6.4 Implement Industrial Referral Policy

The City will review and modify, as necessary, the procedures for informing the Regional Water Board of violations at industries covered by the Industrial General Permit. Referral in writing to the Regional Water Board is appropriate concurrently (within 30 days) with issuance of Notices of Violation or the discovery of the non-filer. The City must refer industrial business violations to the Regional Water Board under three circumstances:

- If a facility fails to respond to progressive enforcement actions;
- If an industrial facility receives a notice for a significant violation under the City's stormwater ordinance; or
- If it is determined that a site should obtain coverage under the General Industrial Permit (non-filers).

The referral to the Regional Water Board should include:

- Name of facility
- Operator of facility
- Owner of facility
- Industrial activity or activities subject to the state Industrial General Permit conducted at the facility
- Records of communication between the City and facility owner and operator.

Non-filers are referred to the Regional Water Board via its website as they are discovered.

The table below summarizes the number and causes of referrals made to the Regional Water Board:

Cause of Referral	Total Number (See the summary below)
Progressive Enforcement	0
Significant Violations	0
Potential Non-Filers	5

During the 2009-2010 reporting period, the City provided the Regional Water Board with a list of the five (5) facilities inspected that did not have a WDID and appeared to be industrial.

5.6.5 Develop an Enforcement Strategy Specifically Addressing the Mobile Business Category Identified in IC1

During the 2009-2010 reporting period, the City developed an enforcement strategy that specifically addresses the mobile business category identified in IC1, carpet cleaners.

The Permittees have progressive enforcement and referral policies in place to address violations by commercial or industrial businesses, including Carpet Cleaners. Enforcement actions match the severity of violation and include distinct, progressive steps. Enforcement steps are addressed within the Permittees' ordinances, as well as within the MUD Directive (**Appendix B-8**).

The progressively severe corrective actions include verbal warnings, followed by written warnings and legal action, if necessary. Illicit discharges are addressed in a formal manner through the appropriate administrative remedies, depending upon the compliance history of the business. Corrective actions are

taken in every instance where a responsible party is identified. Progressive enforcement will be utilized when the Permittees are conducting follow-up actions for businesses that do not respond to the initial mailing by returning the Self-Certification Form within the timeframe stated on the form (i.e., 90 days). Enforcement will include the following steps:

- **Second notification** – A second mailing (as described within the Carpet Cleaner Self-Certification Form section) will be sent, with a cover letter stating that if the Self-Certification Form and appropriate business license application(s) are not completed within 30 days, a Notice of Violation will be sent to the business owner.
- **Notice of Violation** – If the Permittees do not receive the Self-Certification Form and appropriate business license application(s) within 30 days, a Notice of Violation will be sent to the business owner.

Major violations of stormwater regulations or violations that have a potential for a significant impact to the environment will result in a more stringent enforcement response. Repeat offenders (i.e., businesses with multiple violations within a 12-month period) will also be subject to progressive enforcement actions. Incidents that require clean-up will be re-inspected within a short timeframe appropriate for mobile businesses (i.e., within hours).

5.7 IC5 – TRAINING

The Training Control Measure is important for the implementation of the Industrial and Commercial Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

Areas of Focus for the Industrial/Commercial Program Training

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none">Industrial/Commercial inspectors (City staff, not contracted inspectors)Code Enforcement Officers	<ul style="list-style-type: none">ClassroomField Demos	<ul style="list-style-type: none">Overview of stormwater management programStormwater ordinance and enforcement policyBMPs for facilitiesDatabase tracking	<ul style="list-style-type: none">Training seminars or workshops related to the program may be made available by other organizations

5.7.1 Conduct Training

- Did the City conduct Industrial and Commercial Inspectors Field Implementation training for key staff involved in the Industrial and Commercial program (*by March 31, 2010 and March 31, 2012*)?

Yes ☐

No ☒

Although the City did not conduct the Industrial and Commercial Inspectors Field Implementation training, City commercial and industrial inspectors were trained in-house at WGR Southwest by senior staff prior to starting the inspections. Training consisted of both “classroom” and “on-site” training.

- Did the City provide trainings to businesses through partnerships with Downtown Stockton Alliance and the Greater Stockton Chamber of Commerce (Green Team San Joaquin) (*by September 30, 2009 and September 30, 2011*)?

Yes ☐

No ☒

Although the City did not provide trainings to businesses through partnerships with Downtown Stockton Alliance and the Greater Stockton Chamber of Commerce (Green Team San Joaquin), the City did provide outreach during inspections and via utility billing inserts (see **Section 3**). The City will continue to outreach to and develop partnerships with the local business community.

5.8 IC6 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Industrial and Commercial Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Industrial and Commercial Program, the assessment primarily focused on Outcome Levels 1 and 3.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the 2009 SWMP?
- Outcome Level 2 (L2) answers the question: Can the City demonstrate that the control measure/performance standard significantly increased the awareness of a target audience?
- Outcome Level 3 (L3) answers the question: Can the City demonstrate that the control measure/performance standard significantly modified the behavior of a target audience?

The table below summarizes the effectiveness assessment that was conducted for the Industrial and Commercial Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Industrial/Commercial Program

Industrial/Commercial	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
IC1 - Facility Inventory	C – Internal Audit of Database C - Maintain/ Update Industrial/ Commercial Facility Inventory C – Developed a Mobile Business Pilot Program and Inventory	N/A	N/A	N/A
IC2 - Prioritization and Inspection	C – Prioritized Facilities C – Evaluated Prioritization Criteria C – Reviewed Business Checklists C – Conducted Inspections C – Evaluated Compliance Rating System C – Identified Inspection Strategy for Mobile Business Pilot Program	C – BMP Implementation	C – BMP Implementation	N/A
IC3 - Industrial/ Commercial Outreach	C – Reviewed/Revised Outreach Material C – Distributed Outreach Material C – Identified BMPs and Outreach Strategy for Mobile Business Pilot Program	A	A	N/A
IC4 - Enforcement	C – Implemented Progressive Enforcement C – Tracked Enforcement Actions C – Implemented Industrial Referral Policy C – Developed Enforcement Strategy for Mobile Business Pilot Program	N/A	N/A	N/A
IC5 - Training	A	A	N/A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

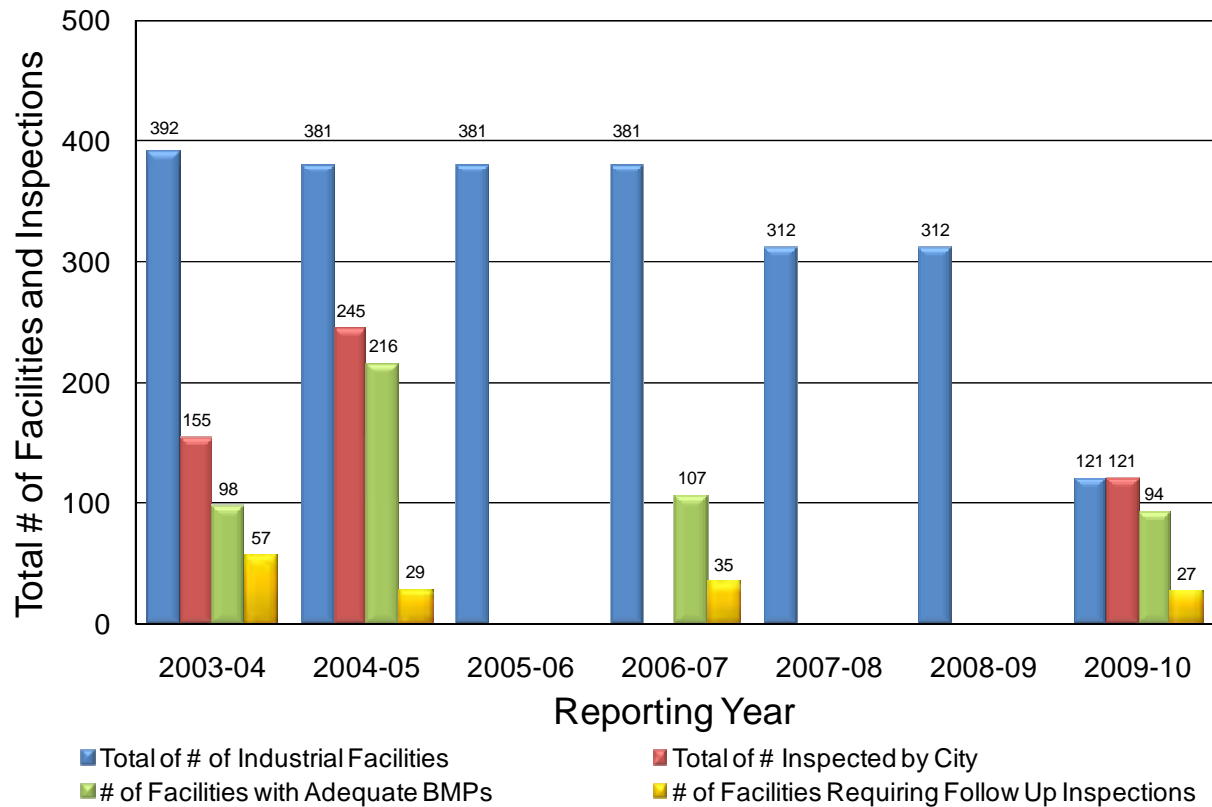
N/A – This outcome level is not applicable for this control measure

Following is an assessment regarding the effectiveness of the Industrial and Commercial Program.

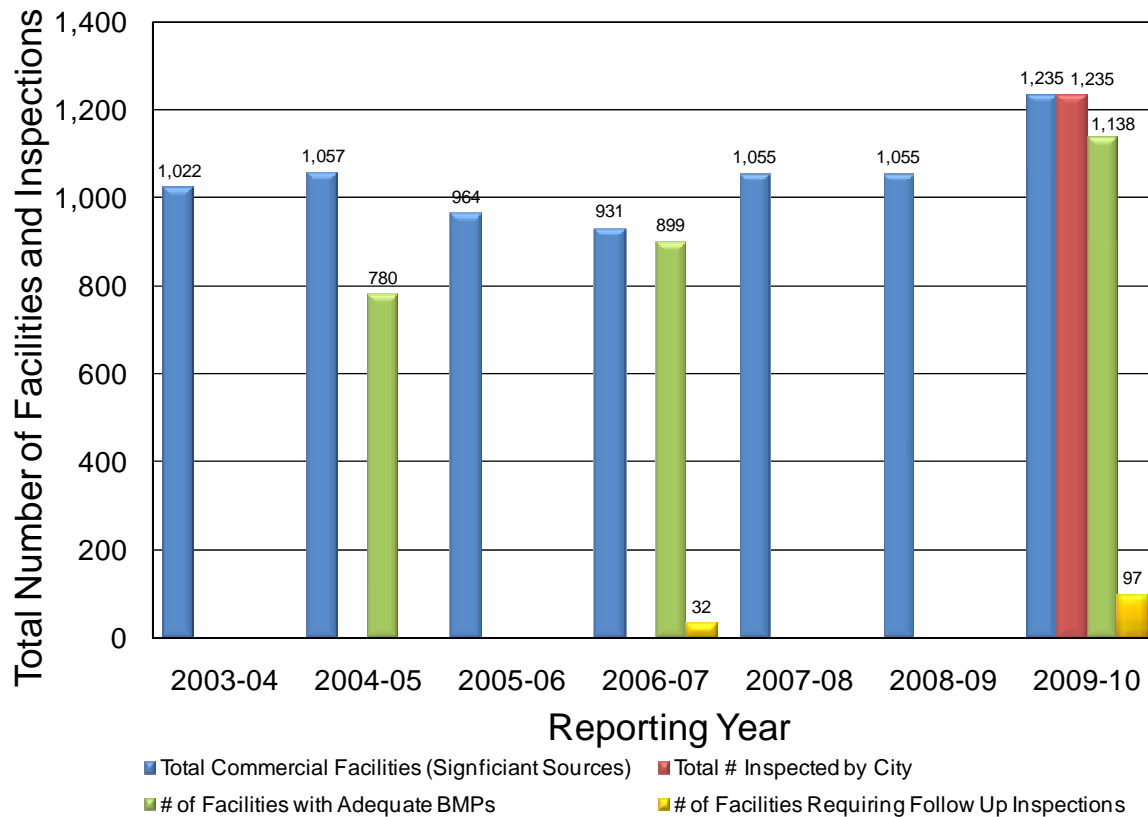
IC1 - Facility Inventory

- The City maintains and updates the inventory of industrial and commercial facilities prior to the start of each inspection round. As of June 30, 2010, there are 121 industrial facilities and 1,235 commercial facilities within the City's jurisdiction (**L1**)

IC1 - Industrial Facilities



IC1 - Commercial Facilities



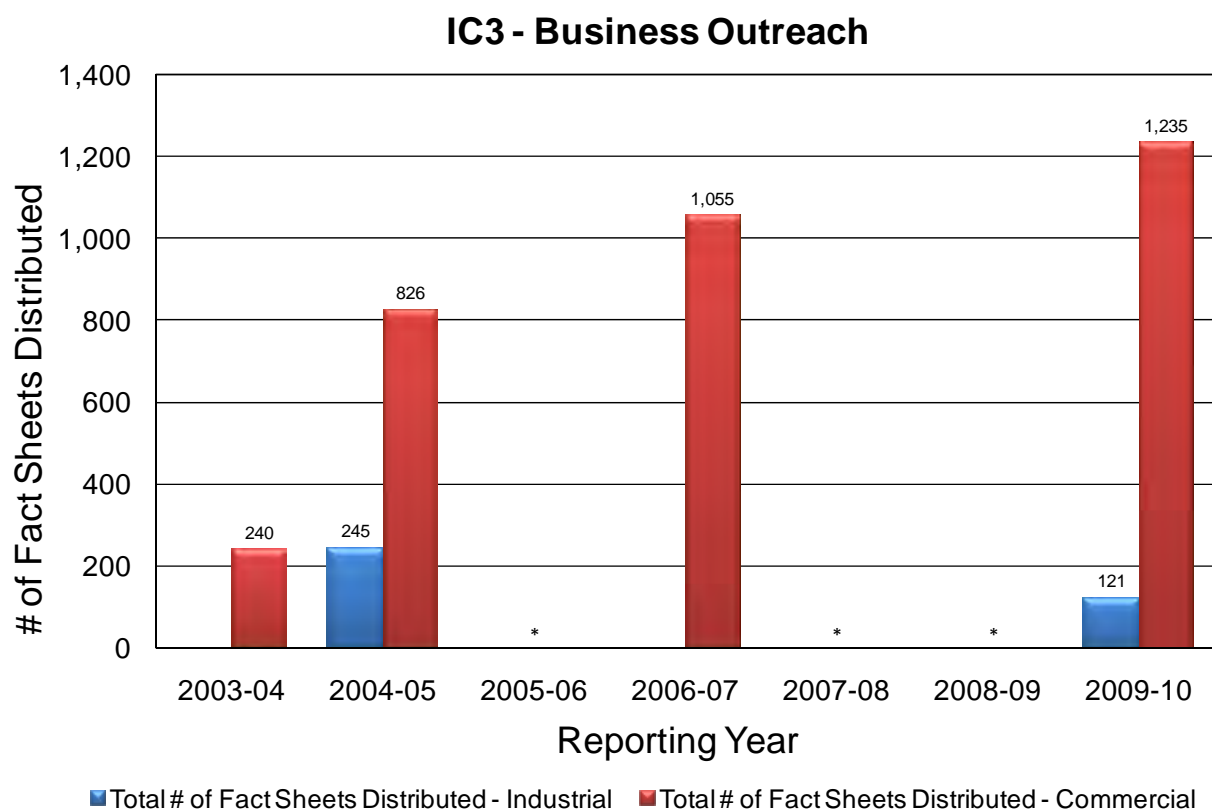
- During the 2009-2010 reporting period, the City developed a mobile business pilot program for carpet cleaners and identified how the various components of the pilot program will be implemented. The strategy addresses inventory, inspections, outreach/education, and enforcement.

IC2 - Prioritization and Inspection

- The City inspected 1,235 commercial facilities and 121 industrial facilities in the 2009-2010 FY. **(L1)**
- During the 2009-2010 reporting period, approximately 78% of industrial facilities and 92% of commercial facilities were in compliance with stormwater requirements during the first inspection. All facilities requiring follow-up inspections were in compliance after those inspections were completed. **(L2, L3)**

IC3 - Outreach

- The City has developed BMP Fact Sheets for high priority industrial and commercial facilities in addition to a poster with fats, oils, and grease BMPs for distribution to restaurants. The City will work to ensure that the facilities that have the potential to discharge a pollutant for which there is a water quality based plan receive pollutant specific information. Over 1,200 fact sheets were distributed during the last round of inspections that concluded on June 30, 2010. (L1)



*Data not available.

IC4 - Enforcement

- The City has developed and currently a progressive enforcement policy so that the enforcement actions match the severity of the violation and include distinct, progressive steps. (L1)
 - During the 2009-2010 reporting period, the City took 156 enforcement actions against industrial and commercial businesses, including 121 verbal warnings, 24 notices of noncompliance, and 1 cease and desist order.
- The City has modified the industrial/commercial database to track enforcement related issues and will continue to make necessary modifications to track this information better. (L1)
- The City has developed and currently implements procedures for informing the Regional Water Board about potential non-filers or other enforcement related issues (L1)

5.9 INDUSTRIAL AND COMMERCIAL PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Industrial and Commercial Program Element. In addition to the anticipated tasks identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, to determine if any additional program modifications are necessary to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that were identified during 2009-2010 include the following:

- **Review/Revise the Commercial Business-Specific Inspection Checklists as Needed:** Prior to the next round of inspections (2011-2012), the City will review/revise the commercial business-specific checklists as needed to ensure that critical areas within facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan are inspected. In particular, vehicle maintenance and repair and restaurant and food service facility checklists will be reviewed/revise to include mercury information and conformance to Universal Waste Rule standards, and the nursery checklist will be reviewed/revise to include an IPM-related item (Water Quality Based Programs Performance Standard). *(Change due date from September 30, 2009 to June 30, 2011)*
- **Revise Industrial and Commercial Inspection Evaluation Checklists to Include Mercury Handling and Disposal Procedures:** The City will revise the commercial inspection evaluation checklists to include discussion of mercury-containing products, along with proper handling and disposal procedures, prior to the next round of inspections. *(Change due date from December 31, 2009 to June 30, 2011)*
- **Inspect High Priority Industrial and Commercial Facilities Twice during Permit Term:** During 2010-2011, the City plans to utilize the updated waste categories, as described in Section 2, to specifically track illicit discharges from these commercial sources. The City updated the waste categories it uses to categorize illicit discharges. Under the new system, each illicit discharge is tracked by facility type, activity causing the illicit discharge, and updated waste categories. The facility types that will be tracked incorporate subcategories of commercial facilities, including those considered to be temporary or intermittent sources.
- **Training:** During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP. *(due June 30, 2011)*

Section 6

Construction (CO)

6.1 OVERVIEW

During construction projects, a number of activities may generate or mobilize pollutants. The purpose of the Construction Program Element is to coordinate City programs and resources to effectively reduce pollutants in runoff from construction sites during all construction phases.

6.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that the construction-related permit requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the SWMP.

The Construction Program Control Measures consist of the following:

CO	Control Measure
CO1	Municipal Code for Construction Sites
CO2	Plan Review and Approval Process
CO3	Construction Projects Inventory
CO4	Construction Outreach
CO5	Construction Site Inspections & BMP Implementation
CO6	Enforcement
CO7	Training
CO8	Effectiveness Assessment

6.3 CO1 – MUNICIPAL CODE FOR CONSTRUCTION SITES

The goal of this Control Measure is to ensure that the City has adequate legal authority to control pollutants from construction sites with land disturbances greater than or equal to one acre. This authority is typically provided through the adoption of an ordinance (and resulting codification in the City's Municipal Code) and erosion and sediment control standards. This Control Measure addresses specific legal authority issues related to construction activities and should be implemented in coordination with Section 1 of the SWMP.

6.3.1 Review/Modify Grading and Erosion Control Ordinance and Standard Specifications

The City adopted a Grading and Erosion Control Ordinance (Municipal Code Section 15.48) effective July 1, 1997.¹ Pursuant to this ordinance, construction activities (with some exclusions, such as mining and agriculture) disturbing more than 50 cubic yards of material and clearing and grubbing more than 0.5 acres are required to obtain a Grading and Erosion Control Permit.

During the 2008-2009 reporting period, the City reviewed and modified the Grading and Erosion Control Ordinance and the Standard Specifications, including items such as changing the Grading and Erosion Control Ordinance language stating "...Disturbances of 5 Acres or More" to "Disturbances of 1 Acre or More". The revised Grading and Erosion Control Ordinance and the Standard Specifications was provided as Appendix F-1 of the 2008-2009 Annual Report.

¹ This ordinance, Stockton Municipal Code - Grading and Erosion Control (Title 15: Buildings and Construction), can be found online at www.stockton.gov. The City of Stockton Standard Specifications (Appendix D-1 of the SWMP) also require erosion and sediment control measures.

6.4 CO2 – PLAN REVIEW AND APPROVAL PROCESS

Effective planning of construction site activities leads to minimizing erosion and preventing pollutants from entering the storm drain system. The City requires projects that disturb greater than one acre of land to address pollutants and activities during the construction phase of the project. Prior to issuing a grading permit, the City reviews construction drawings to ensure that erosion and sediment control BMPs and source and treatment control BMPs are identified.

6.4.1 Review Grading and Building Permit Applications for SWPPP Requirements

The City's Grading and Erosion Control Ordinance (see Control Measure CO1) requires the submittal with grading plans of proof that a NOI has been filed and that a SWPPP has been developed. The City provides a link on its website to the State's Model SWPPP for Construction Activities for project developers.² The Model SWPPP is a five-page guidance document comprising a checklist of information required to be included in the site-specific SWPPP, as applicable.

To ensure that site plans, improvement plans, and building plans are reviewed for stormwater requirements, all plans that are submitted to the City are routed to the MUD representative at the Permit Center for review. A plan review process flow chart was provided as Appendix F-1 to the 2009 SWMP. As part of this review, the MUD representative in the Permit Center reviews project plans, as well as grading and building permit applications, to determine if a SWPPP is required and to verify the following:

- An NOI has been submitted to the State Water Resources Control Board;
- The name of and contact information for the person responsible for SWPPP implementation are provided; and
- The location of and details for all construction activity BMPs are listed.

No permit is issued until the stormwater requirements are satisfied.

During the reporting period the City reviewed the following permit applications to ensure that they complied with the above requirements:

Time Period	Grading Permit Issued	No. of Applicants Requiring SWPPPs and NOIs
Last Year 2008-2009	7	5
This Year 2009-2010	10	5

² http://www.stocktongov.com/MUD/General/stormwater/stormwater_construction.cfm

Number of sites ≥ 1 acre that submitted proof of an NOI and for which SWPPP has been developed: 5

A detailed list of all sites tracked during the reporting period is provided as **Appendix F-1**.

6.4.2 Develop a Plan & Permit Application Review Procedure Handout

Although the City has not specifically developed a Plan & Permit Application Review Procedure handout explaining the review procedure to be provided to all construction project applicants identified as having to comply with the Grading and Erosion Control Ordinance, a flow chart of the plan review process is provided as Figure 2-3 of the 2009 SWQCCP and encompasses both construction and post-construction requirements. This flow chart is available to the public on the City's Web site and can be found within the 2009 SWQCCP.³

6.4.3 Distribute the Plan & Permit Application Review Procedure Handout

A flow chart of the plan review process is provided as Figure 2-3 of the 2009 SWQCCP and encompasses both construction and post-construction requirements. This flow chart is available to the public on the City's Web site and can be found within the 2009 SWQCCP.

6.4.4 Evaluate the County's Construction Small Site SWMP

During the 2009-2010 reporting period, the City evaluated the County's Construction Small Site Stormwater Management Plan and determined that a similar handbook is not warranted for the City, since smaller sites (<1 acre) are adequately addressed by the City's current process. Such sites are not routinely inspected by MUD Stormwater; however, all sites that have a building permit are inspected by Building Inspectors, and they conduct a Stormwater Inspection. If a site has inadequate BMPs, the site is referred to MUD Stormwater for continued follow-up.

³ www.stocktongov.com/mud/General/stormwater/SWQCCP.cfm

6.5 CO3 – CONSTRUCTION PROJECTS INVENTORY

The Construction Projects Inventory Control Measure involves tracking construction sites from the planning stage to completion. This is essential for ensuring that stormwater pollutants are reduced to the MEP. Maintaining a database to track all stages of the construction process is the foundation of construction-related source identification and helps to ensure that pollution prevention and source control are emphasized during all phases of the construction project.

6.5.1 Maintain and Update the Construction Project Database

The MUD – Stormwater Management Program maintains a database system that is capable of tracking inspections that occur at each construction site. The current database fields include:

- Site owner and contact information
- Name, address, and description (type) of project
- WDID numbers
- Inspector and inspection date
- Comments on site conditions
- Notices of Violation and other letters sent

The City maintained and updated the Construction Project Database during the 2009-2010 reporting period.

During the reporting period, the following construction sites were tracked within the City's database:

Construction Site Category	Total Number of Active Construction Sites Requiring SWPPPs	Total Number of Completed Construction Sites
Private Projects	1	1
Public Projects	58	17

6.6 CO4 – CONSTRUCTION OUTREACH

The Construction BMP Implementation Control Measure is required to ensure that appropriate BMPs are implemented at construction sites to prevent pollutants from being discharged to the storm drain system to the MEP. Construction site BMP implementation is accomplished through a combined approach of requiring BMPs at construction sites; educating contractors about the needs and requirements to implement BMPs for different construction-related activities; reviewing grading and erosion control plans and building plans to ensure that stormwater controls have been adequately considered; and ensuring through inspection and enforcement that contractors have a construction site SWPPP and are implementing identified BMPs. This Control Measure focuses on the City's requirements for BMPs at construction sites and the associated outreach efforts to the building community.

6.6.1 Distribute Appropriate BMP Fact Sheets During Inspections

As noted in Control Measure CO2, all construction project applicants identified as having to comply with the Grading and Erosion Control Ordinance are provided a two-page handout describing the application review procedure. The City also provides a link on its website to the State's Model SWPPP that includes a list of BMPs applicable to construction activities.

During the 2009-2010 reporting period, a flyer announcing and explaining the requirements of the new General Construction Permit requirements was developed and mailed out to property owners with active construction projects.

A summary of the types and number of outreach materials distributed is provided below.

Name of Outreach Material	Total Number Distributed
Construction Site – BMP-P2 Construction Site	117
Roadwork & Paving	0
Concrete Applications	0
New General Construction Permit Requirements - Letter	102
Rainy Season Letter	56

6.6.2 Conduct Contractor Tailgate Meetings

The City conducts education and training for construction activities through informational brochures, the City's website, and through one-on-one discussions during site inspections by MUD – Stormwater Construction staff. Experience has shown that the best environment to educate contractors is in the field, where issues, BMP implementation, and regulatory requirements can be discussed on-site.

Tailgate meetings are held on an ongoing basis by the MUD Stormwater Inspector as the routine, monthly inspections are conducted. These meetings are held on-site with the site superintendent and any of the sub-consultants that are present that day. During these meetings, the MUD Stormwater Inspector reviews the Construction General Permit and City requirements for construction sites, including BMPs.

A summary of the contractor tailgate meetings held during the reporting period is provided below.

Date	Location	Number of Active Construction Sites Represented	Number of Attendees
6/3/09	N.McAllen Rd.&Wild Grape	1	11
6/10/09	N.McAllen Rd.&Wild Grape	1	7
6/17/09	N.McAllen Rd.&Wild Grape	1	6
7/10/09	N.McAllen Rd.&Wild Grape	1	7
7/15/09	N.McAllen Rd.&Wild Grape	1	5
8/27/09	10501 Lower Sacramento Rd.	2	35
9/16/09	N.McAllen Rd.&Wild Grape	1	20
5/18/10	1016 S. Wilson Way	1	26

6.6.3 Conduct Training for Developers, Builders and Contractors

During the reporting period, the City invited developers, builders and contractors to internal construction training. A summary of the trainings held during the reporting period is provided under CO7, Training.

6.7 CO5 – CONSTRUCTION SITE INSPECTIONS & BMP IMPLEMENTATION

The Construction Site Inspection Control Measure is critical to the ultimate success of the Construction Program Element. An effective construction site inspection program requires having adequate legal authority to enforce City requirements, tracking active construction sites to identify repeat violators, and conducting inspections to ensure the sources are identified and that BMPs are being implemented and maintained. The inspection program also provides the basis for notifying the Regional Water Board when inspectors identify non-compliant sites including non-filers or repeat violators. Building and engineering inspectors should also be aware of stormwater quality issues and notify the MUD – Stormwater Management Program if any violations are noticed.

6.7.1 Review/Revise Stormwater Construction Site Inspection Form

The MUD – Stormwater Management Program's current inspection checklist includes key fields recommended by the Regional Water Board, as well as an area for general comments. During the first field visit, the inspector verifies that SWPPPs are on-site and being implemented. BMP implementation is assessed at each site. If any problems are identified, the current practice is to identify the sources and conduct a comparison of on-site conditions with SWPPPs or grading plans.

The City last reviewed the Stormwater Construction Site Inspection Form and updated it in September 2007. During the reporting period, the City's Stormwater Construction Site Inspection Form was reviewed and updated by December 2009 by the stormwater construction inspector. The updated Stormwater Construction Site Inspection Form is included as **Appendix F-2**.

6.7.2 Evaluate Options for a Construction Site Compliance Rating System

During the 2009-2010 reporting period, the City discussed options for a rating system for construction site compliance. A rating system will not be developed; however, the intent of this performance standard is being met by the City's existing inspection process. The City determined that the consistency desired for the construction inspection program is currently achieved through use of the updated Stormwater Construction Site Inspection Form, regular inspections, documentation with photographs, and progressive enforcement.

6.7.3 Inspect Construction Sites \geq 1 Acre

All construction sites greater than or equal to one (1) acre are inspected once per month (at a minimum) during the wet season and one time during the dry season until a notice of termination for coverage under the General Construction Permit is issued by the Regional Water Board.

Additional inspections are conducted as time allows or as follow-up when problems were detected in previous inspections. The inspection program ensures that the following minimum requirements are effectively implemented at construction sites:

- Sediments generated on the project site are retained using adequate source control BMPs;
- Construction-related materials, wastes, spills, or residues are retained at the project site to avoid discharges to streets, drainage facilities, receiving waters, or adjacent properties by wind or runoff;
- Non-stormwater runoff from equipment and vehicle washing and any other activity is contained at the project site; and
- Erosion from slopes and channels are controlled by implementing an effective combination of BMPs.

- Construction-related materials, wastes, spills, or residues are retained at the project site to avoid discharges to streets, drainage facilities, receiving waters, or adjacent properties by wind or runoff;
- Non-stormwater runoff from equipment and vehicle washing and any other activity is contained at the project site; and
- Erosion from slopes and channels are controlled by implementing an effective combination of BMPs.

A summary of the active construction sites and inspections conducted is provided below.

Reporting Period	Number of Active Construction Sites Greater than or Equal to One (1) Acre	Number of Regular Inspections¹ Conducted at Each Active Construction Site	Number of Follow-Up Inspections² Conducted at Each Active Construction Site due to Violations
Last Year 2008-2009	93	390	22
This Year 2009-2010	55	672	16

NOTES:

1. Regular inspections: Number of construction sites adequately implementing and maintaining BMPs
2. Follow-up inspections: Number of construction sites adequately implementing and maintaining BMPs

A detailed list of all construction sites tracked and inspected during the reporting period is provided as **Appendix F-1**.

6.8 CO6 – ENFORCEMENT

The Enforcement Control Measure outlines the progressive levels of enforcement applied to construction sites that are out of compliance with local ordinances and establishes the protocol for referring apparent violations of construction sites subject to the General Construction Permit to the Regional Water Board. The progressive enforcement and referral policy, as well as the accompanying legal authority to execute it, is an important tool for providing a fair and equitable approach to bringing contractors and developers into compliance with the City's municipal code requirements. Enforcement actions range from issuance of verbal warnings to stop work orders. Legal action may also be taken. For repeat offenders or contractors that have not filed appropriate applications, the referral policy includes notification to the Regional Board.

6.8.1 Implement Progressive Enforcement and Referral Policy

City inspectors currently have the legal authority, under the Stormwater Management and Discharge Control Ordinance (Chapter 13.16)⁴, to issue administrative complaints (Notice of Violation, or NOV) and, if necessary, to pursue civil actions, criminal actions, and criminal penalties, including arrests and issuance of citations. The Regional Board is routinely mailed copies of NOVs.

The City has developed a *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive) for Construction Activities, Commercial/Industrial Businesses, Residential Activities, and Special Events (see Appendix B-5 of the 2009 SWMP). The MUD Directive⁵ identifies the steps that should be taken when citing violators of ordinances, allows for Citywide consistency in the enforcement of the local ordinances, and provides a mechanism for cost recovery. The progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by industrial or commercial facilities or construction sites are addressed in a formal manner through issuance of notices of violations, citations, or notices and orders (Cease and Desist) depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

The types of enforcement actions that may be taken include the following:

- Administrative Remedies
 - Verbal Warning
 - Notice of Violation
 - Cease and Desist Order
 - Stop Work Order

⁴ The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>, or at <http://qcode.us/codes/stockton/>.

⁵ The City had planned to develop an Enforcement Consistency Guide (ECG); however, the MUD Directive and the Investigative Guidance Manual being developed (see ID3) together will adequately address consistency in the enforcement of the local ordinances and will provide standard guidelines and protocols for identifying, documenting, responding to, and enforcing violations.

- Legal Action
 - Administrative Citation
 - Fine
 - Other

The City generally refers construction site violations to the Regional Board under two circumstances:

- If three *significant violations* have occurred; and
- If it is determined that a site should obtain coverage under the General Construction Permit (*potential non-filers*)

If a construction site has received its third notice for a significant violation of the City's Stormwater Management and Discharge Control Ordinance⁶ within a 12-month period, the City notifies the Regional Board. The construction site referral is made in writing within 30 days of the inspection that led to the third notice. It should be noted that some referrals may vary from this schedule due to the nature of the violation and the type of response involved (i.e., an egregious violation would result in immediate notification of the Regional Board).

6.8.2 Track Enforcement Actions Using Construction Database

During the 2009-2010 reporting period, the City tracked enforcement actions using the construction database.

The number and types of enforcement actions taken during the reporting period are summarized below.

Type of Enforcement Action	Number
Verbal Warning	49
Administrative Enforcement	
Correction Order	28
Notice of Violation	15
Notice to Clean	30
Criminal Enforcement	
Misdemeanor	0
Infraction	0

Total number of enforcement actions taken: 122

Number of repeat offenders (sites) identified: 1

Additional details on the enforcement actions issued are provided in **Appendix F-3**.

⁶ Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

The City generally refers construction site violations to the Regional Board under two circumstances:

- If three *significant violations* have occurred; and
- If it is determined that a site should obtain coverage under the General Construction Permit (*potential non-filers*)

If a construction site has received its third notice for a significant violation of the City's Stormwater Management and Discharge Control Ordinance within a 12-month period, the City notifies the Regional Board. The construction site referral is made in writing within 30 days of the inspection that led to the third notice. It should be noted that some referrals may vary from this schedule due to the nature of the violation and the type of response involved.

6.8.3 Review/Modify Procedures for Informing Regional Water Board of Violations

The City will review and modify, as necessary, the procedures for informing the Regional Board of violations at construction sites subject to the General Construction Permit. Referral to the Regional Board is appropriate concurrently (within 30 days) with issuance of a third citation, or immediately if violation is egregious. As of the 2009-2010 reporting period, the City has reviewed the procedures for informing the Regional Board of violations at construction sites subject to the General Construction Permit. No modifications were deemed necessary.

6.9 CO7 – TRAINING

Training is important for the implementation of the Construction Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

Areas of Focus for Construction Program Element Training

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none">• Stormwater construction inspectors• Building inspectors• Grading permit inspectors• Developers• Builders• Contractors	<ul style="list-style-type: none">• Classroom• Field demos• Tailgate sessions	<ul style="list-style-type: none">• Overview of stormwater management• Stormwater impacts of land development• Stormwater ordinance and enforcement policy• Construction stormwater inspection training• BMPs for construction activities• Tracking database	<ul style="list-style-type: none">• Training seminars or workshops related to Construction may be made available by other organizations
<ul style="list-style-type: none">• Grading plan and SWPPP reviewers	<ul style="list-style-type: none">• Classroom• Field demos	<ul style="list-style-type: none">• Overview of stormwater management• BMPs for construction activities• SWPPP requirements• Tracking database	<ul style="list-style-type: none">• Training seminars or workshops related to Construction may be made available by other organizations

6.9.1 Conduct Training

- Did the City conduct Inspecting Construction Site BMPs training for key staff involved in the Construction program (*by June 30, 2010, September 30, 2010 and September 30, 2011*)?

Yes ☐

No ☒

Although the City did not specifically conduct Inspecting Construction Site BMPs training, the City construction inspector attended Certified Erosion, Sediment and Storm Water Inspector (CESSWI) certification training. Other City staff attended Got SWPPP? and new Construction General Permit training. In addition, staff attended SWQCCP training, described within Section 7 (LD5).

During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP.

- Did the City conduct Grading Plan Review training for key staff involved in the Construction program (*by June 30, 2010 and June 30, 2012*)?

Yes ☐

No ☒

Although the City did not specifically conduct Grading Plan Review training, the City construction inspector attended CESSWI certification training. Other City staff attended Got SWPPP? and new Construction General Permit training. In addition, staff attended SWQCCP training, described within Section 7 (LD5).

During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP.

A summary of the training sessions held is provided below.

Date of Training	Title of Training Module	Number of Attendees	Staff Positions Trained	Trainee City Departments or Divisions
11/5/2009	Got SWPPP? Storm Water Workshop	25 from City (58 total)	Assistant Engineer Associate Engineer Civil Engineer Construction Engineering Supervisor Construction Inspector Deputy Director of Planning/Engineering Engineering Services Manager Junior Engineer Program Manager I Program Manager III Public Works Inspector Registered Assistant Engineer Safety/Training Officer Senior Civil Engineer Sr Engineering Tech	Community Development Facilities Maintenance MUD Engineering Public Works Stormwater
4/21/2010 & 4/22/2010	New Construction General Permit & Storm Water Design Measures Workshop	3 from City (64 total)	Construction Inspector Program Manager I Associate Engineer	Stormwater

6.10 CO8 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Construction Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Construction Program, the assessment primarily focused on Outcome Levels 1 & 3.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the 2009 SWMP?
- Outcome Level 3 (L3) answers the question: Can the City demonstrate that the control measure/performance standard significantly modified the behavior of a target audience?

The table below summarizes the effectiveness assessment that was conducted for the Construction Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Construction

Construction	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
CO1 - Municipal Code for Construction Sites	C – Review of Erosion and Sediment Control Ordinance	N/A	N/A	N/A
CO2 - Plan Review and Approval Process	C – Plan Review Process	N/A	N/A	N/A
CO3 - Construction Projects Inventory	C – Maintained and Updated the Database	N/A	N/A	N/A
CO4 - Construction Outreach	C – Distributed Materials C – Held Tailgate Meetings as Needed	A	A	N/A
CO5 - Construction Site Inspections & BMP Implementation	C – Conducted Inspections	C – BMP Implementation	C – BMP Implementation	N/A
CO6 - Enforcement	C – Conducted Enforcement Actions	N/A	N/A	N/A
CO7 - Training	C – Staff Attended Training	A	A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

N/A – This outcome level is not applicable for this control measure

Following is an assessment regarding the effectiveness of the Construction Program.

CO1 – Municipal Code for Construction Sites

- The City is continuing to incorporate stormwater quality protection principles into the construction program by ensuring that project plans are reviewed by a MUD representative at the Permit Center for satisfaction of stormwater requirements and providing educational materials to the developers via its Web site. **(L1)**

CO2 – Plan Review and Approval Process

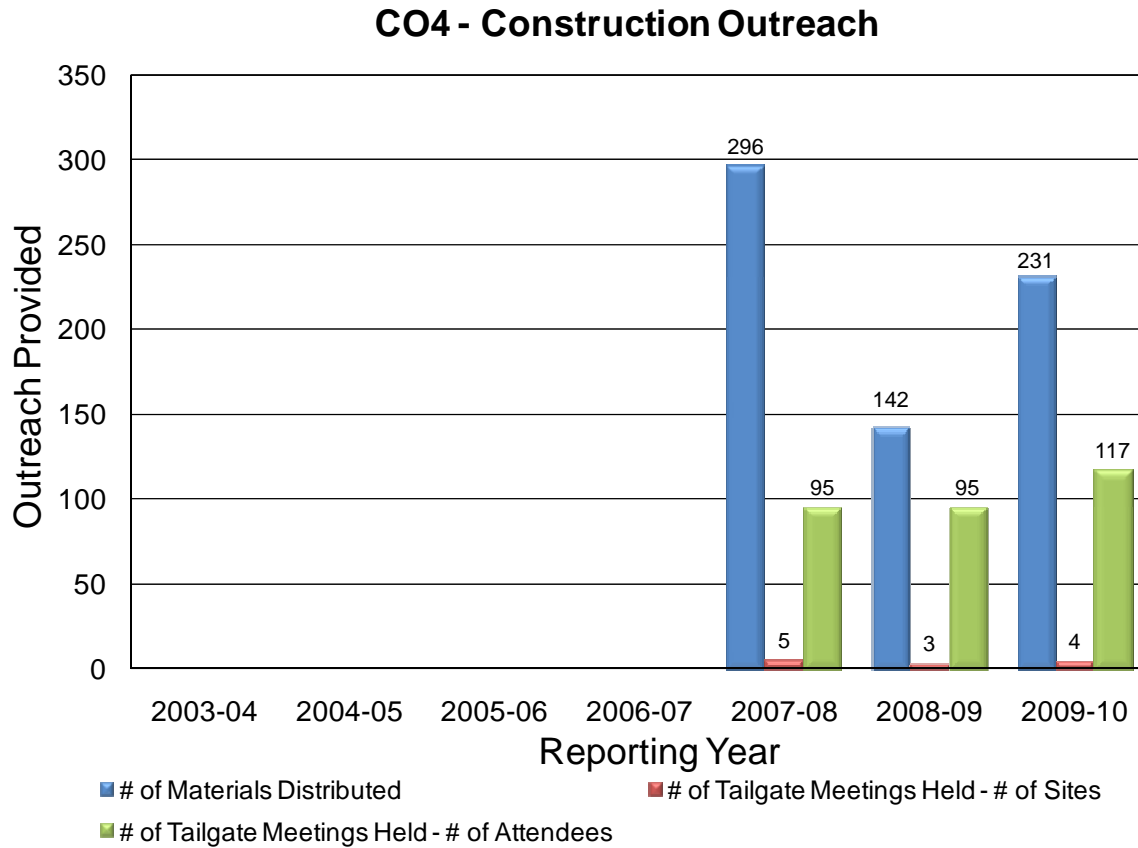
- Developers and construction contractors are becoming better educated and responsive to the City's stormwater requirements as indicated by the following: **(L1)**
 - They are applying for coverage under the General Construction Permit and submitting proof of an NOI to the City.

CO3 – Construction Projects Inventory

- The City has developed and is maintaining a construction project database. The database is updated on an ongoing basis. **(L1)**

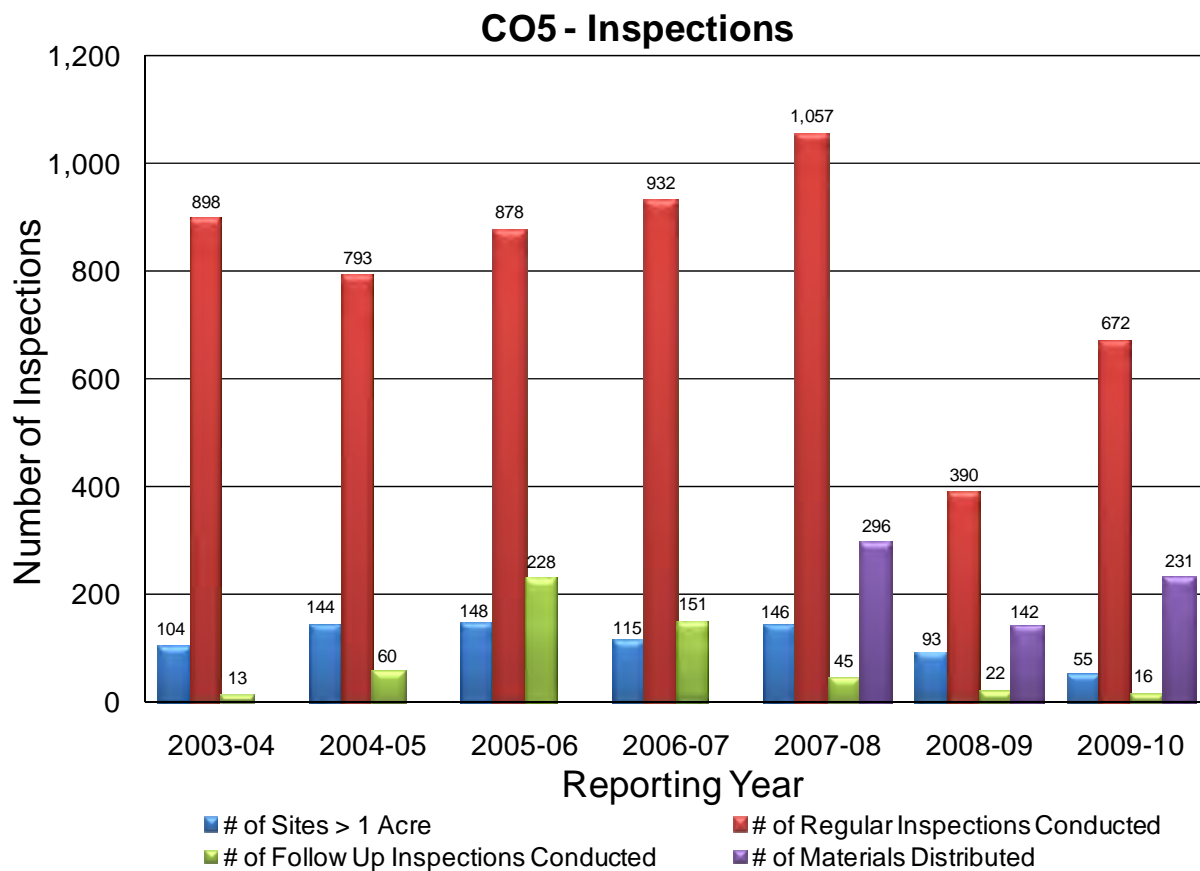
CO4 – Construction Outreach

- The City has developed and is distributing construction-related outreach materials and holding tailgate meetings as needed. **(L1)**



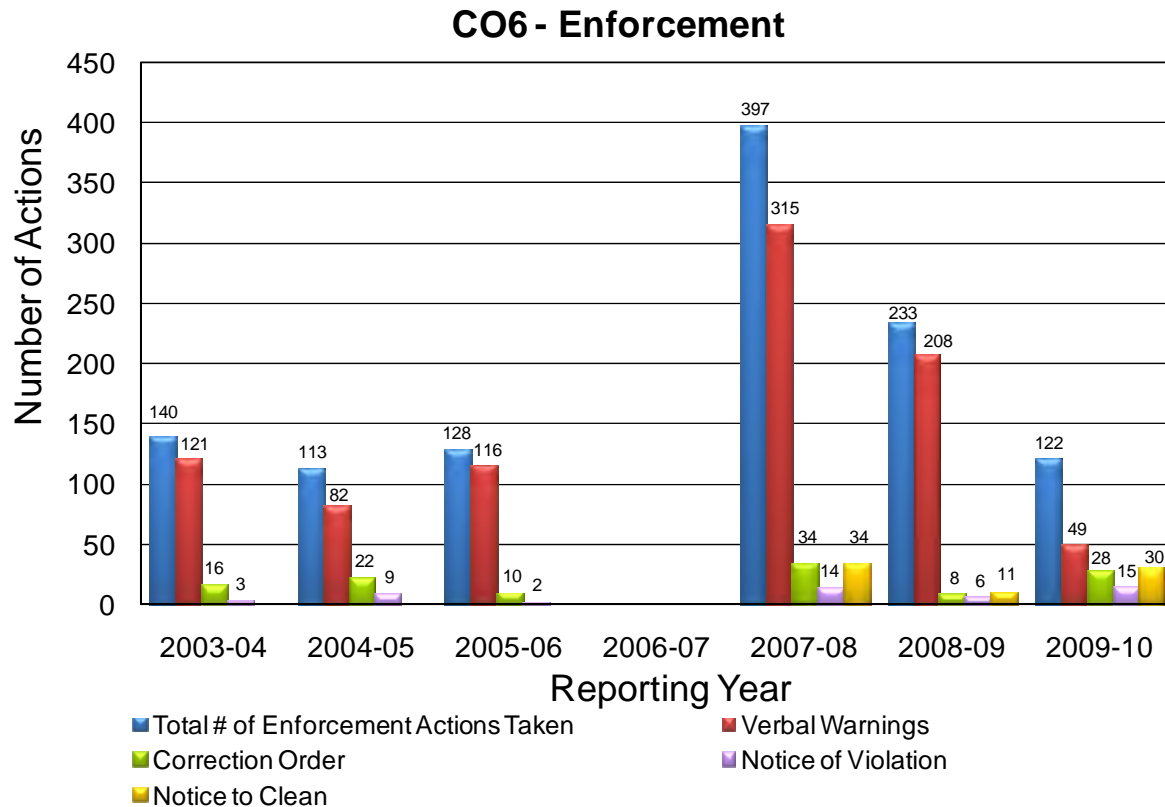
CO5 – Construction Site Inspections and BMP Implementation

- Developers/contractors remain responsible and continue to be proactive when implementing and maintaining the construction site BMPs. This is indicated, in part, by the following: **(L1)**
 - Since 2003, 90.5% of the regular inspections were conducted for construction sites that were in compliance with the City's stormwater program requirements and ordinances and did not require enforcement actions or follow up inspections. **(L2, L3)**



CO6 – Enforcement

- A total of 122 enforcement actions were taken during 2009-2010. While 1,133 enforcement actions have been taken since 2003, most of the enforcement actions (891 of 1,133, or 78.6%) were due to verbal warnings. No legal action has been required during any year. **(L1)**



CO7 – Training

- Although the City staff did not hold their own training session in the 2009-2010 FY, they continue to attend outside meetings to stay informed and educated of stormwater issues in the construction field. They also work to incorporate the lessons from these outside training sessions into their day-to-day inspection and enforcement activities. **(L1)**

6.11 CONSTRUCTION PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Construction Program Element. In addition to the anticipated tasks identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, to determine if any additional program modifications are necessary to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

The program modifications that were identified during 2009-2010 include the following:

- **Training:** During 2010-2011, the City will develop and provide three to four training workshops to address the training elements outlined in the SWMP. *(due June 30, 2011)*

Section 7

Planning and Land Development (LD)

7.1 OVERVIEW

The addition of impervious areas for homes, industrial and commercial businesses, parking lots, streets and roads increases the amount of stormwater runoff, as well as the potential for pollution. The Planning and Land Development Program Element ensures that the impacts on stormwater quality from new development and redevelopment are limited through implementation of Site Design Controls, Source Controls, Volume Reduction Measures, and Treatment Controls. The general strategy for development is to avoid, minimize, and mitigate (in that order) the potential adverse impacts to stormwater. The potential for long-term stormwater impacts from development is also reduced by requiring ongoing operation and maintenance of post-construction treatment controls selected for a site.

7.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that the planning and land development program requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the Stormwater Management Plan (SWMP).

The Planning and Land Development Program Control Measures consists of the following:

LD	Control Measure
LD1	Incorporation of Water Quality Protection Principles into City Procedures and Policies
LD2	New Development Standards
LD3	Plan Review Sign-Off
LD4	Maintenance Agreement and Transfer
LD5	Training
LD6	Effectiveness Assessment

The next section of the annual report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Planning and Land Development Program performance standards and implementation schedules.

7.3 LD1 – INCORPORATION OF WATER QUALITY PROTECTION PRINCIPLES INTO CITY PROCEDURES AND POLICIES

Traditional methods of land development tend to increase stormwater discharge volumes and flow velocities. These alterations to the natural hydrologic regime may lead to increased erosion and flooding and decreased habitat integrity. Water quality and watershed protection principles and policies such as minimization of impervious areas, pollutant source controls, preservation of natural areas, and peak runoff controls can help to minimize the impacts of urban development on the local hydrology and aquatic environment. Integration of stormwater quality and watershed principles into the City's General Plan will serve as the basis for directing future planning and development in order to minimize these adverse effects. In addition, the California Environmental Quality Act (CEQA) process provides for consideration of water quality impacts and appropriate mitigation measures.

7.3.1 Review and Revise CEQA Review Documents

The CEQA review process is necessary for determining what impacts a proposed development project could have on the environment. The City's current CEQA review process includes procedures for considering potential stormwater quality impacts and providing for appropriate mitigation.

The City reviews and revises the CEQA review documents as needed for consistency with the Permit. The Municipal Utilities Department (MUD) reviews all CEQA documents, responding to checklist items under the Hydrology and Water Quality section.

7.3.2 Revise Municipal Code

The City's Stormwater Management and Discharge Control Ordinance No. 010-97 (Section 13.20) serves as the enforcement mechanism to ensure new development and redevelopment projects comply with the General Plan and City policies, including the Stormwater Quality Control Criteria Plan (SWQCCP) requirements for post-construction best management practices (BMPs).

During fiscal year 2008-2009, the City of Stockton updated/codified the Stormwater Management Control Ordinance. No additional changes to the Standards were required.

7.4 LD2 – NEW DEVELOPMENT STANDARDS

Post-construction BMPs, including those for site design, source control, volume reduction, and treatment, are necessary for development and redevelopment projects in order to mitigate potential water quality impacts. In addition, Priority Projects identified within the Permit require specific mitigation measures. In order to assist developers in meeting these requirements, the City developed a guidance manual for stormwater quality control measures for new development and redevelopment, the SWQCCP.

7.4.1 Require Priority Projects to Implement the 2009 SWQCCP

The City and County updated the 2003 SWQCCP to reflect new permit requirements with a special emphasis on the implementation of low impact development (LID) strategies in the Stockton Urbanized Area. Revision of the SWQCCP included a stakeholder participation element. Stakeholder input was solicited through three stakeholder meetings and three rounds of public comment. Modifications to the SWQCCP included the creation of a Volume Reduction Requirement to provide a measureable criterion for achievement of LID. The Volume Reduction Requirement is defined as the post-project runoff volume minus the pre-project runoff volume for the 0.51" rainfall event. The Volume Reduction Requirement must be met through the application of Volume Reduction Measures (e.g., rain barrels, interception trees) and LID Treatment Controls (e.g., bioretention, tree-well filters).

The 2009 SWQCCP was finalized on March 31, 2009 and was approved by the City Council on July 6, 2009. All projects that meet the Priority Project definition must comply with the SWQCCP. The 2009 SWQCCP is available on the City's website at: www.stocktongov.com/MUD/. A 2009 SWQCCP fact sheet (**Appendix G-1**) and Volume Reduction Requirement (VRR) Calculator (**Appendix G-2**) were developed to communicate changes to the SWQCCP and assist with new requirements.

7.4.2 Review Local Development Standards for Compatibility with the 2009 SWQCCP

The City recently reviewed their development regulations in the context of the 2009 SWQCCP requirements. A summary of findings is provided below:

- **Setbacks:** For the residential medium-density zoning district, the City of Stockton's Development Standards require the following: side setbacks of five feet, front setbacks of 15 feet and rear setback of 10 feet. Setbacks are considered minimal and provide the flexibility needed to minimize clearing and grading and conserve natural resources.
- **Landscaping:** The Landscaping Standards do not prohibit integration of stormwater management with landscape features.
- **Tree Canopy/Tree Preservation:** Tree preservation is indirectly encouraged through the Volume Reduction Requirement. The Volume Reduction Requirement can be reduced through the conservation of trees and other natural vegetation. The 2009 SWQCCP also includes tree interception as a Volume Reduction Measure. No known conflicts exist.
- **Street Width:** The Public Works Standard Specifications include street schematics that depict curb and gutter. Standard Specifications indicate that the minimum street width for residential collector street with no parking is 26 feet. The 2009 SWQCCP strongly encourages the use of swales in place of curb and gutter.
- **Parking Lot Design:** The City's minimum parking space requirements are standard in comparison with most other communities. For example, for most business types, 1 space per 200 square feet of gross floor area is required for the first 50,000 square feet of floor area. Gross floor area exceeding 50,000 square feet is required to provide 1 space per 500 square feet. Landscape and

parking requirements specify that continuous curbing must be provided, but alternatives may be approved. The Parking Standards address shared parking which may reduce impervious cover: where two or more adjacent nonresidential uses have distinct and differing peak parking usage periods, (e.g. a theater and a bank), a reduction in the required number of parking spaces may be approved.

- Rooftop Runoff: The SWQCCP strongly encourage rooftop runoff to be conveyed to vegetated swales and vegetative buffer strips. The SWQCCP also actively encourages the use of rain gardens, cisterns and rain barrels. No known conflicts exist.

This review reveals that the majority of Stockton's codes and ordinances are not in conflict with the 2009 SWQCCP. An update of the Standard Specifications is not anticipated at this time, but the City will continue to hold a dialogue with Public Works staff so that this issue may be revisited during the next revision.

7.5 LD3 – PLAN REVIEW SIGN-OFF

Stormwater quality controls should be considered throughout the development plan review and approval process. Comprehensive review by the City of development plans must be provided in order to ensure that stormwater controls minimize stormwater quality impacts.

7.5.1 Review the Post-Construction Plan Review Database

The City requires that each Priority Project submit a Project Stormwater Quality Control Plan (SWQCP) that documents how the project is complying with the requirements contained within the 2009 SWQCCP. An excel spreadsheet is used to document control measures proposed on the site plan. The City has reviewed the SWQCP template and the excel spreadsheet.

7.5.2 Revise the Post-Construction Plan Review Database

The City has revised the SWQCP template and excel spreadsheet. Each Priority Project is required to submit a SWQCP as documentation of compliance with the 2009 SWQCCP. The SWQCP template is provided as an appendix to the 2009 SWQCCP and can be found here: www.stocktongov.com/mud/.

7.5.3 Use Post-Construction Plan Review Database

The City utilized the SWQCP template and excel spreadsheet for each Priority Project as described above.

7.5.4 Participate on the DRC

The City's Development Review Committee (DRC), which is made up of representatives from various City departments, primarily reviews and approves larger projects and sub-divisions and ensures that the erosion control, Stormwater Pollution Prevention Plan (SWPPP) requirements, and post-construction controls are identified and included on the tentative map. A MUD representative is on the DRC to ensure that post-construction stormwater quality controls are addressed and included during the planning of new development projects. If there are any issues identified by the DRC, they are resolved with the developer prior to project approval.

A summary of MUD participation on the DRC is presented below:

How many times did the DRC meet? 12

How many meetings did the MUD staff participate in? 12

7.5.5 Review Project Plans and Grading Plans for Stormwater BMPs

The City reviewed project and grading plans to make sure that stormwater BMPs were incorporated. Since the 2009 SWQCCP was formally adopted by the City Council in July 6, 2009, the majority of the projects reviewed fell under the 2009 SWQCCP requirements.

A summary of the projects that were reviewed is provided below:

Reporting Period	Total Number of Project Plans Reviewed
Last Year 2008-2009	100
This Year 2009-2010	110

The majority of projects reviewed in fiscal year 2009-2010 were not Priority Projects and included tenant improvements in existing commercial buildings, infill projects, and single family homes. The table below summarizes the Priority Projects:

Priority Project Category ¹	Total Projects Reviewed
Commercial Developments ($\geq 100,000$ SF)	2
Automotive Repair Shops	--
Retail Gasoline Outlets	--
Restaurants	--
Parking Lots ($\geq 5,000$ SF or 25 spaces)	--
Streets and Roads (>1 acre paved surface)	2
Home Subdivisions (≥ 10 units)	--
Total	4

NOTE:

1. The Development Standards apply to all Priority Projects or phases of Priority Projects at the date of adoption unless the projects already had approval by the City or County Engineer, a permit for development or construction or an approved tentative map prior to the Development Standards date of adoption.

Total number of Priority Projects approved: 4

Total acreage covered by the approved Priority Projects: 6.41

The total number of Priority Projects includes one CIP. In the following tables, a summary of the type and number of post-construction BMPs that were implemented as a part of the Priority Projects that were approved is provided. Definitions and guidance for each of the controls can be found in the City's 2009 SWQCCP.

Control Measure Type	Total Number Approved 2009-2010
Site Design Controls	
G-1: Conserve Natural Areas	4
G-2: Protect Slopes and Channels	4
G-3: Minimize Soil Compaction	4
G-4: Minimize Impervious Area	4
Total Site Design Controls	16
Source Controls	
S-1: Storm Drain Message and Signage	4
S-2: Outdoor Materials Storage Area Design	--
S-3: Outdoor Trash Storage and Waste Handling Area Design	2
S-4: Outdoor Loading/Unloading Dock Area Design	--
S-5: Outdoor Repair/Maintenance Bay Design	--
S-6: Outdoor Vehicle/Equipment/Accessory Wash Area Design	--
S-7: Fuel Area Design	--
Total Source Controls	6
Volume Reduction Measures	
V-1: Rain Garden	--
V-2: Rain Barrel/ Cistern	--
V-3: Vegetated Roof	--
V-4: Interception Trees	--
V-5: Grassy Channel	2
V-6: Vegetated Buffer Strip	2
Total Volume Reduction Measures	4
Treatment Control Measures	
L-1: Bioretention	--
L-2: Stormwater Planter	--
L-3: Tree-well Filter	--
L-4: Infiltration Basin	--
L-5: Infiltration Trench	--
L-6: Porous Pavement Filter	--
L-7: Vegetated (Dry) Swale	--
L-8: Grassy Swale	3
L-9: Grassy Filter Strip	2
C-1: Constructed Wetland	--
C-2: Extended Detention Basin	1
C-3: Wet Pond	--
C-4: Proprietary Treatment Controls (see table below for details)	--
Total Treatment Control Measures	6

Number of Priority Projects draining to regional treatment facility: 0

Additional detail on approval of proprietary control measures (C-4) is provided in the table below:

Facility Name	Type of Treatment Unit
--	--

The City has a comprehensive database established for all developments projects reviewed for stormwater quality as well as for other requirements.

7.5.6 Explore Options for a GIS or Other Electronic System for Tracking Projects with Post-Construction Treatment Control BMPs

During the 2007-2008 reporting period the City developed a GIS system for tracking projects with post-construction BMPs.

7.5.7 Implement a GIS or Other Electronic System for Tracking Projects with Post-Construction Treatment Control BMPs

Information related to tracking the project while under active construction is kept within the Stormwater Construction Inspection database and is included as **Appendix F-1**. Specifically, the Construction inspector tracks project information including contact information, project size and WDID number.

By June 30, 2010 the City completed GIS plotting of all permanent post-construction stormwater treatment devices that have been approved and constructed within the City of Stockton to date. Staff developed maps which pinpoint the location of all devices (see **Appendix G-3**). Additional maps will be developed during Fiscal Year 2010-2011 which distinguish devices maintained by the Consolidated Storm Drainage Maintenance Assessment District and identifies the properties which receive benefit from those devices. As new devices are constructed they will be plotted and the maps updated annually. The location maps will assist in monitoring and maintenance, as well as be placed on the MUD webpage for public information.

7.5.8 Conduct Inspections of Completed Priority Projects

Inspections take place over the different phases of project construction by staff from the following Departments: Building, Community, Development, Public Works and MUD. All construction sites are inspected at least once over a 30-day period. MUD has the primary responsibility for following up once the treatment control has a fully signed operation and maintenance agreement.

The City inspected Priority Projects and associated treatment controls are provided in **Appendix F-1**.

7.6 LD4 – MAINTENANCE AGREEMENT AND TRANSFER

Maintenance agreement and transfers ensure that selected post-construction stormwater control measures will remain effective upon project completion. As a condition of approval for all Priority Projects, the City requires the owner/developer/successor-in-interest (ODS) of stormwater control measures to provide proof of control measure maintenance in the form of a Stormwater Treatment Device Access and Maintenance Agreement and a Maintenance Plan. Alternatively, a maintenance district zone may be established by the City.

7.6.1 Require Stormwater Treatment Device Access and Maintenance Agreement

The City integrated the development/submittal of a stormwater maintenance agreement as a condition within the project approval process for Priority Projects. To enforce the requirements of post-construction BMPs, a Maintenance Agreement is required to be executed between the City and the ODS for any private facilities who remain the responsible party in operating and maintaining the post-construction treatment control measures. However, if the project is annexed to the City, the Stockton Consolidated Storm Drainage Maintenance Assessment District No. 2005-1, established on July 26, 2005, is responsible for operation and maintenance of all post-construction treatment control measures built within each subdivision zone. Funding to provide O&M services is provided through an annual tax roll levied upon the ODS of the property in the subject district.

The SWQCCP addresses the City's Development Standards (see LD2) as well as the need for the development and submittal of Maintenance Agreements when a developer is responsible for ongoing maintenance of on-site treatment BMPs.

During this reporting period, the City required the Stormwater Treatment Device Access and Maintenance Agreement as part of the project approval process.

A summary of the maintenance agreements executed during the reporting period is provided in the table below:

Agreements for City Maintained BMPs	Agreements for Privately Maintained BMPs
1	7

Total number of maintenance agreements executed and recorded in FY 2009-2010: 8

7.6.2 Finalize and Populate Post-Construction BMP Tracking Spreadsheet

By June 2010 staff completed the GIS tracking all post-construction treatment devices, both the privately owned as well those maintained by the Stockton Consolidated Storm Drainage Maintenance Assessment District No. 2005-1. A citywide map containing all approved and fully constructed BMPs was developed. Maps of the City's Assessment Districts are provided in **Appendix G-4**.

7.6.3 Finalize Post-Construction BMP Maintenance Oversight Protocols

A total of 42 letters were sent out in June 2009 to the owners of privately maintained post-construction stormwater treatment devices reminding them of their maintenance responsibilities as stipulated in their executed and recorded access and maintenance agreements with the city. The letter requested documentation from the owner's operation and maintenance records which verified that their unit had undergone periodic inspection and the manufacturer's general maintenance guidelines had been followed. The City received a response from 30 of the owners (a 71.4% rate). With the preparation of the Fiscal Year 2010-2011 reminder letters, a new "second" more severe letter will be generated and sent specifically to those owners which failed to respond to the first letter. This second letter will indicate that failure to respond will result in an inspection completed by the City and that the owner will be invoiced for reimbursement of cost to the city as well as for any required maintenance. A copy of the mailing list and letter are provided in **Appendix G-5**.

7.6.4 Implement Post-Construction BMP Maintenance Oversight Protocols

As noted above, a template letter was developed and sent to the unit owners of post-construction treatment devices maintenance reminding them of their responsibilities as stipulated in their fully executed and recorded access and maintenance agreement with the city. The letter requested copies of

documentation from the owner's operation and maintenance records which verified that their unit had undergone periodic inspection, that the manufacturer's general maintenance guidelines have been followed for the unit and that it continues to operate at peak performance. The letters were mailed to 42 owners by certified mail on June 16, 2009. The owners were given until July 31, 2009 to respond. Thirty owners responded. Staff also worked throughout Fiscal Year 2009-2010 to update property owner information for 21 additional properties with signed and recorded access and maintenance agreements. With the current economic crisis and the high foreclosure rates, staff experienced difficulties in securing accurate property owner information of these parcels to send the new annual maintenance reminder letter. Staff continues to work at updating property information and will send letters to these owners in Fiscal Year 2010-2011.

7.7 LD5 – TRAINING

Training is important to the successful implementation of the Planning and Land Development Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

Areas of Focus for Training

Target Audience	Format	Subject Material
<ul style="list-style-type: none">• Plan Checkers• Engineers• Building and Construction Inspectors	<ul style="list-style-type: none">• Classroom	<ul style="list-style-type: none">• Overview of storm water management• Stormwater Ordinance• Enforcement policy• SWQCCP and overview of post-construction control measures• Project tracking database

7.7.1 Conduct Project Planning and Design Training

- Did the City conduct Project Planning & Design training for key staff involved in the Planning and Land Development program (*by September 30, 2009, September 30, 2010, and September 30, 2011*)?

Yes ☒

No ☐

On March 11, 2010 the City and County of San Joaquin held a four hour workshop at the San Joaquin County Agricultural Center for key staff and the development and construction community to highlight the requirements of the 2009 SWQCCP. This workshop was used to review the 2009 SWQCCP, provide an overview of post-construction control measures, introduce the VRR Calculator, and demonstrate how it can be used to demonstrate compliance with the Volume Reduction Requirement. The Workshop also described the roles and responsibilities of City staff under the SWQCCP. An agenda from this workshop is provided in **Appendix G-6**. More than 75 people attended the workshop including 23 City staff. City staff positions trained included plan checkers, engineers, capital improvement project staff, redevelopment agency staff, and inspectors.

7.7.2 Conduct Project Inspection Training

- Did the City conduct Project Inspection training for key staff involved in the Planning and Land Development program (*by June 30, 2010, June 30, 2011, and June 30, 2012*)?

Yes ☒

No ☐

Inspection staff were trained during the 2009 SWQCCP Workshop. A description of this training is provided above and a tabular summary is provided below.

Date of Training	Title of Training Module	Number of City Attendees	Staff Positions Trained	Trainee City Departments or Divisions
3/11/10	SWQCCP Workshop	23	Senior Civil Engineer Associate Engineer Program Manager III Engineering Services Manager Registered Assistant Engineer Inspector	Public Works Community Development MUD Engineering Stormwater Facilities Maintenance

A summary of the pre- and post-training surveys is provided below.

Training Module	Total Number of Surveys from City Staff	Average Pre-Survey Score¹	Average Post-Survey Score¹	% Difference
SWQCCP Workshop	23	69	76	9%

1. Average is weighted based on number of students in each class

7.8 LD6 – EFFECTIVENESS ASSESSMENT

In order to determine the effectiveness of the Planning and Land Development Program, a comprehensive assessment of the program data is conducted as a part of the annual report. The results of this assessment are used to identify modifications that need to be made to the program. Each year the effectiveness assessment is reviewed and revised as needed.

By conducting these assessments and modifying the program as needed, the City ensures that the iterative process is used as an effective management tool. Due to the types of data collected for the Planning and Land Development Program, the assessment primarily focused on Outcome Level 1 with some assessment conducted at Outcome Level 2.

- Outcome Level 1 (L1) answers the question: Did the City implement the components of the Permit and the SWMP?
- Outcome Level 2 (L2) answers the question: Can the City demonstrate that the control measure/performance standard significantly increases the awareness of a target audience?

The table below summarizes the effectiveness assessment that was conducted for the Planning and Land Development Program Element. Additional detail for each component of the assessment is provided on the following pages. It should be noted that Outcome Levels 5 and 6 will only be assessed as a part of the Water Quality Based Programs and the Monitoring Program on a longer term basis since those analyses rely on environmental data.

Program Effectiveness Assessment Summary for Planning and Land Development

Planning and Land Development	Level 1	Level 2	Level 3	Level 4
	Implement Program	Increase Awareness	Behavior Change	Load Reduction
LD1 - Incorporation of Water Quality Protection Principles into City Procedures and Policies	C – Reviewed CEQA Documents C - Revised Municipal Code	N/A	N/A	N/A
LD2 - New Development Standards	C - Required Implementation of 2009 SWQCCP C – Reviewed Local Development Standards	N/A	N/A	N/A
LD3 - Plan Review Sign-Off	C – Reviewed Plan Review Database C- Reviewed Plan Review Database C – Revised Plan Review Database C – Participated on DRC C - Reviewed Project Plans for BMPs C – Explored Options for a Tracking BMPs C – Implemented Tracking BMP System C – Conducted Inspections of Priority Projects	A	N/A	N/A
LD4 - Maintenance Agreement and Transfer	C - Required Maintenance Agreement C - Finalized Maintenance Tracking Spreadsheet C - Finalized Maintenance Protocols C - Implemented Maintenance Protocols	N/A	N/A	N/A
LD5 - Training	C – Conducted Project Planning & Design Training	C – Pre- and Post-Survey Results	N/A	N/A

C – An effectiveness assessment was conducted during fiscal year 2009-2010

A – It is anticipated that an effectiveness assessment may be conducted in future annual reports

N/A – This outcome level is not applicable for this control measure

The following is a general assessment regarding the effectiveness of the Planning and Land Development Program:

LD1 - Incorporation of Water Quality Protection Principles into City Procedures and Policies

- The Municipal Utilities Department reviews all CEQA documents, responding to checklist items under the Hydrology and Water Quality section. **(L1)**
- The City updated the Stormwater Management Control Ordinance during fiscal year 2008-2009. **(L1)**

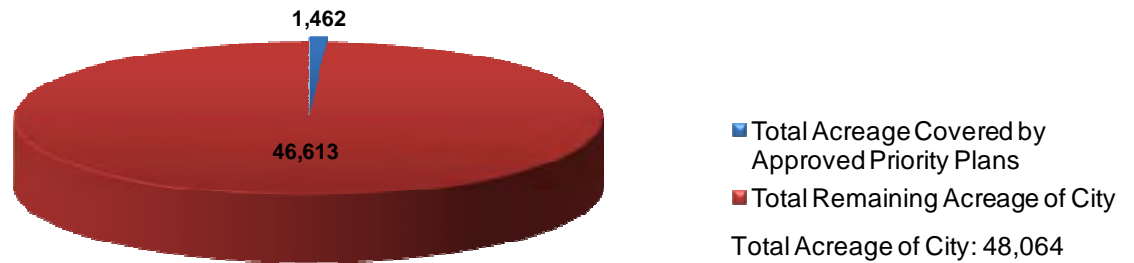
LD2 - New Development Standards

- Beginning in mid-July 2009, the City has required Priority Projects to implement the 2009 SWQCCP. A fact sheet and Volume Reduction Calculator were developed to communicate changes to the SWQCCP and assist with compliance. **(L1)**
- The City reviewed local development standards for compatibility with the 2009 SWQCCP. The City will hold a dialogue with Public Works staff to discuss the potential of updating the Standard Specifications in the future. **(L1)**

LD3 - Plan Review Sign-Off

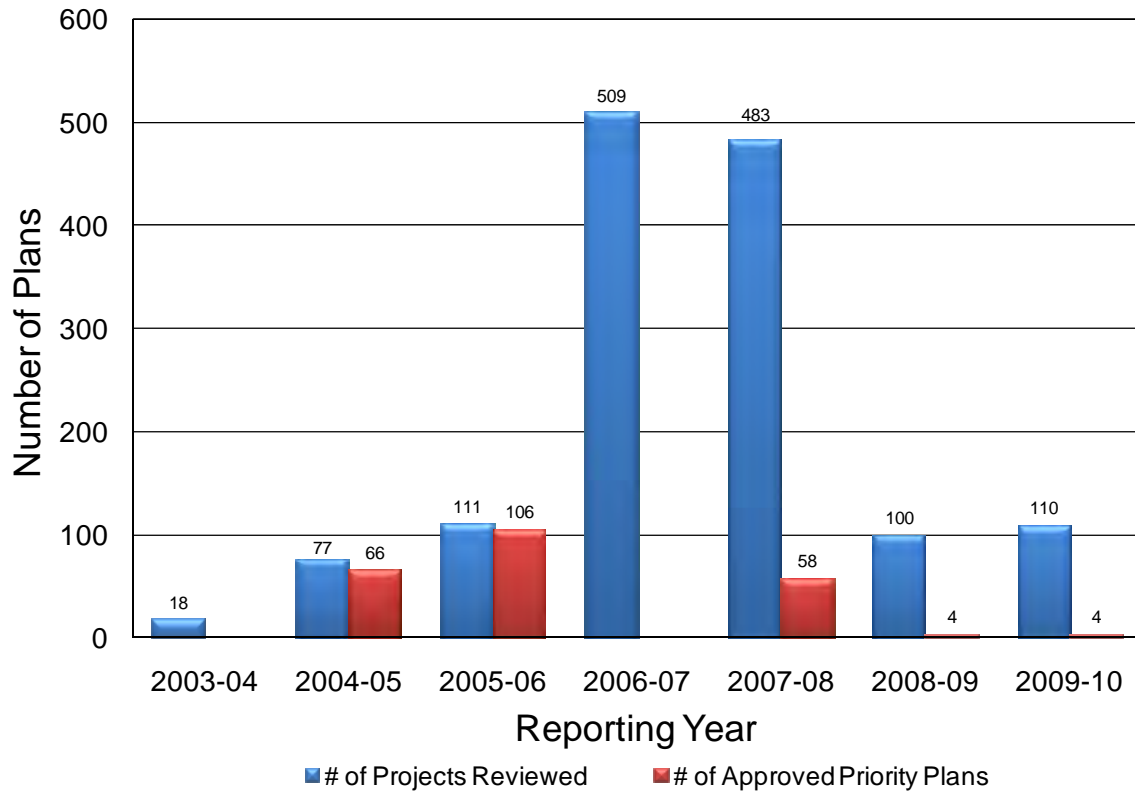
- The City continued to require submittal of a SWQCP that documents how the project is complying with the 2009 SWQCCP. The City also uses an excel spreadsheet to document control measures proposed on the site plan. Modifications to the tracking tool will be developed in FY10-11. **(L1)**
- The City participated in 12 DRC meetings to ensure that post-construction stormwater quality controls are addressed and included during the planning of new priority projects. **(L1)**
- During 2009-2010, four Priority Project plans were reviewed (four were reviewed in 08/09, 67 were reviewed in 07/08, 229 were reviewed in 06/07; 111 were reviewed in 05/06; 77 were reviewed in 04/05; and 8 were reviewed in 03/04). **(L1)**
- As illustrated in the graph below, approximately 3% of the City's acreage is covered by approved priority plans. **(L1)**

LD3 - Acreage Covered by Approved Development Plans 2007 - 2010



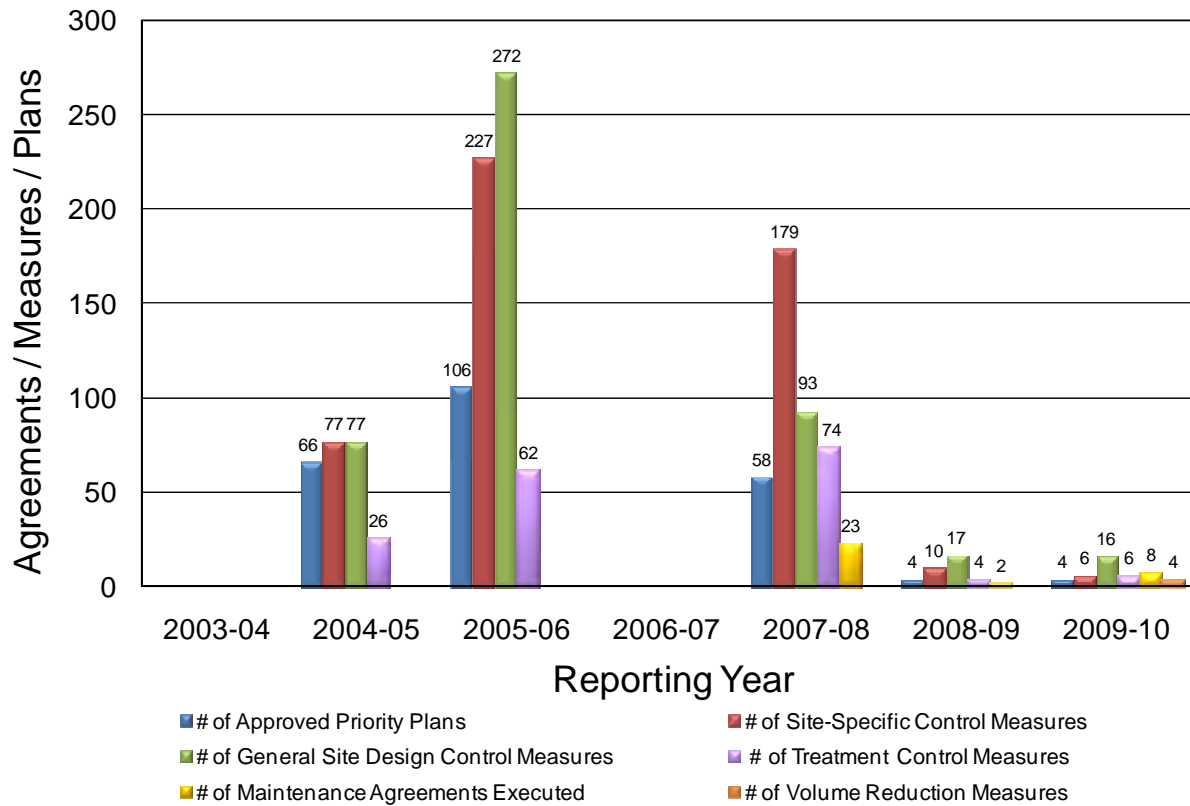
- Due to the current economic climate, the City continues to see a significant decrease in the number of development applications, including Priority Projects. This decrease is reflected in the graph below. **(L1)**

LD3 - Plan Review Sign Off



- Within the four Priority Projects that were approved, 16 Site Design Controls, six Source Controls, four Volume Reduction Measures and six Treatment Control measures were incorporated. **(L1)**
- The graph below illustrates the consistent use of a combination of site design, source control and treatment control measures over the years. **(L1)**

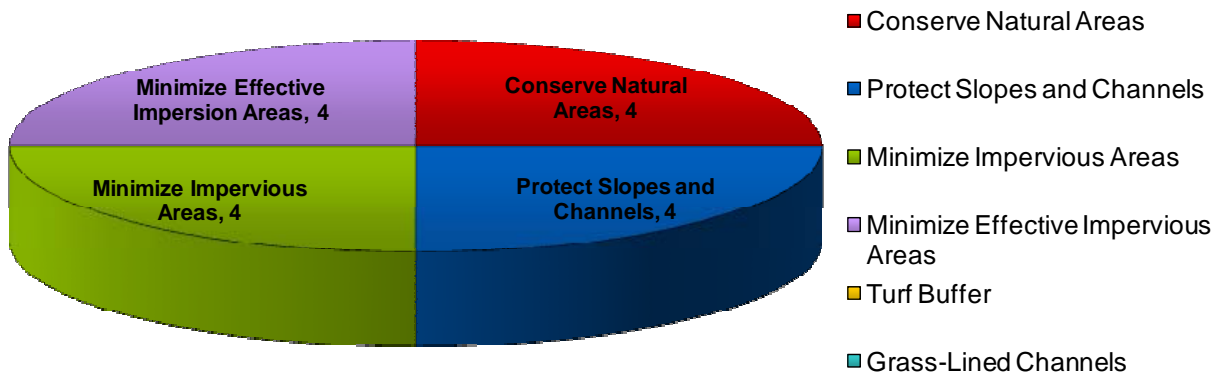
LD3 - Plan Review and Maintenance Agreements



Note: Data not available in 2003-04 and 2006-07

- Sixteen Site Design Controls were approved for four Priority Projects. As the graph illustrates below, these Site Design Controls included four Conserve Natural Areas, four Protect Slopes and Channels, four Minimize Soil Compaction, and four Minimize Impervious Areas. **(L1)**

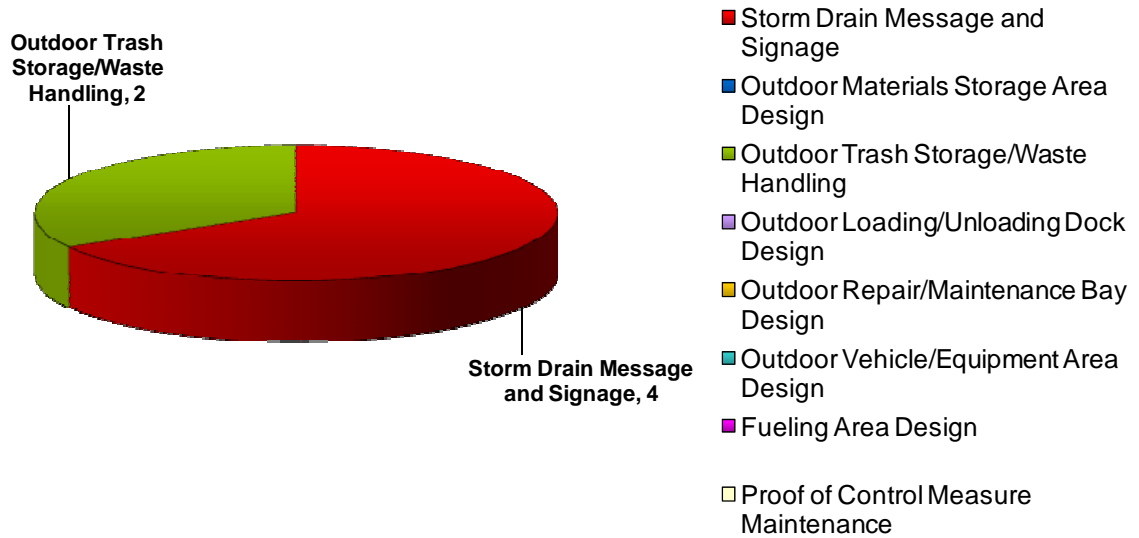
2009-2010 Site Design BMPs



Total: 16 Site Design BMPs

- Six Source Controls were approved for four Priority Projects. As the graph illustrates below, these Source Controls included four Storm Drain Message and Signage and two Outdoor Trash Storage/Waste Handling. **(L1)**

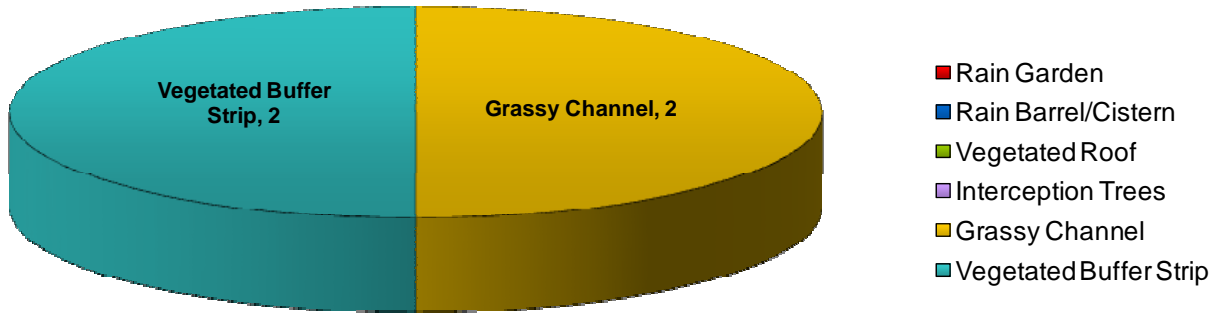
2009-2010 Source Control BMPs



Total: 6 Site Specific Source Control Measures

- Four Volume Reduction Measures were implemented for the four Priority Projects. This includes two vegetated buffer strips and two grassy channels. **(L1)**

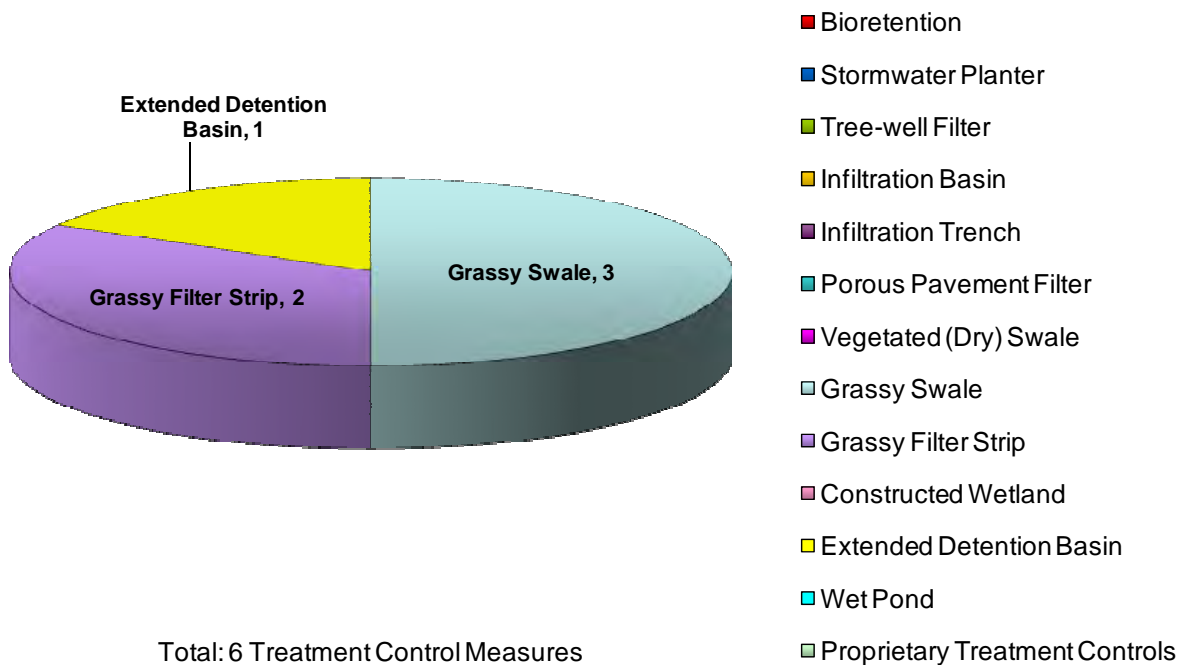
2009-2010 Volume Reduction Measures



Total: 4 Volume Reduction Measures

- Six Treatment Controls were implemented for the four Priority Projects. This includes three grassy swales, two grassy filter strips, and one extended detention basin. No proprietary devices were implemented. In the past Treatment Control Measures included a high percentage of proprietary control measures so this may represent a shift in the types of Treatment Controls implemented within the City. (L1)

2009-2010 Treatment Control BMPs



- The City completed the GIS layer of all permanent post-construction stormwater treatment devices that have been approved and constructed within the City to date. The City will continue to develop layers that identify devices maintained by the Consolidated Storm Drainage Maintenance Assessment District and identified the properties which receive benefit from those devices. **(L1)**
- All construction sites were inspected at least once over a 30-day period. **(L1)**

LD4 - Maintenance Agreement and Transfer

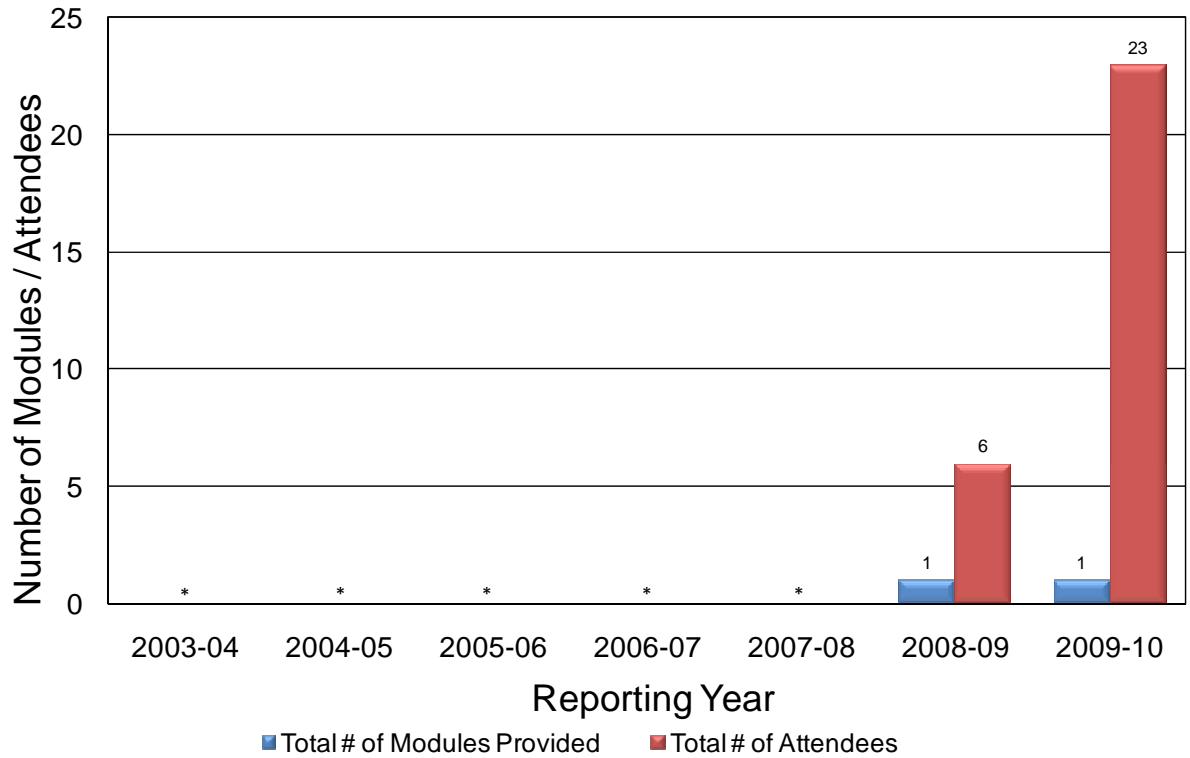
- Eight maintenance agreements were executed, one will be maintained by the City and seven will be privately maintained. **(L1)**
- The City finalized and implemented post-construction BMP maintenance oversight protocols. A letter was developed and sent to 42 owners of post-construction treatment devices to remind them of their maintenance responsibility and request documentation of maintenance activities. Responses were received from more than 71% of owners. A second more severe letter will be sent to owners which failed to respond to the first letter. **(L1)**

LD5 - Training

- The City and the County of San Joaquin jointly held a four hour workshop on March 11, 2009 to train local government plan reviewers and inspectors and the local development community on how to use and implement the 2009 SWQCCP. Twenty-three of the 75 attendees were City staff. **(L1)**

- The 2009 SWQCCP Workshop increased City staff and local development community's awareness of the new development standards. This is demonstrated by a 9% improvement in post-workshop survey results in comparison with pre-workshop survey results. (L2)

LD5 - Training



7.9 PLANNING AND LAND DEVELOPMENT PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for the Planning and Land Development Program. In addition to the anticipated tasks identified within the annual work plan, the City evaluates the results of the annual report, as well as the experience that staff has had in implementing the program, to determine if any additional program modifications are necessary to comply with Clean Water Act requirement to reduce the discharge of pollutants to the maximum extent practicable.

No program modifications were identified for the next fiscal year.

Section 8

Water Quality Monitoring Program

The City of Stockton and County of San Joaquin NPDES municipal stormwater permit (Order No. R5-2007-0173) (Permit) requires monitoring of urban runoff and receiving waters as detailed in the Monitoring and Reporting Program (MRP). The MRP requires the characterization of runoff and receiving water, water column toxicity, as well as sediment toxicity. The MRP also requires an assessment of the effectiveness of control measures. Characterization elements are designed to monitor trends over long-term periods and to identify specific pollutants of concern (POCs). As a component of the NPDES Permit, Water Quality Based Programs related to identified POCs including pesticides, pathogens, mercury, and low dissolved oxygen are used to identify the geographic and temporal scope of urban runoff impacts with respect to these constituents (see **Section 9**).

A brief description of the monitoring elements specified in each MRP section is provided in **Table 8-1**. For the purposes of the annual report, elements prescribed in Sections II.C through II.F are grouped under the title of “baseline monitoring”, following the structure of the MRP. Elements prescribed in Sections II.G, II.H, III.A, and III.B are grouped under the title of “supplemental monitoring”, since each of these elements has its own work plan and monitoring sites. Water Quality Based Programs prescribed in Section II.I are discussed in **Section 9** of this Annual Report.

Table 8-1. Monitoring and Reporting Program Sections and Associated Programs

MRP Section	General Description	General Information	Baseline Program	Supplemental Program	Water Quality Based Programs
I	Guidance for submission of work plans and reports including Annual Report	X			
II.A	Requirements for baseline monitoring, which is described as coordinating monitoring of urban discharge and receiving waters		X		
II.B	Sampling protocol		X		
II.C	Urban Discharge Monitoring		X		
II.D	Receiving Water Monitoring		X		
II.E	Water Column Toxicity Monitoring		X		
II.F	Dry Weather Field Screening		X		
II.G	Sediment Toxicity Monitoring			X	
II.H	Bioassessment Monitoring			X	
II.I	Water Quality Based Programs (see Section 9)				X
III.A	Detention Basin Monitoring			X	
III.B	BMP Effectiveness Study			X	

8.1 BASELINE MONITORING ACTIVITIES

Baseline monitoring consists of urban runoff discharge, receiving water, and water column toxicity monitoring, as well as dry weather field screening. The urban runoff discharge, receiving water, and water column toxicity monitoring are coordinated activities so that monitoring for each occurs on the same day and receiving water and water column toxicity monitoring take place at the same sites. Baseline monitoring activities completed in 2009-2010 are summarized in **Table 8-2** and discussed in the following sections.

Table 8-2. 2009-2010 Baseline Monitoring and Reporting Program Accomplishments

BASELINE MONITORING	
Monitoring Activity	Status
Urban Runoff Discharge Characterization (see Section 8.1.2)	<ul style="list-style-type: none">• 2 wet weather events successfully monitored at 4 sites (10/13/09 and 4/11/10)• 2 dry weather events successfully monitored at 4 sites (2/17/10 and 6/8/10)• All events coordinated with receiving water monitoring
Receiving Water Monitoring (see Section 8.1.2)	<ul style="list-style-type: none">• 2 wet weather events successfully monitored at 2 upstream sites and 4 urban sites (10/13/09 and 4/11/10)• 1 dry weather event successfully monitored at 1 upstream site and 4 urban sites (2/17/10)• 1 dry weather event successfully monitored at 3 upstream sites and 4 urban sites (6/8/10)• All events coordinated with urban runoff discharge monitoring
Water Column Toxicity (see Section 8.1.3)	<ul style="list-style-type: none">• Toxicity monitoring completed during the same wet weather and dry weather events and at the same sites as receiving water monitoring (10/13/09, 2/17/10, 4/11/10, 6/8/10)
Dry Weather Field Screening (see Section 8.1.4)	<ul style="list-style-type: none">• 23 outfalls screened (6/3/10 – 6/29/10)

8.1.1 Storm Tracking and Selection

Monitoring of stormwater runoff is a key component of the baseline monitoring program and requires a high level of coordination of equipment and field crews. Incoming storms are tracked and assessed against storm selection criteria (e.g., amount of precipitation, days since last rain event, duration of event) and the forecasted reliability that the storm will occur in the Stockton area. Wet weather monitoring is particularly challenging in the SUA, as rainfall forecasts are often unreliable due to the convective nature of incoming storms. In addition, because storms normally intersect Stockton traveling from the west to the east, it is not unusual for northern Stockton to receive substantial rainfall, while southern Stockton remains dry, or vice versa.

Sampling of wet weather events is timed to best characterize urban runoff by taking either flow weighted composite or grab samples at the peak of the storm hydrograph. Automatic flow-based composite samplers are used at urban discharge locations, although in 2009-2010, equipment failures prevented composite sampling at two sites during the first sampling event. Grab sampling was used instead at these

sites during the first event. Due to standard method requirements, grab sampling is always used for the following constituents:

- Oil and grease
- Indicator bacteria (*E. coli*, fecal coliform, and total coliform)
- Pesticides
- Mercury and methylmercury

During the 2009-2010 monitoring year (July 1, 2009 to June 30, 2010), 14.4 inches of rainfall were recorded at the Stockton Metro Airport¹, and 14.2 inches were recorded at Stockton Fire Station². The Stockton Metro Airport is currently used for tracking storms. The daily total rainfall at Stockton Metro Airport is shown in **Figure 8-1** for 2009-2010. The total cumulative seasonal rainfall is also shown (compared to the historic average) as well as the timing of monitoring events. Historic average annual rainfall at the Stockton Metro Airport is 14 inches. The 2009-2010 monitoring year was normal, with total rainfall for the year at the Stockton Metro Airport about 103% of historic rainfall.

¹ <http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caKSCK>

² http://cdec.water.ca.gov/cgi-progs/selectQuery?station_id=SFS&dur_code=D&sensor_num=45&start_date=07/01/2009+00:00&end_date=06/30/2010+00:00

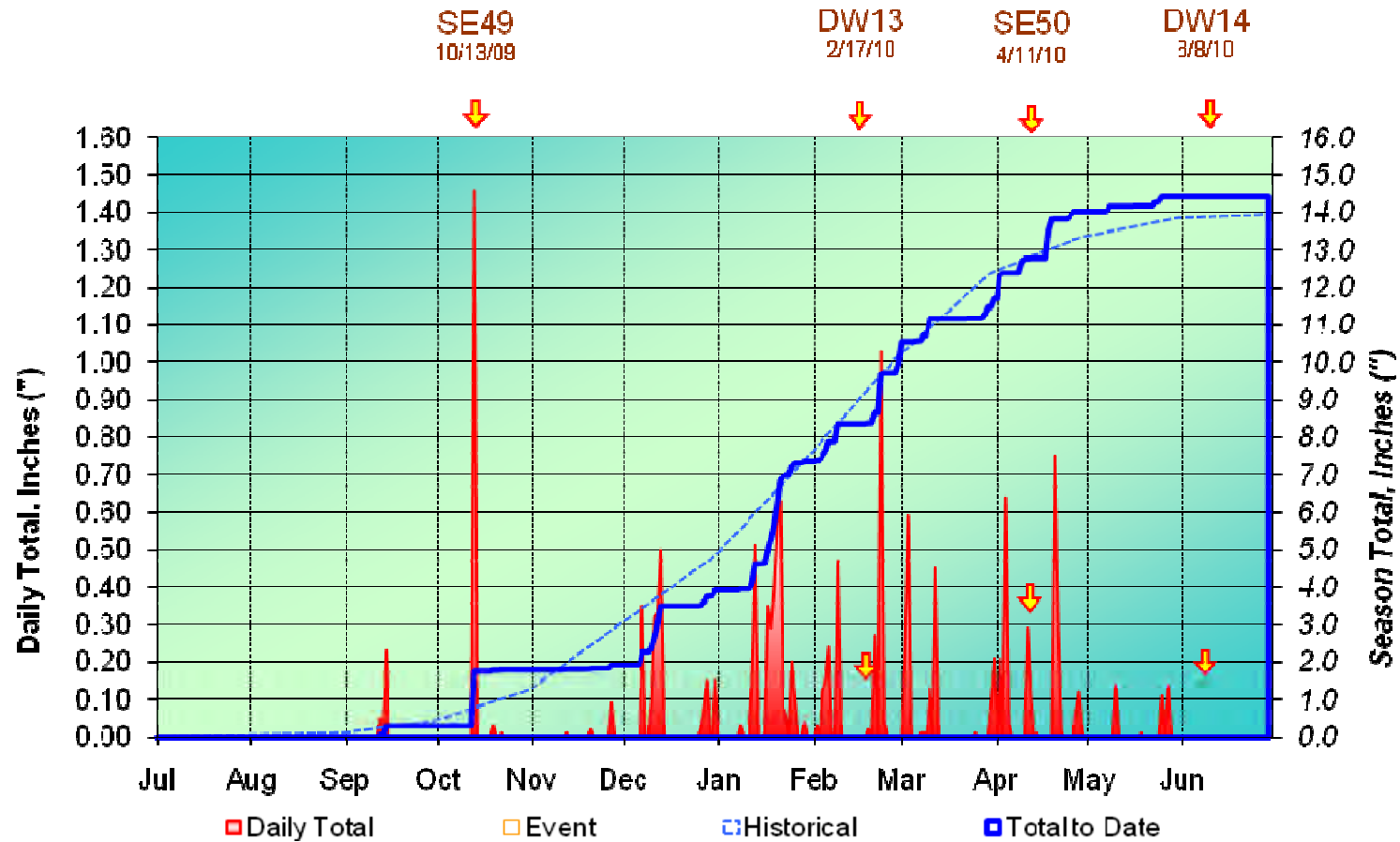


Figure 8-1. 2009-2010 Precipitation at Stockton Metro Airport and Captured Monitoring Events³

³ Precipitation data shown in these tables is taken from the Stockton Metro Airport. <http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caKSCK>

8.1.2 Urban Runoff Discharge and Receiving Water Monitoring

Urban discharge monitoring characterizes the quality of urban runoff discharged directly to receiving waters within the SUA. Under the 2002-2007 permit, four receiving water sites were sampled downstream of the urban discharge sites to gauge the impact of discharge on receiving waters. These sites are termed urban receiving water sites because they characterize receiving water quality within the SUA. The Permit requires three additional receiving water sites upstream of urban discharge sites in order to characterize the quality of water entering the SUA. Three upstream sites rather than four are required because of the four waterways with urban discharge sites, only three extend upstream past the border of the SUA. The upstream receiving water sites were intended to be as close to the boundary of the SUA as possible, but waterbodies at the boundary of the SUA are often seasonally dry. Consequently, it was a challenge to keep sites near the SUA boundary, but at locations where flow was most likely to be present. However, even with this consideration, upstream sites were occasionally dry in 2009-2010. To increase the number of events where the Calaveras River can be sampled upstream, the upstream receiving water site will be moved to the Stockton Diverting Canal at the South Main Street Bridge. A formal request for consideration was sent to the RWQCB during 2009-2010 to change the monitoring location. The City and County will implement this change effective 2010-2011.

The watersheds in which baseline urban discharge and receiving water monitoring sites are located are:

- Mosher Slough (MS)
- Calaveras River (CR)
- Duck Creek (DC)
- Smith Canal (SC)

Urban discharge and receiving water sites that were sampled in 2009-2010 are shown in **Figure 8-2**. Urban receiving water sites are labeled with an “R” for receiving water. Sites upstream of the SUA are labeled with an “RUS” for receiving water, upstream. Previously, upstream sites were labeled with an “RU”, but this has been changed to an “RUS” to prevent confusion with sites monitored in Water Quality Based Programs.

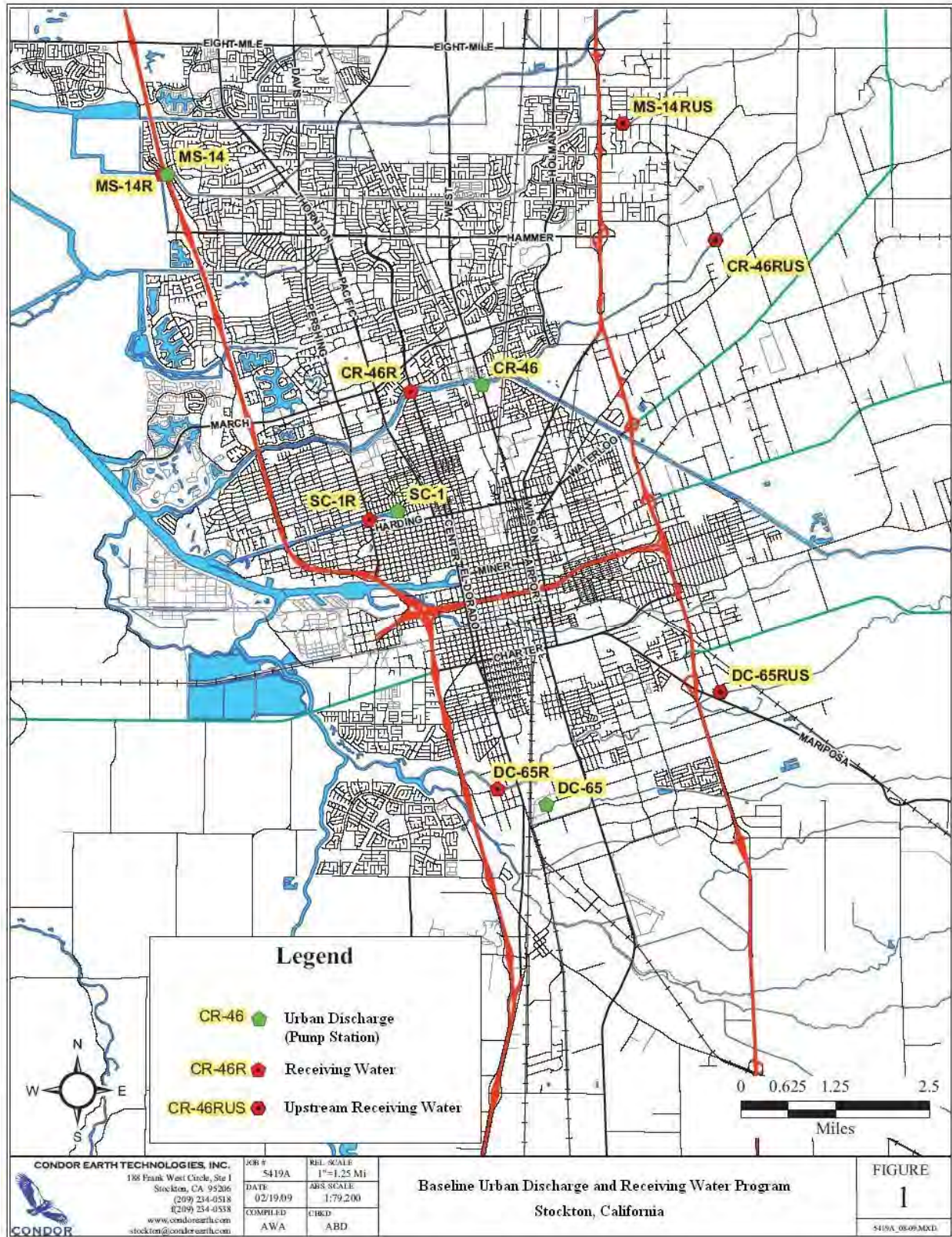


Figure 8-2. 2009-2010 Baseline Monitoring Locations Monitored in Stockton Urbanized Area

Urban discharge monitoring locations are outfalls representative of the various land uses within the urbanized area. These stations are summarized in **Table 8-3**. Receiving water locations are also listed in **Table 8-3**. The selected urban discharge monitoring stations are located at sites that are representative of commercial, industrial, residential, and mixed land uses, respectively. Land uses of receiving water monitoring locations are also shown in **Table 8-3** to indicate that upstream sites may represent runoff from different land uses than urban sites.

Table 8-3. 2009-2010 Urban Discharge and Receiving Water Monitoring Sites

Monitoring Program	Station ID	Monitoring Site Location	Predominant Land Use	Watershed Area (acres)
Urban Discharge	MS-14	9211 Kelly Drive	Residential	533
	CR-46	4250 North West Lane	Commercial	169
	DC-65	555 Zephyr Drive	Industrial	343
	SC-1	840 Baker Place	Mixed use	1,866
Receiving Water	MS-14RUS	Mosher Slough at North Cole Drive	Residential / Agricultural	NA
	MS-14R	Mosher Slough at Mariners Drive Bridge	Residential	NA
	CR-46RUS	Calaveras River at Solari Ranch Road	Agricultural	NA
	CR-46R	Calaveras River at east side of the bridge for El Dorado St.	Commercial	NA
	DC-65RUS	Duck Creek at Stagecoach Road	Industrial / Agricultural	NA
	DC-65R	Duck Creek at Odell Ave. over-crossing	Industrial	NA
	SC-1R	Smith Canal at east side of the bridge for Pershing Avenue	Mixed use	NA

Monitoring was completed at each urban discharge and urban receiving water site twice during the wet season and twice during the dry season. Monitoring was not completed at all upstream monitoring locations during some events due to lack of flow at the sampling sites, as discussed previously. The timeline of the 2009-2010 events is shown in **Figure 8-1**. The sites that were sampled during each event are listed in **Table 8-4**. Wet weather events (labeled “SE” for storm event) and dry weather events (labeled “DW” for dry weather) are numbered from the initiation of monitoring wet weather and dry weather events (in 1992 and 2004, respectively).

Table 8-4. Sites Sampled and Type of Sample Taken during 2009-2010 Monitoring Events

Monitoring Program	Station ID	SE49 10/13/09	DW13 2/17/10	SE50 4/11/10	DW14 6/8/10
Urban Discharge	MS-14	G	G	C	G
	CR-46	C	G	C	G
	DC-65	G	G	C	G
	SC-1	C	G	C	G
Receiving Water	MS-14RUS	G	I	G	G
	MS-14R	G	G	G	G
	CR-46RUS	G	I	I	G
	CR-46R	G	G	G	G
	DC-65RUS	E	G	G	G
	DC-65R	G	G	G	G
	SC-1R	G	G	G	G

Notes:

C = Composite

E = No sample taken because upstream site was flowing to the east, away from the Stockton Urbanized Area

G = Grab

I = No sample taken due to insufficient flow

During the first wet weather event (SE49), the flow-weighted composite samplers were intended to be operated at all urban discharge sites. However, because the composite samplers on Mosher Slough (MS-14) and Duck Creek (DC-65) malfunctioned, grab samples were taken at these locations. These issues were resolved for the second wet weather event (SE50).

Details of 2009-2010 Urban Runoff Discharge and Receiving Water Wet Weather Monitoring Events

Each monitoring event is unique in terms of the antecedent weather conditions, flow in the waterbody, field conditions, etc. Wet weather events are particularly influenced by the amount and intensity of rainfall and time of sampling with respect to the rainfall hydrograph. While field notes are taken during dry weather events, more in-depth field measurements are taken to characterize wet weather events.

Accordingly, field measurements for each wet weather event are summarized in **Table 8-5** and **Table 8-6**.⁴

⁴ Precipitation data shown in these tables is taken from the Stockton Metro Airport. NOAA rainfall data for this site is available at: <http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caKSCK>

Table 8-5. Details of Wet Weather Event SE49 on 10/13/09

Rainfall/Runoff	MS	CR	DC	SC
Time of first rain		10/13/09 04:55		
Time of last rain		10/13/09 20:55		
Total rain (in)		0.51		
Time of first sample	No	05:42	No	06:07
Time of last sample	composite	14:00	composite	13:55
Total runoff volume (kcf)	samples taken ¹	985	samples taken ¹	2,433
Percent storm capture		78		100
Number of successful aliquots		102		39
Total sampling time (hrs)		8.3		7.8
Grab sample time	06:16	07:36	07:10	07:25
Upstream Receiving Water Conditions				
Sampling time	07:10	08:35	No sample taken because creek was flowing East	No upstream receiving water site
Flow measurement time	06:45	08:50		
Velocity (fps)	0.75	0.5		
Width (ft)	9.0	25		
Depth (ft)	0.5	1.5		
Urban Receiving Water Conditions				
Sampling time	07:48	10:20	09:20	09:49
Flow measurement time	08:00	10:00	09:15	10:00
Velocity (fps)	0.5	1	1.5	1
Width (ft)	88	60	48	120
Depth (ft)	3.0	5.5	1.5	9
Antecedent Conditions				
Time of last precipitation		9/14/09 05:55		
Date of last storm > 0.1		9/14/09		
Time since last storm		29 days		
Date of last storm > 0.25		5/1/09		
Time since last storm		164 days		
Cumulative rainfall to date (in)		0.29 (7/1/09 to 10/12/09)		

Note:

1. Grab samples were taken in place of composite samples because equipment malfunctioned,

Table 8-6. Details of Wet Weather Event SE50 on 4/11/10

Rainfall/Runoff	MS	CR	DC	SC
Time of first rain		13:55		
Time of last rain		17:55		
Total rain (in)		0.29		
Time of first sample	15:42	15:27	15:07	15:59
Time of last sample	17:23	16:27	16:56	17:39
Total runoff volume (kcf)	226.39	63.70	31.71	466.23
Percent storm capture	100	100	68.9	100
Number of successful aliquots	39	39	78	39
Total sampling time (hrs)	1:41	1:00	1:49	1:40
Grab sample time	15:13	16:10	15:48	15:06
Upstream Receiving Water Conditions				
Sampling time	18:15	Insufficient	17:30	No
Flow measurement time	18:22	flow to	17:37	upstream
Velocity (fps)	1	take	1.2	receiving
Width (ft)	4.5	upstream	11	water site
Depth (ft)	1.5	receiving	3.0	
		water		
		sample		
Urban Receiving Water Conditions				
Sampling time	16:33	17:40	17:36	16:50
Flow measurement time	17:03	17:00	17:36	17:45
Velocity (fps)	0.2	0.5	0.5	0.2
Width (ft)	88	60	48	120
Depth (ft)	4.4	6.5	4.0	6.3
Antecedent Conditions				
Time of last precipitation		4/5/2010 03:55		
Date of last storm >0.1		4/4/2010		
Time since last storm		7 days		
Date of last storm > 0.25		4/4/2010		
Time since last storm		7 days		
Cumulative rainfall to date (in)		12.38 (7/1/09 to 4/10/2010)		

Monitored Constituents and Analytical Methods

The analytical methods for urban discharge and receiving water monitoring are in accordance with the reporting limits (RLs) that are specified in the MRP. During the 2009-2010 events, samples were collected according to the constituent “schedule” shown in **Table 8-7**.

Table 8-7. Constituent Analysis for Urban Runoff Discharge and Receiving Water Monitoring

Constituent	EPA Method Used in Analysis	Target Reporting Limit	Units
Conventionals			
Turbidity	180.1	0.1	NTU
Total Suspended Solids	160.2	2	mg/L
Total Dissolved Solids	160.1	2	mg/L
Total Organic Carbon	415.3	1	mg/L
Biochemical Oxygen Demand	405.1	2	mg/L
Chemical Oxygen Demand	SM 5220D	20 - 900	mg/L
Alkalinity	310.1	2	mg/L
Oil and Grease	1664A	5	mg/L
Specific Conductance	120.1	1	µmhos/cm
pH	SM 4500-H+B	0.0 - 14.0	std. units
Temperature	Field	0.1	deg C
Dissolved Oxygen	Field	0.1	mg/L
Nutrients			
Total Phosphorous	365.1	0.05	mg/L
Nitrate-Nitrite	300.0	0.1	mg/L
Total Ammonia-Nitrogen	350.1	0.1	mg/L
Total Kjeldahl Nitrogen	351.2	0.1	mg/L
Bacteria			
<i>E. coli</i> (fresh waters)	SM 9223B	10	MPN/100mL
Fecal coliform	SM 9221B	20	MPN/100mL
Total coliform	SM 9221B/9223B	20	MPN/100mL
Metals			
Aluminum (Al)	200.8	50	µg/L
Copper (Cu)	200.8	0.5	µg/L
Iron (Fe)	200.8	100	µg/L
Lead (Pb)	200.8	0.5	µg/L
Mercury (Hg)	1631E	0.5	ng/L
Methylmercury	Draft EPA 1630	0.05	ng/L
Zinc (Zn)	200.8	1	µg/L
Hardness	SM 2340H+B	2	µg/L
Pyrethroids	625mNCI	5	ng/L
Organophosphate Pesticides	625m		µg/L
Chlorpyrifos		0.01	µg/L
Diazinon		0.05	µg/L

Urban discharge and receiving water quality results for the constituents in **Table 8-7** are included as **Appendix H-1A**, which contains information regarding:

- Sample location
- Station type (urban discharge [UD] or receiving water [RW])
- Sampling method (composite or grab)
- Sample date and time
- Sample result
- Method detection limits (MDLs)
- RLs
- Data qualifiers
- Comparison to the lowest applicable water quality objective (WQO), and
- The analyzing lab

For analyses that were non-detect, the value is reported as less than the MDL where the MDL is provided by the lab; otherwise, the value is reported as less than the RL. **Appendix H-1B** consists of original lab reports. **Table 8-8** through **Table 8-11** summarize urban discharge results for POCs. A discussion of data quality evaluation, Quality Assurance/Quality Control (QA/QC), is included in Section 8.3.

Table 8-8. Concentrations of Pollutants of Concerns at Urban Discharge Sites during Wet Weather Event SE49 on 10/13/09

Pollutant of Concern	Units	WQO	MS-14	CR-46	DC-65	SC-1
Oil and grease	mg/L	0*	<3 ND	<3 ND	<3 ND	13
Specific conductivity	µS/cm	700	220	120	110	130
Total dissolved solids	mg/L	400	200	110	94	130
Aluminum, total	µg/L	200	2,300	2,100	3,900	2,500
Aluminum, dissolved	µg/L	200	94	60 FB	<50 ND	100
Copper, total	µg/L	H	44	47	18	34
Copper, dissolved	µg/L	H	12	24	1.2	5.9
Iron, total	µg/L	300	3,300	2,900	4,700	3,700
Lead, total	µg/L	H	2.3	6	4.4	15
Lead, dissolved	µg/L	H	<0.5 ND	<0.5 ND	<0.5 ND	1.6
Zinc, total	µg/L	H	140	400	200	220
<i>E. coli</i>	MPN/100mL	235	17,329	990	15,531	>24192
Fecal coliform	MPN/100mL	400	30,000	2,300	50,000	1,100,000

Notes:

Values in **bold** exceed the water quality objective

* While the water quality objective for oil and grease is 0 mg/L, the method detection limit was 3 mg/L for this event. A non-detect (ND) result is therefore not considered an exceedance.

FB = This result is an estimate because a field blank taken at this site had concentrations of the given constituent above the corresponding reporting limit.

H = This WQO is hardness based, so the WQO is specific to the hardness measured at each site.

ND = This constituent was not detected in the effluent and is given as less than the method detection limit.

Table 8-9. Concentrations of Pollutants of Concerns at Urban Discharge Sites during Dry Weather Event DW13 on 2/17/10

Pollutant of Concern	Units	WQO	MS-14	CR-46	DC-65	SC-1
Oil and grease	mg/L	0*	<5 ND	<5 ND	<5 ND	<5 ND
Specific conductivity	µS/cm	700	580	85 FB	160	310
Total dissolved solids	mg/L	400	270	10	160	130
Aluminum, total	µg/L	200	350	640 FB	5,000	1,500
Aluminum, dissolved	µg/L	200	<50 ND	100	98	180
Copper, total	µg/L	H	7.8	12 FB	34	13
Copper, dissolved	µg/L	H	1.8	5.1	5.3	4.8
Iron, total	µg/L	300	NA	NA	NA	NA
Lead, total	µg/L	H	NA	NA	NA	NA
Lead, dissolved	µg/L	H	NA	NA	NA	NA
Zinc, total	µg/L	H	12	65 FB	140	61
<i>E. coli</i>	MPN/100mL	235	187	809	160	>24,192
Fecal coliform	MPN/100mL	400	300	300	170	80,000

Notes:

Values in **bold** exceed the water quality objective

* While the water quality objective for oil and grease is 0 mg/L, the method detection limit for this event is 5 mg/L. A non-detect (ND) result is therefore not considered an exceedance.

FB = This result is an estimate because a field blank taken at this site had concentrations of the given constituent above the corresponding reporting limit.

H = This WQO is hardness based, so the WQO is specific to the hardness measured at each site.

NA = Samples not analyzed for this constituent due to lab error.

ND = This constituent was not detected in the effluent and is given as less than the method detection limit.

Table 8-10. Concentrations of Pollutants of Concerns at Urban Discharge Sites during Wet Weather Event SE50 on 4/11/10

Pollutant of Concern	Units	WQO	MS-14	CR-46	DC-65	SC-1
Oil and grease	mg/L	0*	<5 ND	<5 ND	<5 ND	<5 ND
Specific conductivity	µS/cm	700	54	61	100	76
Total dissolved solids	mg/L	400	32	54	80	46
Aluminum, total	µg/L	200	230	310	1,300	260
Aluminum, dissolved	µg/L	200	<0.5 ND	110	250	92
Copper, total	µg/L	H	7.1	28	10	13
Copper, dissolved	µg/L	H	<0.5 ND	5.8	3.5	2.5
Iron, total	µg/L	300	310	480	1,200	410
Lead, total	µg/L	H	1.2	4.5	3.1	3.2
Lead, dissolved	µg/L	H	<0.5 ND	0.8	<0.5 ND	1.8
Zinc, total	µg/L	H	36	73	36	91
<i>E. coli</i>	MPN/100mL	235	63	201	727	>24,192
Fecal coliform	MPN/100mL	400	140	800	3,000	140,000

Notes:

Values in **bold** exceed the water quality objective

* While the water quality objective for oil and grease is 0 mg/L, the method detection limit for this event is 5 mg/L. A non-detect (ND) result is therefore not considered an exceedance.

H = This WQO is hardness based, so the WQO is specific to the hardness measured at each site.

Table 8-11. Concentrations of Pollutants of Concerns at Urban Discharge Sites during Dry Weather Event DW14 on 6/8/10

Pollutant of Concern	Units	WQO	MS-14	CR-46	DC-65	SC-1
Oil and grease	mg/L	0*	<5 ND	<5 ND	<5 ND	<5 ND
Specific conductivity	µS/cm	700	570	240	380	430
Total dissolved solids	mg/L	400	260	74	180	130
Aluminum, total	µg/L	200	55	80	410	160
Aluminum, dissolved	µg/L	200	<50 ND	<50 ND	<50 ND	<50 ND
Copper, total	µg/L	H	3.2	2.4	2.8	21
Copper, dissolved	µg/L	H	1.9	0.8	1.4	7.8
Iron, total	µg/L	300	210	670	840	400
Lead, total	µg/L	H	<0.5 ND	<0.5 ND	<0.5 ND	<0.5 ND
Lead, dissolved	µg/L	H	<0.5 ND	<0.5 ND	<0.5 ND	<0.5 ND
Zinc, total	µg/L	H	1.5	14	3.9	29
<i>E. coli</i>	MPN/100mL	235	323	9,804	262	7,270
Fecal coliform	MPN/100mL	400	340	5,000	300	7,000

Notes:

Values in **bold** exceed the water quality objective

* While the water quality objective for oil and grease is 0 mg/L, the method detection limit for this event is 5 mg/L. A non-detect (ND) result is therefore not considered an exceedance.

ND = This constituent was not detected in the effluent and is given as less than the method detection limit.

H = This WQO is hardness based, so the WQO is specific to the hardness measured at each site.

A discussion of urban discharge water quality objective exceedances, which potentially caused or contributed to receiving water exceedance and a map of exceedance locations is included in Section 8.4.

8.1.3 Water Column Toxicity Monitoring

Water column toxicity monitoring was conducted at receiving water sites during two wet weather and two dry weather events in 2009-2010 in conjunction with baseline receiving water monitoring. Pacific EcoRisk tested the samples for toxicity. For each event, samples collected were compared to a control sample to determine if there was a statistically significant difference in *Ceriodaphnia dubia* survival and reproduction and fathead minnow survival and growth between the control and the environmental samples.⁵ In accordance with the Permit, if 100% mortality of *Ceriodaphnia dubia* or fathead minnow is detected within 24 hours of test initiation, a dilution series must be conducted. If statistically significant toxicity is found at the end of a 6 day test for *Ceriodaphnia dubia* or a seven-day test for fathead minnow, a targeted Toxicity Identification Evaluation (TIE) is conducted. Finally, if a toxicant is identified through the targeted TIE process, a Toxicity Reduction Evaluation (TRE) is performed to identify the sources of toxicity and discuss appropriate BMPs to eliminate the causes of toxicity. Complete results of water column toxicity testing are given in **Appendix H-2**⁶. Samples with identified toxicity are discussed by event in the following sections.

Wet Weather Event on October 13, 2009 (SE49)

The upstream receiving water samples taken during SE49 at CR-46RUS and MS-14RUS showed significant toxicity. The CR-46RUS sample showed a significant reduction in *Ceriodaphnia dubia* and fathead minnow survival. The MS-14RUS sample showed a significant reduction in fathead minnow survival only. In addition, DC-65R showed a significant reduction in *Ceriodaphnia dubia* survival. Upstream toxicity suggests that samples may have been impacted by non-point source toxicity.

Two TIEs were performed on the CR-46RUS samples: one for *Ceriodaphnia dubia* toxicity and one for fathead minnow toxicity. In the first sample TIE, significant toxicity was not observed in the baseline sample (before any TIE treatments were performed) indicating that the source of toxicity was not persistent. In the second TIE, toxicity was persistent. Tests indicated that divalent cations (e.g., metals), persistent organics and/or metabolically active substances (e.g., organophosphate pesticides) may have caused toxicity. Therefore, the toxicity may have been additive or synergistic. However, dissolved concentrations of aluminum, copper, and lead as well as diazinon and chlorpyrifos in the sample were all non-detect. However other metals were not assessed as they are not part of the required suite of constituents to be analyzed as dictated by the MRP.

One TIE was performed on the MS-14RUS sample with fathead minnow toxicity. Toxicity in this sample was persistent, and divalent cations (e.g., metals) were indicated. In addition, metabolically active substances may have been partially responsible for this sample as well, so the toxicity may have been additive or synergistic. Dissolved concentrations of aluminum, copper, and lead as well as chlorpyrifos in the sample were all non-detect. Diazinon was detected, but below the effect threshold.

Finally, the 100% *Ceriodaphnia dubia* survival in the baseline sample indicated that toxicity was not persistent in the TIE performed on the DC-65R sample. The impact of TIE treatments on *Ceriodaphnia dubia* reproduction indicated that particulate associated contaminants (e.g., metals or persistent organics) may have been a source of toxicity. In addition, one treatment suggested that a substance that becomes more toxic via blocking enzyme activity in the organism (e.g., pyrethroids) may have been contributing to

⁵ Statistically significant toxicity is defined as a greater than or equal to 50% increase in fathead minnow or *Ceriodaphnia dubia* mortality or reduction in *Ceriodaphnia dubia* reproduction compared to the lab control.

⁶ In these documents MS-14RUS is sometimes referred to as MS-1RUS. These are two names for the same site.

toxicity. Dissolved concentrations of aluminum, copper, and lead were non-detect. Esfenvalerate and lambda-cyhalothrin were the only pyrethroids detected in the sample, and both were below the RL of 1 ng/L.

Dry Weather Event on February 17, 2010 (DW13)

There was no significant toxicity detected in any samples taken during DW13, therefore no TIEs were conducted. All of the samples had mean percent survivals of 100% for *Ceriodaphnia dubia* and 94% to 100% for fathead minnow.

Wet Weather Event on April 11, 2010 (SE50)

During SE50, significant toxicity was observed in the MS-14RUS sample only. There was a greater than 50% reduction in survival of *Ceriodaphnia dubia* and the resulting TIE found that toxicity was persistent. One analysis suggested toxicity caused by divalent cations (e.g., metals), however additional analyses suggested otherwise. Analyses indicated a non-polar organic and/or a metabolically activated substance (e.g., an OP pesticide) may have contributed to toxicity. Although chlorpyrifos was not detected in the sample, diazinon was present above the species effect threshold at 303 ng/L.

MS-14RUS is on Mosher Slough upstream of the SUA and is primarily influenced by non-point agricultural sources. In comparison, toxicity within the SUA on Mosher Slough at MS-14R was not significantly different than the toxicity of the control sample. The drainageshed for this upstream site is largely outside of the Permittees' jurisdiction and any control measures implemented by the stormwater program are not affecting potential sources outside of SUA. For these reasons, further investigation of the toxicity observed during this event and the initiation of the TRE was not warranted.

Dry Weather Event on June 8, 2010 (DW14)

A significant reduction in *Ceriodaphnia dubia* reproduction was observed in the SC-1R sample during DW14 and in fathead minnow survival in the CR-46RUS sample. The toxicity in the SC-1R sample was persistent, but TIE analyses were inconclusive as to the source of toxicity. One analysis indicated cations, in particular divalent cations (e.g., metals), but two other analyses suggested otherwise. Concentrations of dissolved metals, chlorpyrifos, diazinon and pyrethroids were all below effect levels for *Ceriodaphnia dubia* reproduction. The CR-46RUS sample exhibited mortalities that were due to pathogen related mortality, which interferes with the capacity to differentiate between a toxic response and a response to pathogens. Therefore, no TIE was conducted.

Historic Comparison

During the 2002-2007 permit term, water column toxicity testing was required at receiving water sites twice per permit term. Therefore, the last water column toxicity testing event in the former permit term occurred in 2005-2006. In this permit term, water column toxicity testing is required annually. In order to evaluate trends in water column toxicity, results from 2009-2010 are compared to 2008-2009 and 2005-2006 in **Table 8-12**. During 2005-2006, fathead minnow growth was evaluated to determine toxicity. However, in the current permit, significant toxicity is not assessed using fathead minnow growth.

In **Table 8-12**, a "No" indicates that there was no significant toxicity. During 2005-2006, upstream receiving water sites did not exist so an "NA" is given for those sites for that year. Other codes indicate the type of toxicity that was observed, which is listed in the table notes. As explained in Section 8.1.2, upstream receiving water sites were not always sampled in 2008-2009 and 2009-2010 due to insufficient flow. When sites were not sampled, a "--" is used.

Table 8-12. Comparison of Water Column Toxicity Detected in 2005-2006, 2008-2009, and 2009-2010

Event	Date	Urban Sites				Upstream Sites		
		MS-14R	CR-46R	DC-65R	SC-1R	MS-14RUS	CR-46RUS	DC-65RUS
2005-2006								
SE39	12/1/2005	No ¹	No ¹	--	--	NA	NA	NA
SE40	2/26/2006	No	--	No	No	NA	NA	NA
SE41	3/20/2006	--	No	No	--	NA	NA	NA
SE42	4/12/2006	--	--	--	No	NA	NA	NA
DW05	5/10/2006	No	No	No	No	NA	NA	NA
DW06	6/5/2006	FG	No	CS	CR	NA	NA	NA
2008-2009								
SE47	11/1/2008	No	No	CS	No	No	--	--
DW11	2/4/2009	FS	--	No	FS	--	--	No
SE48	2/5/2009	FS	No	No	No	--	--	No
DW12	5/20/2009	No	No	CR	No	No	FS	No
Makeup	6/4/2009	No	No	--	No	--	--	--
2009-2010								
SE49	10/13/09	No	No	CS	No	FS	CS, FS	--
DW13	2/17/10	No	No	No	No	--	--	No
SE50	4/11/10	No	No	No	No	CS	--	No
DW14	6/8/10	No	No	No	CR	No	No ¹	No

Notes:

-- = Sample not collected during this event.

CR = Significant reduction in *Ceriodaphnia dubia* reproduction.

CS = Significant reduction in *Ceriodaphnia dubia* survival.

FG = Significant reduction in fathead minnow growth.

FS = Significant reduction in fathead minnow survival.

NA = Not applicable because site did not exist in 2002-2007 permit.

No = No significant toxicity.

1. Pathogen related mortality observed, which is a common side effect that does not necessarily indicate ambient toxicity.

A review of **Table 8-12** shows that water column toxicity has decreased at urban receiving water sites in 2009-2010. In 2005-2006, 25% of urban samples were toxic. In 2008-2009, this number increased to 33%. In 2009-2010, only 17% were toxic. The urban Calaveras River site has never shown toxicity, while the upstream site to date has consistently shown toxicity. This may indicate possible non-point sources of toxicity in the Calaveras River watershed outside of the SUA. To date, the upstream Duck Creek site has shown no toxicity in the six samples taken.

A map of toxicity detected at sites in 2005-2006, 2008-2009, and 2009-2010 is shown in **Figure 8-3**. In the graphs on the figure, the total height of the bars indicates the number of events with significant toxicity observed in the given year. The color of the bars indicates what type of toxicity was observed as follows:

- Dark blue bar: A significant reduction in *Ceriodaphnia dubia* survival (CS) was observed.
- Dark red: Significant reduction in *Ceriodaphnia dubia* reproduction (CR) was observed.

- Yellow: A significant reduction in fathead minnow survival (FS) was observed.
- Light blue: A significant reduction in Fathead minnow growth (FG) was observed. Fathead minnow growth was only considered a sign of significant toxicity in 2005-2006.

In one case, at site CR-46RUS in 2009-2010, a significant reduction in both *Ceriodaphnia dubia* survival and fathead minnow survival was seen in the same sample. Because this only represented significant toxicity during one event, the bar is shown as half dark blue (CS) and half yellow (FS) so that it does not appear as though there were more events where significant toxicity was observed. Where no toxicity was observed, the graphs are labeled with an “NT”. Upstream sites did not exist in 2005-2006, so graphs for upstream sites are labeled “NA” during this year.

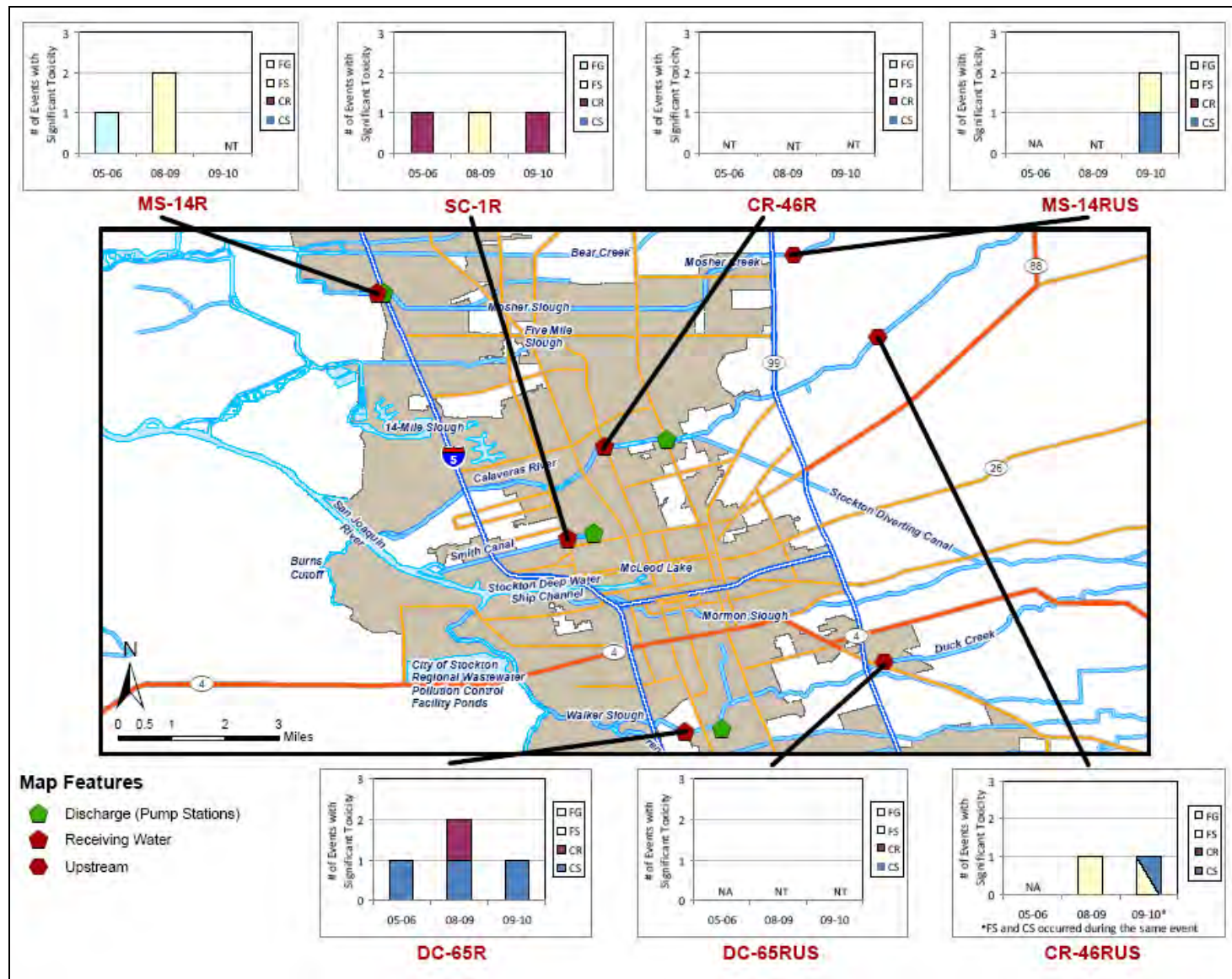


Figure 8-3. Toxicity Observed at Baseline Receiving Water Sites in 2005-2006, 2008-2009, and 2009-2010

Follow-up TIEs in both 2005-2006 and 2008-2009 indicated that toxicity was rarely persistent in samples. In 2009-2010, toxicity in most samples was persistent, but the source of toxicity was not confirmed. There were two cases in which diazinon appeared to be the cause of toxicity. In other samples, toxicity was attributed to multiple broad categories of constituents (e.g., non polar organics or metabolically active substances). A summary of the possible causes of toxicity for those samples which demonstrated toxicity is given in **Table 8-13**.

Table 8-13. Possible Sources of Toxicity Observed in 2005-2006, 2008-2009, and 2009-2010

Urban Receiving Waters				Upstream Receiving Waters		
Event	Date	MS-14R	DC-65R	SC-1R	MS-14RUS	CR-46RUS
2005-2006						
DW06	6/5/2006	FG: Not persistent	CS: Possibly non-polar organics, non-polar metal chelates, metabolically-active substances, and/or metals	CR: Not persistent	NA	NA
2008-2009						
SE47	11/1/2008	No	CS: Not persistent	No	No	--
DW11	2/4/2009	FS ²	No	FS ²	--	--
SE48	2/5/2009	FS ³	No	No	--	--
DW12	5/20/2009	No	CR: Not persistent	No	No	FS: Metals
2009-2010						
SE49	10/13/09	No	CS: Possibly particulate-associated contaminants (e.g., metals, persistent organics) and/or substance blocking enzyme activity	No	FS: Possibly metals and/or metabolically active substances	CS, FS: Possibly metals, persistent organics and/or metabolically active substances
SE50	4/11/10	No	No	No	CS: Possibly diazinon	No
DW14	6/8/10	No	No	CR: Persistent, but inconclusive	No	No

Notes:

-- = Sample not collected during this event.

CR = Significant reduction in *Ceriodaphnia dubia* reproduction.

CS = Significant reduction in *Ceriodaphnia dubia* survival.

FG = Significant reduction in fathead minnow growth.

FS = Significant reduction in fathead minnow survival.

NA = Not applicable because site did not exist in 2002-2007 permit.

No = No significant toxicity.

1. Pathogen related mortality was observed, which is a common side effect that does not necessarily indicate ambient toxicity.

2. Due to miscommunication with the lab, no TIE was conducted. A makeup event was conducted to test for toxicity again, but no toxicity was detected.

3. Due to miscommunication with the lab, no TIE was conducted. There were no qualifying wet weather events after SE48, so no makeup event was conducted.

8.1.4 Dry Weather Field Screening

Provision II.F of the Permit requires the Permittees to screen 20% of their outfalls annually to identify potential illicit connections and illegal discharges. In 2009-2010, 23 outfalls (20% of 115) were screened from June 3, 2010 to June 29, 2010. Outfalls screened in 2009-2010 are shown in **Figure 8-4**.

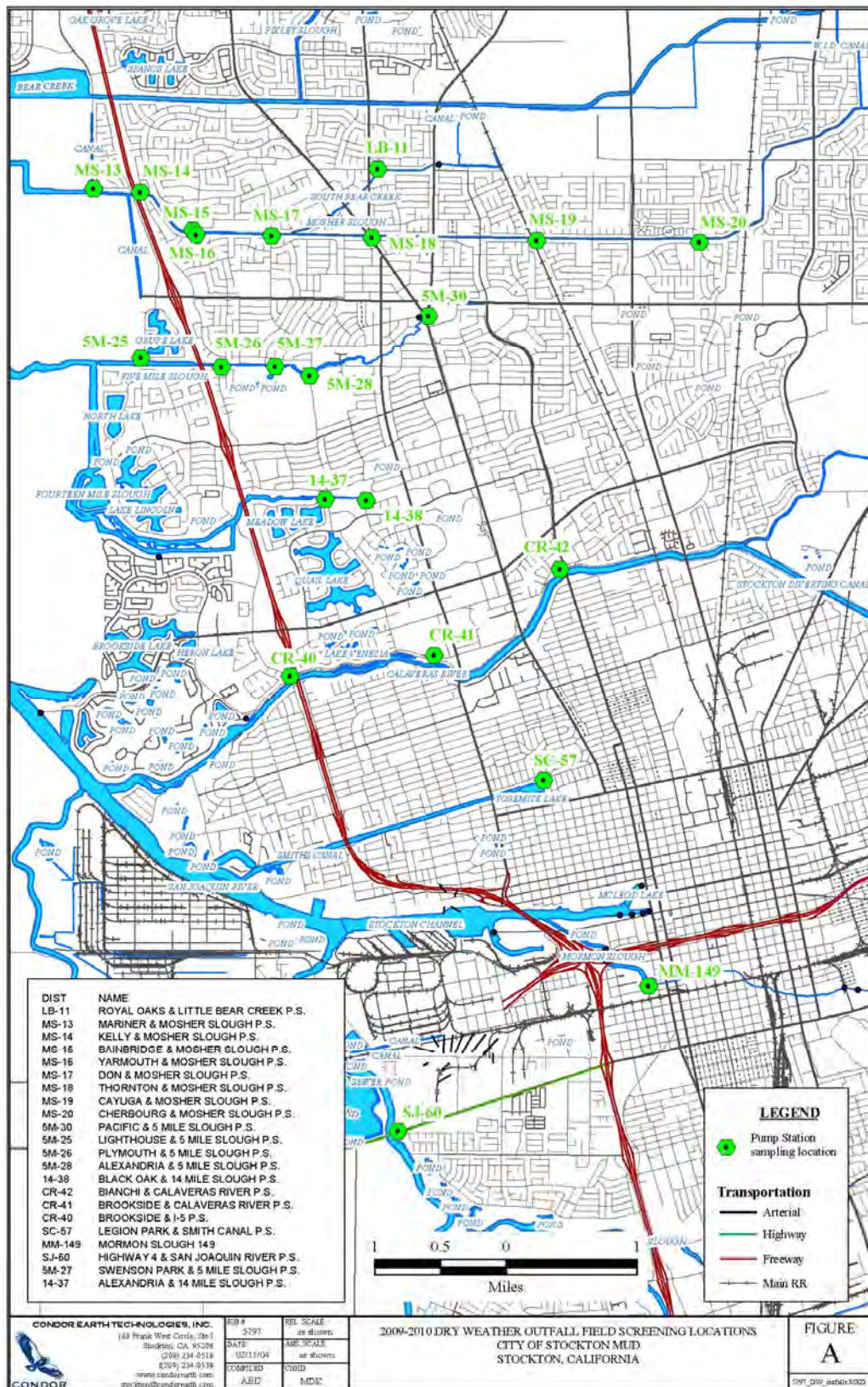


Figure 8-4. Dry Weather Field Screening Outfalls Monitored in 2009-2010

Field staff was unable to locate one outfall, 5M-31, which is on Five-Mile Slough. Consequently, this outfall was not sampled. Of the remaining outfalls, eight contained sufficient flow for field screening analysis. Samples from these outfalls were tested for temperature, pH, phenols, chlorine, total copper, electrical conductivity (EC), methyl blue activated substances (MBASs, which are detergents/surfactants), and turbidity. Action levels for these constituents set in the Permit are shown in **Table 8-14**. If these action levels are exceeded, a follow-up investigation is conducted.

Table 8-14. Dry Weather Field Screening Action Levels

Constituent	Units	Action Levels
Phenols	mg/L	>0.017
Total copper	mg/L	>2
Electrical Conductivity	µmhos/cm	>700
Methyl Blue Activated Substances (MBAS)	mg/L	>0.275
Turbidity	NTU	>55

Documentation of all the outfalls screened is given in **Appendix H-3**. For each site with sufficient flow for sampling, a follow up event was conducted to sample the outfall a second time. For each of the eight sites with sufficient flow for sampling, no action levels were exceeded. This suggests that the dry weather flow is primarily irrigation runoff and not illegal or illicit discharges.

Further discussion of measures taken to identify potential illicit discharges and illegal connections is included in **Section 2** of this Annual Report.

8.2 SUPPLEMENTAL MONITORING

Supplemental monitoring completed in 2009-2010 is summarized in **Table 8-15**.

Table 8-15. 2009-2010 Supplemental Monitoring and Reporting Program Accomplishments

SUPPLEMENTAL MONITORING AND REPORTING	
Monitoring Activity	Status
Legion Park BMP Study (see Section 8.2.1)	<ul style="list-style-type: none"> 2 wet weather events (1/12/10 and 3/2/10) successfully monitored 4 dry weather events (8/4/09, 3/25/10, 4/24/10, and 6/28/10) successfully monitored
BMP Effectiveness Study (see Section 8.2.2)	<ul style="list-style-type: none"> 1 wet weather event (4/11/10) successfully monitored at Filterra unit
Bioassessment (see Section 8.2.3)	<ul style="list-style-type: none"> Monitoring conducted 4/19/10 – 4/23/10
Sediment Plan and Sediment Toxicity Monitoring (see Section 8.2.4)	<ul style="list-style-type: none"> 1 post wet weather event successfully monitored at two sites on the Calaveras River (CR-46R - 10/20/09 and CR-39R - 10/22/09) 1 dry weather event successfully monitored at two sites on the Calaveras River (CR-42R and CR-39R - 6/21/10)
Detention Basin Monitoring (see Section 8.2.5)	<ul style="list-style-type: none"> Not required in 2009-2010

8.2.1 Legion Park Best Management Practice (BMP) Study

In Provision III.B, the Permit requires that two BMP effectiveness studies be conducted. The Permittees elected to meet the requirements for one of these studies by continuing monitoring of the Legion Park Pump Station BMP (LPPS BMP). The LPPS BMP is a Media Filter Stormwater Treatment System (MFST) intended to reduce pollutants entering the adjacent Yosemite Lake. Based on the Permittees' Smith Canal Work Plan and an agreement with the Friends of Smith Canal, the City constructed the MFST System and began operation in December 2005. The filter is connected to the 2,800 gallons per minute (gpm) low-flow pump, which is the main pump operated during dry weather and during the early stage of wet weather events.

In March 2006, the City began monitoring of the MFST, and monitoring continued through March 2007. Results showed a net increase in metals, nitrate, phosphate and total coliform, indicating that the MFST was not functioning as anticipated and may have been clogged. In response, the MFST was cleaned out, and the filter media was replaced in June 2008. The Legion Park BMP Revised Study Plan (Appendix H-6 of the 2009 SWMP) was developed to direct further monitoring efforts. In January 2009, the LPPS low-flow pump went out of service. Once the low-flow pump was repaired and fully operational (May 22, 2009), samples were taken during five dry weather events and two wet weather (storm) events during the 2008-2009 and 2009-2010 reporting periods.

Table 16. Legion Park Pump Station BMP Study Sample Events

Event Code	Event Date
DW1	6/3/2009
DW2	8/4/2009
SE1	1/12/2010
SE 2	3/2/2010
DW3	3/25/2010
DW4	5/24/2010
DW5	6/28/2010

LPPS BMP influent and effluent were sampled for laboratory analysis of nutrients, bacteria, conventionals, metals, and pesticides (i.e., organochlorine pesticides, organophosphate pesticides, and pyrethroids). A complete record of the environmental and quality assurance/quality control results and field data for the seven LPPS BMP events is provided as **Appendix H-4**. Based on a preliminary analysis of these monitoring data, no clear trends regarding removal efficacy are evident. A more thorough review of the LPPS BMP monitoring efforts will be provided by December 31, 2010. This review will include an assessment of monitoring data, monitoring protocol, filter performance, and filter maintenance and will include recommendations for either the continuation or termination of the LPPS BMP study.

8.2.2 BMP Effectiveness Study

The Permittees were required to identify and develop a Sampling and Analysis Plan (SAP) for a Low Impact Development (LID) BMP in 2008-2009. In both 2010-2011 and 2011-2012 they are required to sample five wet weather events. The Permittees have identified a Filterra unit that has recently been installed at the City's Waterfront Promenade and Marina Redevelopment Project area for the BMP

Effectiveness Study. Stormwater management for the Waterfront Marina is provided in part by a Filterra device that drains up to 0.42 acres of parking lot. The Filterra device is a pre-cast concrete box with a small tree planted in a bed filled with engineered soil media. It is installed along the edge of the parking lot and is designed to receive, retain, and treat stormwater runoff from the adjoining paved surfaces. The dimensions of the Filterra installed at the Downtown Marina are 6' x 8' and the soil media has an infiltration rate of approximately 100 inches per hour.

The Permittees developed a Sampling and Analysis Plan (SAP) for monitoring the Filterra unit and monitored one pilot event in 2009-2010 on 4/11/10. The City's Redevelopment Agency is required by the Army Corps of Engineers to conduct water quality monitoring of the Stockton Channel for a five-year period to assess the effects of the Downtown Marina Redevelopment Project and its associated upland development. As part of the SAP, the Permittees have partnered with the Redevelopment Agency to monitor the effluent from the Filterra unit. The SAP is still a working document because there have been some issues in isolating the effluent from overland flow during storm events. During initial observation of the unit during a storm event, heavy runoff from the surrounding area to the catch basin overwhelmed the treatment pipe and impacted treated discharge with untreated sheet flow.

Table 8-17 characterizes the 4/11/10 rainfall event monitored and antecedent conditions.

Table 8-17. Details of Wet Weather Event on 4/11/10

Rainfall/Runoff	
Time of first rain	13:55
Time of last rain	17:55
Total rain (in)	0.29
Time of first sample	15:15
Time of last sample	17:45
Antecedent Conditions	
Time of last precipitation	4/5/2010 03:55
Date of last storm >0.1	4/4/2010
Time since last storm	7 days
Date of last storm > 0.25	4/4/2010
Time since last storm	7 days
Cumulative rainfall to date (in)	12.38 (7/1/09 to 4/10/2010)

During the 4/11/10 pilot event, sandbags and plastic sheeting were used to dam this untreated flow from entering the unit effluent as much as possible. However, because the effluent could not completely be isolated, the data collected did not appear representative of the BMPs removal capabilities. The 4/11/10 pilot event will, therefore, be used to assess and improve the SAP to better capture effluent quality. Summary monitoring results will be included in future annual reports as additional data is available to assess trends.

8.2.3 Bioassessment Report

Background

Bioassessment monitoring was required by the 2002-2007 permit and was successfully completed in 2004 and 2005. The bioassessment monitoring program was designed to detect biological trends in the receiving waters of the SUA and to collect data to contribute to the Surface Water Ambient Monitoring

Program (SWAMP). The SWAMP is a statewide effort to develop standardized measures and criteria for monitoring and assessing the physical and biological integrity of the state's waters with the goal of developing a regional IBI for each geographic region of California. In general, the ultimate goal of bioassessment is to assess the biological integrity of receiving waters, to detect biological responses to pollution, and to identify probable causes of biological responses not detected by more traditional chemical and physical water quality analyses.

The Permit calls for an assessment of the data collected in 2004 and 2005, which was included as Appendix H-4 in the 2007-2008 Annual Report. In general, the results of the 2004 and 2005 bioassessment monitoring effort indicated that the waterways of the SUA are subject to the influence of human activities as well as the Delta hydrology (i.e. tidal influences). Given the limited amount of data, the report was only a preliminary analysis. The assessment recommended continued monitoring once a regional IBI is developed. As the development of an IBI may take some time, the Permittees opted to continue monitoring in 2009-2010.

Methods

The same 17 reaches monitored in 2004 and 2005 were monitored in 2009-2010. These reaches are located on Mosher Slough, the Calaveras River/Stockton Diverting Canal, Smith Canal and Walker Slough/Duck Creek in keeping with the waterbodies monitored in the baseline monitoring program. The sites are shown in **Figure 8-5**. The sampling was scheduled for the spring, to correlate with the 2004 and 2005 sampling which also occurred in the spring. Of the 17 reaches, 15 were sampled because 2 of the reaches were dry. The two dry reaches were at Mosher Slough sites above Morada Lane (MS-4) and Hildreth Lane (MS-5).

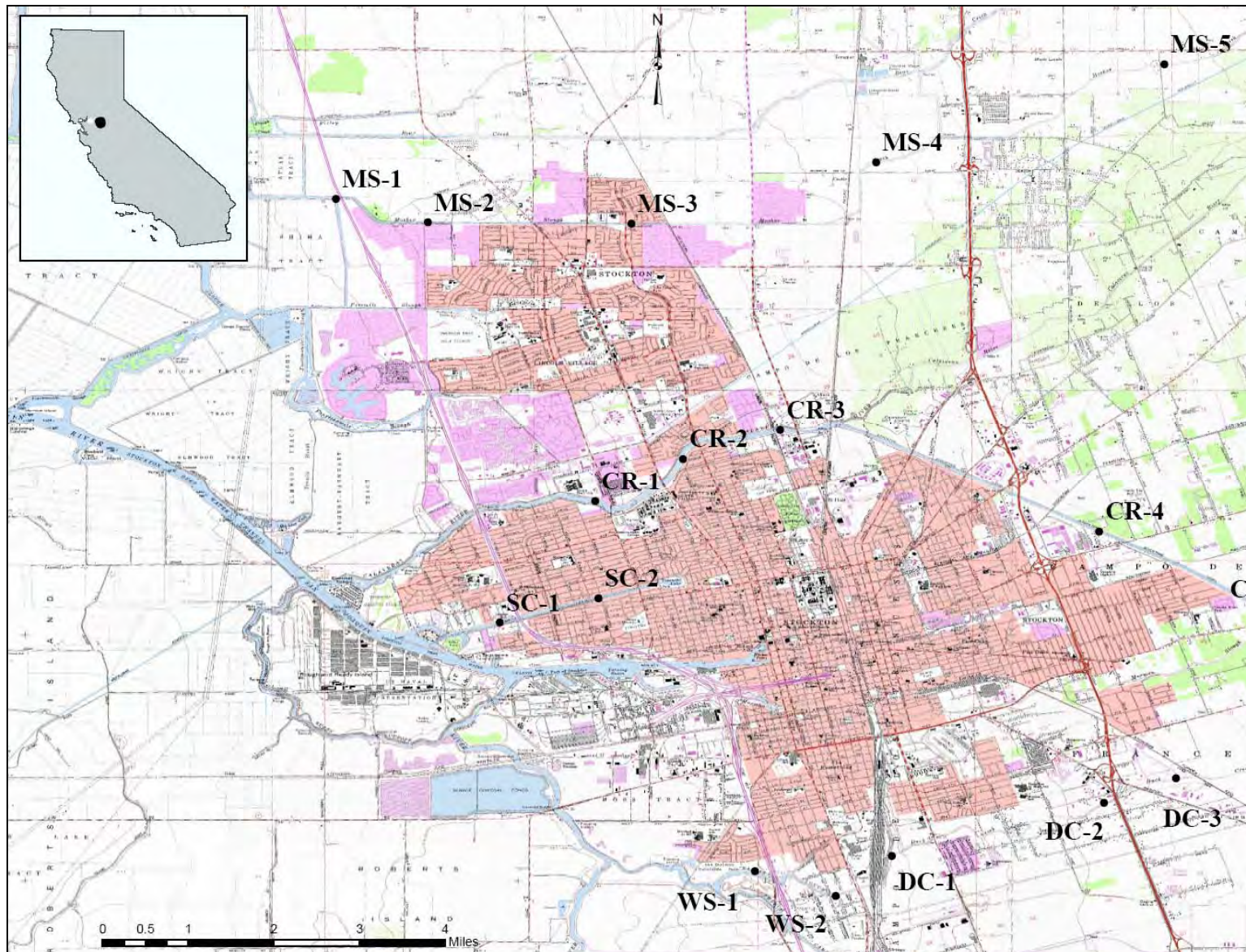


Figure 8-5. Stockton Urbanized Area Bioassessment Monitoring Reach Locations

Habitat Assessment

Bioassessment includes quantitative habitat ranking based on scoring of favorable vs. unfavorable substrate, sediment deposition, and channel alteration. In addition qualitative observations are made including:

- **Habitat diversity** - Diversity of particle sizes (clay, fines, sand, gravel, etc.)
- **Habitat complexity** - Diversity of habitat features such as boulders, woody debris, and overhang vegetation
- **Canopy cover**

Sediment deposition and channel alteration reflect greater site disturbance and biological impacts, which lowers the habitat ranking, while favorable substrate improves the habitat ranking. Greater habitat diversity, habitat complexity, and canopy cover increase the types of habitats and therefore the diversity of taxa that are present at a site. Canopy cover, for example, creates shade, leaf litter, and exposed roots, which increases the types of habitat at a site.

A summary of the habitat assessment is shown in **Table 8-18**.

Table 8-18. Summary of Bioassessment Habitat Evaluation

Site	Habitat Ranking	Habitat Diversity	Habitat Complexity	Canopy Cover
Mosher Slough*				
MS-1	Suboptimal	Low	Low	Moderate
MS-2	Marginal	Low	Low	Moderate
MS-3	Suboptimal	Moderate	Low	Moderate
Calaveras River/Diverting Canal				
CR-1	Optimal	Low	Low	Moderate
CR-2	Optimal	Low	Low	Moderate
CR-3	Optimal	Low	Low	Moderate
CR-4	Optimal	Low	Low	Moderate
CR-5	Optimal	Low	Low	Moderate
Smith Canal				
SC-1	Suboptimal	Low	Low	Moderate
SC-2	Suboptimal	Low	Low	Moderate
Walker Slough/Duck Creek				
WS-1	Suboptimal	Low	Low	Moderate
WS-2	Suboptimal	Low	Low	Limited
DC-1	Optimal	Moderate	Low	Limited
DC-2	Optimal	Low	Low	Moderate
DC-3	Optimal	Low	Low	Moderate

*MS-4 and MS-5 were not monitored because the sites were dry

Biological Trends

Although not consistent with previous sampling, the Permittees chose to use updated SWAMP methods for bioassessment in 2009-2010. Due to use of different sampling devices in 2004 (Ponar Dredge and kick-net), 2005 (Hester-Dendy and kick net), and 2010 (Eckman Dredge and kick-net) it is not

appropriate to draw strong conclusions over this time period. For example, the Hester-Dendy samples a hard artificial substrate that allows for organisms to colonize the substrate and may over-represent the hard substrate at the reach (clearly the case with the study sites in this evaluation). This provides a false impression of not only the number of organisms present, but also of the types of organisms that can actually reside in the habitats at the various reaches. However, one may assess the data for general trends of less biological impact and greater biological impact.

Benthic macroinvertebrate assessment is based on the following variables:

- **Taxa richness** – Total number of taxa (groups of aquatic organisms judged to have similar characteristics)
- **Organism abundance** – Total number of organisms
- **Taxa tolerance** - Percent of various taxa present that are either sensitive or insensitive to environmental conditions including pollutant concentrations, but also the type of substrate and sedimentation.
- **Trophic measures** – Relative proportion of types of taxa (e.g., ratio of collector taxa to predator taxa).

Trends based on these variables are summarized in **Table 8-19**.

Table 8-19. Bioassessment Trends Based on 2004, 2005 and 2010 Assessments

Site	Less Disturbance	More Disturbance	Trends
Walker Slough and Duck Creek	Increase in taxa richness	Increase in taxa tolerance	No clear trends
Calaveras River and Stockton Diverting Canal	Moderate tolerance and highest taxa richness in study	Increase in tolerance values from 2004 and 2005	No clear trend
Mosher Slough/Mosher Creek	High species abundance, increase in number of taxa since 2004 and 2005, and decrease in dominance by a single taxon since 2004 and 2005	Population composed of primarily highly tolerant taxa	Less biological impact than in 2004 and 2005
Smith Canal	Increase in number of taxa and high taxa richness	Overall higher tolerance	No clear trend
Overall, for all sites	Substantial increase in taxa richness. Increase in two types of taxa that are less tolerant and decrease in one type of taxa that is more tolerant to create a more balanced benthic community.	Low taxa diversity caused by low taxa richness. Dominant percentage of one or two taxa, resulting in high overall tolerance values. As in 2004 and 2005, all waterbodies demonstrate biological impact.	Overall inconclusive trends

Conclusions

The waterways within the SUA are subject at times to substantial influence of human activities that include both physical (e.g., habitat degradation via sedimentation) and chemical factors (e.g., stormwater runoff). As in 2004 and 2005, each sampling reach included in the 2010 monitoring can be characterized as impacted based on presence of tolerant taxa, relatively low taxa richness, and dominant percentages of one or two taxonomic groups. Although the overall conclusion of the 2010 bioassessment data does not differ from that obtained in the 2004 and 2005, there was a substantial increase in species richness, a

decrease in percent of some tolerant species, as well as an increase in some intolerant species. These values are a clear indication that the waterways of the SUA have the capacity to support a healthy aquatic community. However, the elevated tolerance in 2010 suggests an increased level of biological impact.

Although the biological metrics in 2004, 2005, and 2010 indicate some level of biological impacts in the receiving waters of the region, the degree of impact cannot be accurately assessed at this time because adequate reference conditions are not available and regional criteria have not been established for the San Joaquin Valley region. The current reference condition protocols for bioassessment monitoring are designed for western Sierra streams and not for tidal sloughs and low gradient urban waterways. Because of inherent differences between the waterways and sloughs of this study and the mountain streams where accepted biocriteria and sampling methods have been developed, it is not appropriate to make direct comparisons between data obtained through this sampling effort and the metric values or indices established elsewhere in California. However, bioassessment monitoring efforts conducted by the Permittees have provided information that can be used to identify the presence/absence of biological trends and to provide baseline conditions.

Overall, the results of the 2010 bioassessment monitoring effort indicate that the waterways within the SUA experienced an increase in the relative level of biological impact. Some measures of the overall biological impact assessment suggest improving conditions, resulting in an overall inconclusive trend for measuring urban influence on stream communities. Additional impacts may be caused by the configuration of the Delta and the location of Stockton within the Delta. This assessment therefore serves to establish a baseline dataset for determination of trends upon completion of a regional IBI and additional data collection. The complete 2010 Bioassessment Report is included as **Appendix H-5**.

8.2.4 Sediment Plan Monitoring

The City and County were required by Permit Provision D(26)(a-i) and Monitoring and Reporting Program (MRP), Provision II(G), to submit a sediment toxicity work plan (Sediment Toxicity Work Plan⁷) and to commence sediment quality characterization sampling to:

1. Characterize sediment toxicity within SUA subject to urban discharge
2. Assess the significance of the increase in urban pyrethroid usage
3. Based on the results, identify best management practices (BMPs) for controlling sources of sediment toxicity

The Sediment Toxicity Work Plan identifies a schedule to sample nine sites over the course of the permit term, sampling two to three sites each year.

The entire urbanized length of the Calaveras River (approximately 5.8 miles from the Stockton Diverting Canal to the San Joaquin River [SJR] confluence) has been classified as pesticide-impaired under the Federal Clean Water Act Section 303(d). During 2009-2010, sediment toxicity samples were collected at three Calaveras River receiving water sites shown in **Table 8-30**. These sampling sites locations were based on site selection requirements summarized in Section 3.0 of the Sediment Toxicity Work Plan (Appendix H-8 of the SWMP). The requirements included sampling of sites downstream of discharges from developments of various ages.

⁷ Permittees' *Sediment Toxicity Work Plan*, dated March 27, 2008, revised June 2009.

Table 8-20. 2009-2010 Sediment Toxicity Work Plan Monitoring Locations

Waterbody	Monitoring Location*	Receiving Water Site ID	Land Use	Approximate Development Age
Calaveras River	Brookside Road	CR-39R	Residential/Recreational	< 10 years
Calaveras River	West Lane Bridge	CR-46R	Mixed Use	< 5 to > 25 years
Calaveras River	El Dorado Bridge	CR-42R	Residential/Commercial	> 25 years

*Nearest cross street or urban feature

Mixed Use = Residential/Commercial/Industrial Uses

Sites in **Table 8-20** were sampled during one “post-first flush” storm event⁸ and one dry weather event. The relative placement of the sites along the Calaveras River is shown in **Figure 8-6**. The downstream site (CR-39R) is downstream of essentially all urban discharges within the City and County’s jurisdiction. The CR-39R site is within 300 feet downstream (west) of the Brookside Pump Station (CR-39), which discharges from an upscale residential and golf course/country club urban area. The CR-46R site is within 300 feet downstream of the CR-43 and CR-46 West Lane pump stations. These two West Lane pump stations discharge a mixed use area located between two Union Pacific Railroad lines whose development ranges in age from approximately five to older than 25 years. Finally, site CR-42R is approximately 150 feet downstream (west) of the Bianchi Pump Station, which discharges approximately 21% of the stormwater runoff within the Calaveras River urban watershed.

⁸ Post first flush timeframe is within two weeks of the first storm event of the wet season.

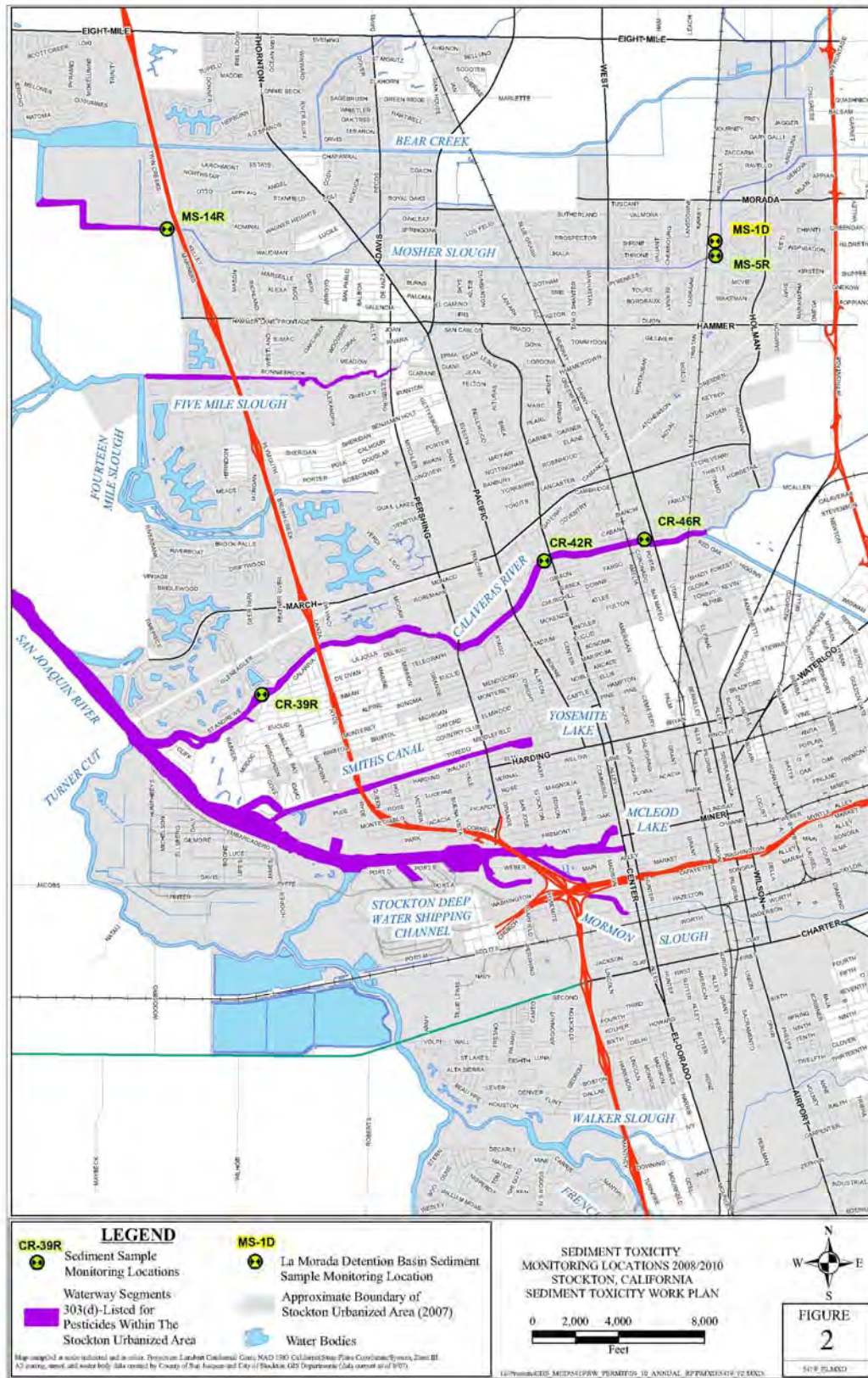


Figure 8-6. 2008-2009 and 2009-2010 Sediment Toxicity Plan Monitoring Locations

Sediment samples were analyzed by using the EPA standardized ten-day sediment toxicity testing method (EPA/600/R-99/064) for freshwaters using the amphipod *Hyalella azteca*, and for total organic carbon (TOC), and grain size. If toxicity was determined to be statistically significant and greater than or equal to 50% increase in *Hyalella azteca* mortality was observed, follow-up testing consisting of chemical analyses for chlorpyrifos and pyrethroid pesticides was conducted.

Several factors must be considered when interpreting the results of *Hyalella* sediment toxicity tests as they relate to environmental conditions and pesticide concentrations in the samples. TOC and grain size can dramatically affect the toxicity of sediment samples. As TOC increases, the bioavailability of many hydrophobic pesticides (e.g., pyrethroids, chlorpyrifos) decreases, and therefore the toxicity decreases. For this reason, the analytical data for pyrethroids and chlorpyrifos are organic carbon-corrected in order to evaluate the toxicity data. Samples with grain size that are primarily comprised of fine sediments and clay are more likely to have increased concentrations of hydrophobic contaminants than samples comprised mostly of sand, assuming that there are similar contaminant contributions/inputs.

Hyalella effect thresholds are published in the literature for many, but not all, pyrethroids. However, it is important to note that the use of such literature values must be put into context for a few reasons. First, the literature values are based on the outcome of the test results in a limited number of laboratories and under the test conditions in those laboratories. One significant variable in the testing of *Hyalella* among laboratories is the type of food used in the laboratories, each of which may have a different effect on the organisms response to toxic stress based on the amount of organic carbon in the food. Most of the pyrethroid analytical results in the literature are published as toxic units (one [1] TU is expected to cause a 50% reduction in *Hyalella* survival) of the ambient sediment samples, and not of the sediments used in the toxicity test after the food addition. Therefore, it is not expected that there will be a direct 1:1 relationship between the number of pyrethroid toxic units and the percent *Hyalella* mortality reported in the sample. However, one can evaluate the data and determine if there was a sufficient amount of pyrethroid TUs to account for the observed toxicity

2009/2010 Wet Weather Sediment Sampling

The post-first flush sediment toxicity sampling event was conducted on October 20, 2009 at CR-46R and October 22, 2009 at CR-39R following a 1.46 inch rain event which occurred on October 13, 2010. At the time of sample collection, the water column depths at the CR-46R and CR-39R sites were 2 and 11.6 feet, respectively.

Sediment characterization and toxicity monitoring results from the October 2009 wet weather event are summarized in **Table 8-21**.

Table 8-21. October 20, 2009 and October 22, 2009 Wet Weather Event Sediment Toxicity (FY 2009-2010)

Sample ID	Date	Sand (%)	Silt (%)	Clay (%)	Median Grain Size (mm)	TOC (mg/kg)	Significant <i>Hyalella azteca</i> Survival Toxicity?
CR-46R	10/20/09	44	44	12	0.050	27,300	Yes
CR-46R (FD)	10/20/09	43	46	11	0.045	23,800	Yes
CR-39R	10/22/09	52	38	10	0.087	13,600	No

Notes:

FD = Field duplicate

TOC= Total Organic Carbon

mg/kg= Milligrams per kilogram =parts per million (ppm)

Although the TOC in the toxic samples is higher than in the sample that did not exhibit significant toxicity, grain size must also be considered. Lower grain size is conducive to hydrophobic contaminants

such as pesticides, so smaller grain size may have contributed to toxicity. Due to less than 50% survival in *Hyalella azteca* in the CR-46R sample, follow-up chlorpyrifos and pyrethroid pesticides were conducted. Results are provided in **Table 8-22**, with **bold** concentrations indicating exceedance of pyrethroid sediment median lethal concentrations (LC50)⁹.

Table 8-22. Follow-Up Chemical Analyses for 10/20/09 Event at CR-46R

Constituents ¹	Analytical Result	Units	Reporting Limit
Chlorpyrifos	5.2	µg/kg	1.6
Allethrin	<1.6 ^a	µg/kg	1.6
Bifenthrin (Biphenthrin)	11	µg/kg	1.6
Cyfluthrin (Baythroid)	36	µg/kg	1.6
Lambda-cyhalothrin-1	<1.6	µg/kg	1.6
Cypermethrin	7.1	µg/kg	1.6
Deltamethrin (Tralomethrin)	<1.6	µg/kg	1.6
Esfenvalerate (Fenvalerate)	<1.6	µg/kg	1.6
Fenpropathrin (Danitol)	<1.6	µg/kg	1.6
Tau-Fluvalinate	<1.6	µg/kg	1.6
Permethrin	130	µg/kg	1.6
Tetramethrin	<1.6	µg/kg	1.6
Solids (percent)	31% H		0.1

µg/kg = micrograms per kilogram = parts per billion (ppb)

H = This result is an estimate. The sample was received out of hold time.

¹ Pyrethroid isomers are typically reported as totals instead of the individual isomers except where individual isomers may be obtained.

^a Sample diluted prior to analysis in an effort to reduce matrix interferences resulting in (a) higher reporting limit(s).

Based on performing an organic carbon correction for the pesticides that were analyzed in the CR-46 sample, there were about 1.0 TUs pyrethroids, which were slightly less than the amount necessary to have induced the toxicity observed in the samples; chlorpyrifos, however, was also present in the sample, and likely contributed to the toxicity. The presence of a lower number of pyrethroid TUs is consistent with the sample being composed of moderate amounts of sand (~44% of the sample matrix) and organic matter that was screened out prior to the grain size assessment, as well as a relatively high TOC concentration.

2009/2010 Dry Weather Sediment Sampling

The dry weather monitoring event conducted on June 21, 2010 at the CR-39R and CR-42R sites was preceded by 25 days of no measurable rainfall; 0.14 inches of rain was last recorded on May 27, 2010. A field duplicate sample was collected at the CR-39R site.

Sediment toxicity monitoring results from the June 21, 2010 dry weather event are summarized in **Table 8-23**, below. Percent survival was greater than 50% in each test.

⁹ Amweg, E.L., D.P. Weston, N.M. Ureda. 2005. Use and toxicity of pyrethroid pesticides in the Central Valley, California, USA. Environmental Toxicology and Chemistry, 24:966-972; erratum 24:1300-1301.

Table 8-23. June 21, 2010 Dry Weather Event Sediment Toxicity (FY 2009-2010)

Sample ID	Date	Sand (%)	Silt (%)	Clay (%)	Median Grain Size (mm)	TOC (mg/kg)	Significant <i>Hyaella azteca</i> Survival Toxicity?
CR-39R	6/21/10	32	58	11	0.028	13,500	No
CR-39R (FD)	6/21/10	19	70	11	0.021	20,300	No
CR-42R	6/21/10	70	26	4	0.303	15,600	No

Notes:

FD = Field duplicate

TOC = Total Organic Carbon

mg/kg= Milligrams per kilogram =parts per million (ppm)

The CR-39R field duplicate sediment sample consisted of finer grained material with a higher organic content than the associated environmental sample. The CR-39R samples are collected in fairly deep water (>10 ft), so the sediment samples are challenging. The field duplicate is also a separate sample (not homogenized and split from a single sample), so the composition of the sediment is variable.

2008-2009 Follow-Up Dry Weather Sediment Sampling

During 2008-2009 three sites were monitored on Mosher Slough, which are shown in **Figure 8-6**. Results for monitoring at two of sites were not complete at the time of submittal of the 2008-2009 Annual Report. Therefore, the results are discussed here.

On May 26, 2009 and June 2, 2009, dry weather sediment toxicity samples were collected at the La Morada Detention Basin (MS-1D) and Mosher Slough urban receiving water (MS-14R) sites. The MS-1D site is at the La Morada Detention Basin which drains a primarily residential area. MS-14R receives discharge from the MS-14 pump station at Kelley Drive which drains an urbanized watershed consisting of predominantly mixed residential and commercial areas. Summary information about these sites is given in **Table 8-24**.

Table 8-24. 2008-2009 Sediment Toxicity Work Plan Monitoring Locations Sampled on May 26, 2009 and June 2, 2009

Waterbody	Monitoring Location*	Receiving Water Site ID	Land Use	Approximate Development Age
Mosher Slough	La Morada Basin	MS-1D	Residential	< 10 years
Mosher Slough	Mariner's Bridge	MS-14R	Residential/Commercial	10 - 25 years

*Nearest cross street or urban feature

Toxicant testing of *Hyaella azteca* indicated there were significant reductions in survival in the MS-1D, MS-1D duplicate, and MS-14R sediment samples. Initial analytical results reported that chlorpyrifos and pyrethroids were not detected at or above the laboratory reported detection limits. Confirmation samples were collected from the toxicity samples collected at the MS-1D and MS-14R site locations and analyzed for pesticides, grain-size, and TOC. These results were pending at the time of the 2008-2009 Annual Report preparation and are provided in **Table 8-25** and **Table 8-26**.

Table 25. May 26, 2009 and June 2, 2009 Dry Weather Events Sediment Toxicity Sampling (FY 2008-2009)

Sample ID	Date	Sand (%)	Silt (%)	Clay (%)	Median Grain Size (mm)	TOC (mg/kg)	Significant <i>Hyaella azteca</i> Survival Toxicity?
MS-1D	5/26/09	8	63	29	0.011	10,300	Yes
MS-14R	6/2/09	59	31	9	0.144	37,600	Yes

Notes:

FD = Field duplicate

TOC = Total Organic Carbon

mg/kg= Milligrams per kilogram =parts per million (ppm)

Results in **bold** indicate concentrations above the pyrethroid sediment median lethal concentrations (LC50).

Table 8-26. Follow-Up Chemical Analyses for 5/26/09 and 6/2/09 Dry Weather Events at MS-1D and MS-14R

Constituent	Units	MS-1D	RL	MS-14R	RL	Method Blank	RL
Chlorpyrifos (Dursban)	µg/kg	0.64	0.34	241	0.71	<0.33	0.33
Allethrin	µg/kg	<0.34	0.34	<0.71	0.71	<0.33	0.33
Bifenthrin (Biphenthrin)	µg/kg	98¹	0.34	290¹	0.71	<0.33	0.33
Cyfluthrin (Baythroid)	µg/kg	3	0.34	10¹	0.71	<0.33	0.33
Lambda-cyhalothrin	µg/kg	0.44	0.34	4.5	0.71	<0.33	0.33
Cypermethrin	µg/kg	1.5	0.34	4.8	0.71	<0.33	0.33
Deltamethrin (Tralomethrin)	µg/kg	<0.34	0.34	<0.71	0.71	<0.33	0.33
Esfenvalerate (Fenvalerate)	µg/kg	0.31 J	0.34	2.4	0.71	<0.33	0.33
Fenpropathrin (Danitol)	µg/kg	<0.34	0.34	0.66 J	0.71	<0.33	0.33
Tau-Fluvalinate	µg/kg	<0.34	0.34	<0.71	0.71	<0.33	0.33
Permethrin	µg/kg	16	0.34	210¹	0.71	<0.33	0.33
Tetramethrin	µg/kg	<0.34	0.34	<0.71	0.71	<0.33	0.33
Solids (percent)	%	982	0.1	472	0.1	<0.1	0.1

TOC = Total organic carbon

J = This result is an estimate. It is quantified above the method detection limit, but below the reporting limit.

µg/kg = micrograms per kilogram =parts per billion (ppb)

¹ Result is an estimated concentration due to concentration exceeding linear range of calibration

Based on performing an organic carbon correction for the pesticides that were analyzed in the MS-1D sample, there were 18.8 TUs of pyrethroids, which were more than enough to have caused the toxicity observed in the sample; chlorpyrifos was also present in the sample, and likely contributed to the toxicity. The presence of a relatively elevated number of pyrethroid TUs is consistent with the sample being composed mostly of silt and clay (~92% of the sample matrix) and a relatively low/moderate TOC concentration.

The organic carbon correction for the pesticides that were analyzed in the MS-14R sample showed there were 7.6 TUs of pyrethroids, which were more than enough to have induced the toxicity observed in the sample; chlorpyrifos was also present in the sample, and likely contributed to the toxicity. The presence of a lower number of pyrethroid TUs is consistent with the sample being composed mostly of sand (~59% of the sample matrix) and a relatively high TOC concentration.

Complete Sediment Plan toxicity results are given in **Appendix H-6**.

8.2.5 Detention Basin Monitoring

Detention basin monitoring is not required in 2009-2010. It will resume in 2010-2011.

8.3 DATA QUALITY EVALUATION

Quality assurance/quality control (QA/QC) refers to the process of reviewing lab and “field” initiated checks on the sampling and analytical process. These checks –which include field blanks, method blanks, field duplicates, lab duplicates and matrix spike/matrix spike duplicates - and data review are used to confirm that collected data are of high quality and suitable for future use. Lab reports are initially screened by the field monitoring contractor for missing analytical data (both environmental and QA/QC), holding time violations, discrepancies in analytical methods or detection limits, and any apparent out-of-range environmental results. If the analytical work appears to be missing any requested analysis, the lab is asked to complete the missing analysis if it is possible to do so within the specified holding time. Periodically data analyses are requested even if missed samples exceed the hold time. Data qualifiers are appended to the environmental data points where appropriate by applying the data quality objectives provided by the laboratories.

Primarily, the QA/QC analysis process identifies isolated incidents of out-of-range lab and sampling performance, but more importantly identifies potential long term trends in lab and sampling performance. An important and ongoing component of the QA/QC program is to report and correct these problems as they arise.

During the first baseline monitoring event of 2009-2010 (DW13), samples were not analyzed for total iron and total and dissolved lead. This was due to lab error and the issue was resolved in the following events. Overall, no significant problems with data quality were identified. There were isolated instances of constituents detected in field blanks, field duplicates not meeting relative percent difference standards (RPD), a few analyses not run within hold times, and limited lab QAQC issues. However, when conducting such a large monitoring and reporting program, it is normal for field, lab, and/or analytical issues to arise for a small number of samples. In general, the data collected and reported here are considered of high quality and suitable for future use with the qualifications noted in the **Appendix H-1** data report. **Table 8-27** summarizes the main qualifiers used.

Table 8-27. Definition of Common QAQC Qualifiers and Instances of Application to 2009-2010 Data

Qualifier	Definition of Qualifier	Data to Which Qualifier Applies
FB	The concentration of a given constituent was detected in the field blank above the reporting limit. The sample associated with the site where the field blank was taken is considered an estimate.	<ul style="list-style-type: none"> A field blank was taken at one site for all constituents during each baseline monitoring event. The FB qualification for baseline monitoring was isolated to 1-3 constituents for 3 of the 4 events. One event has been monitored at the Filtterra unit as part of the BMP Effectiveness Study. One field blank was collected and FB qualification was assigned to 2 constituents
FD	The relative percent difference (RPD) between the concentrations of a given constituent in the field duplicate and the associated environmental sample was outside the acceptable limit. This indicates that the duplicability and precision of the results for this constituent may be low.	<ul style="list-style-type: none"> A field duplicate was taken at one site for all constituents during each baseline monitoring event. The FD qualification for baseline monitoring was isolated to 1-3 constituents for each event. Seven events have been monitored at the Legion Park BMP. A field duplicate was taken during each event for select constituents. Out-of-range RPDs resulted in 17 "FD" qualifications.
H	The hold time allowed for analysis of the given constituent was exceeded. Accordingly, results are considered an estimate.	<ul style="list-style-type: none"> Two events in the baseline monitoring program resulted in 1-2 H qualifications. The single event at the Filtterra unit resulted in 3 H qualifications One event in the Sediment Toxicity Plan resulted in 1 H qualification
J	The concentration of a given constituents is between the method detection limit (MDL) and the reporting limit (RL) and is therefore an estimate. The J qualifier does not indicate poor data quality because all the RLs used meet permit requirements.	<ul style="list-style-type: none"> The J qualifier is common in all data in the monitoring program.
ND	A given constituent was not detected and is given as < MDL. The ND qualifier does not indicate poor data quality but rather that a constituent was simply not detected.	<ul style="list-style-type: none"> The ND qualifier is common in all data in the monitoring program.

8.4 REPORT OF WATER QUALITY EXCEEDANCES

Pursuant to Monitoring and Reporting Program and Permit Provision C.3, the Permittees must provide a summary of the monitoring data, including the identification of water quality improvements or degradation, and recommendations for improvements to the Stormwater Management Plan. To support this effort, all receiving water monitoring data are compared with applicable water quality objectives contained in:

- The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan)
- The California Toxics Rule (CTR)
- California Title 22 Regulations¹⁰

Provision C.3 requires the Permittees to develop a Report of Water Quality Exceedances (RWQE) when the Permittees determine that their stormwater discharges have likely caused or are likely causing an exceedance of applicable water quality objectives (WQO).¹¹ A relatively simple but straight-forward approach is used to address these Permit requirements. The approach consisted of three steps:

Step 1: Measured *receiving water* concentrations were compared against the relevant WQOs from the Basin Plan, the CTR, and/or the Title 22 drinking water maximum contaminant levels (MCLs).

Step 2: When the reported receiving water concentrations exceeded the WQOs, the urban runoff concentrations as monitored from upstream outfalls were compared to the WQOs. Based on these comparisons, the WQO exceedances were classified as “likely caused or contributed to by urban runoff” if both urban discharge and urban receiving water concentrations exceed the lowest applicable WQO.

Step 3: When water quality exceedances were determined to be “likely caused or contributed to by urban runoff,” upstream receiving water exceedances were reported to characterize any upstream input into the waterways that may also have caused or contributed to the exceedance.

Pursuant to the report RWQE Permit requirements, the Permittees must address those constituents that are identified as potentially causing or contributing to an exceedance of a water quality objective. It should be noted, however, that simple comparisons of receiving water constituent concentrations to the WQO do not consider the *duration* of exceedances. The duration of wet weather event exposure depends on the hydrology of the waterbody, which can be very dynamic, and thus, more likely that an acute (instantaneous) exposure to a contaminant would occur. In contrast, an exposure on human health (longer term) timescale is less likely, but, where applicable, human health criteria are used. As a result of the lack of duration data and the relatively few data points available, the approach used in this Annual Report should be viewed as a planning-level effort to assess WQO exceedances.

¹⁰ It should be noted that there is some question as to the applicability of these water quality objectives and criteria to stormwater discharges. It is not clear that a proper Water Code section 13241 analysis was performed on the state water quality objectives used herein. In addition, the State Water Resources Control Board (SWRCB) has determined that the federal water quality criteria, such as are contained in the CTR, do “not apply to regulation of storm water discharges.” See SWRCB Policy for Implementation of Toxics Standards for the Inland Surface Waters, Enclosed Bays, and Estuaries of California at pg. 1, fn 1; see also CTR Preamble, 65 Fed. Reg. 31682 (May 18, 2000), which does not identify municipal stormwater as a potentially affected entity. Moreover, there is no indication that these objectives and criteria were ever intended to be applied to stormwater discharges at the end of pipe. Nevertheless, these objectives and criteria are utilized herein for the purposes of this report.

¹¹ The term “water quality objectives” is used interchangeably with “water quality criteria”.

All monitoring data, along with comparisons to WQOs, are presented in **Appendix H-1**. At the end of this section, summaries of all potential “cause and contribute” WQO exceedances for each site are summarized by site:

- Mosher Slough: **Table 8-30** (wet weather) and **Table 8-31** (dry weather)
- Calaveras River: **Table 8-32** (wet weather) and **Table 8-33** (dry weather)
- Duck Creek: **Table 8-34** (wet weather) and **Table 8-35** (dry weather)
- Smith Canal: **Table 8-36** (wet weather) and **Table 8-37** (dry weather)

These tables show that the following constituents may be contributing to receiving water exceedances:

- Metals (total aluminum, total iron, and total copper)
- Pathogen indicators (*E. coli* and fecal coliform)

The number of cause and contribute exceedances for each of these constituents is summarized in **Table 8-28** (wet weather) and **Table 8-29** (dry weather).

Table 8-28. Total Number of Exceedances on Each Waterbody during Two Wet Weather Events (SE49 and SE50)

Constituent	Waterbody			
	Mosher Slough	Calaveras River	Duck Creek	Smith Canal
Aluminum (total)	1	1	2	1
Copper (total)	1	1	2	1
Iron (total)	1	1	2	2
<i>E. coli</i>	1	1	1	1
Fecal Coliform	1	2	1	1

Table 8-29. Total Number of Exceedances on Each Waterbody during Two Dry Weather Events (DW13 and DW14)

Constituent	Waterbody			
	Mosher Slough	Calaveras River	Duck Creek	Smith Canal
Aluminum (total)	0	0	2	1
Copper (total)	1	1	1	1
Iron (total)	0	1	1	1
<i>E. coli</i>	0	0	1	0
Fecal Coliform	0	0	0	1

Table 8-30. Mosher Slough Wet Weather Water Quality Objective (WQO) Analysis from 2009-2010

Constituent	Units	WQO	SE49		Urban Receiving Water	Upstream Receiving Water	SE50	
			Upstream Receiving Water	Urban Discharge			Urban Discharge	Urban Receiving Water
Aluminum (total)	µg/L	200	2,600	2,300	1,300	--	--	--
Copper (total)	µg/L	H	2.5	44	8.7	--	--	--
Iron (total)	µg/L	300	3,500	3,300	1,800	--	--	--
<i>E. coli</i>	MPN/100mL	235	464	17,329	3,448	--	--	--
Fecal Coliform	MPN/100mL	400	5,000	30,000	3,500	--	--	--

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted acute CTR water quality objective and assumed default translator.

Table 8-31. Mosher Slough Dry Weather Water Quality Objective Analysis from 2009-2010

Constituent	Units	WQO	DW13		Urban Receiving Water	Upstream Receiving Water	DW14	
			Upstream Receiving Water	Urban Discharge			Urban Discharge	Urban Receiving Water
Copper (total)	µg/L	6.5 H	NA	7.8	8.0	--	--	--

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted chronic CTR water quality objective and assumed default translator.

NA = Upstream water samples were not taken during this event due to insufficient flow for sampling.

Table 8-32. Calaveras River Wet Weather Water Quality Objective (WQO) Analysis from 2009-2010

Constituent	Units	WQO	SE49		Urban Receiving Water	Upstream Receiving Water	SE50	
			Upstream Receiving Water	Urban Discharge			Urban Discharge	Urban Receiving Water
Aluminum (total)	µg/L	200	1,600	2,100	980	--	--	--
Copper (total)	µg/L	H	6.5	47	8.8	--	--	--
Iron (total)	µg/L	300	2,400	2,900	1,300	--	--	--
<i>E. coli</i>	MPN/100mL	235	24,192	990	3,076	--	--	--
Fecal Coliform	MPN/100mL	400	13,000	2,300	23,000	NA	800	500

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted acute CTR water quality objective and assumed default translator.

NA = Upstream water samples were not taken during this event due to insufficient flow for sampling.

Table 8-33. Calaveras River Dry Weather Water Quality Objective (WQO) Analysis from 2009-2010

Constituent	Units	WQO	DW13		Urban Receiving Water	Upstream Receiving Water	DW14	
			Upstream Receiving Water	Urban Discharge			Urban Discharge	Urban Receiving Water
Copper (total)	µg/L	H	NA	640 FB	390			
Iron (total)	µg/L	300	--	--	--	200	670	500

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

FB = This number should be considered an estimate because copper was detected above the reporting limit in a field blank taken at the same site.

H = WQO is based on receiving water hardness adjusted chronic CTR water quality objective and assumed default translator.

NA = Upstream water samples were not taken during this event due to insufficient flow for sampling.

Table 8-34. Duck Creek Wet Weather Water Quality Objective (WQO) Analysis from 2008 – 2009

Constituent	Units	WQO	SE49		SE50		Urban Receiving Water
			Upstream Receiving Water	Urban Discharge	Upstream Receiving Water	Urban Discharge	
Aluminum (total)	µg/L	200	NA	3,900	3,200	590	560
Copper (total)	µg/L	H	--	--	--	4.6	7.8
Iron (total)	µg/L	300	NA	4,700	3,100	310	750
<i>E. coli</i>	MPN/100mL	235	NA	15,531	565	--	--
Fecal Coliform	MPN/100mL	400	NA	50,000	3,000	--	--

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted acute CTR water quality objective and assumed default translator.

NA = Upstream water samples were not taken during this event due to insufficient flow for sampling.

Table 8-35. Duck Creek Dry Weather Water Quality Objective (WQO) Analysis from 2008 – 2009

Constituent	Units	WQO	DW13		DW14		Urban Receiving Water
			Upstream Receiving Water	Urban Discharge	Upstream Receiving Water	Urban Discharge	
Aluminum (total)	µg/L	200	2,700	5,000	2,600	2,000	840
Copper (total)	µg/L	H	13	34	14	--	--
Iron (total)	µg/L	300	--	--	--	2,200	1,100
<i>E. coli</i>	MPN/100mL	235	--	--	--	98	2,489

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted chronic CTR water quality objective and assumed default translator.

Table 8-36. Smith Canal Wet Weather Water Quality Objective (WQO) Analysis from 2008 – 2009

Constituent	Units	WQO	SE49		SE50	
			Urban Discharge	Urban Receiving Water	Urban Discharge	Urban Receiving Water
Aluminum (total)	µg/L	200	2,500	1,100	--	--
Copper (total)	µg/L	H	--	--	13	4.1
Iron (total)	µg/L	300	3,700	1,600	410	370
<i>E. coli</i>	MPN/100mL	235	24,192	12,997	--	--
Fecal Coliform	MPN/100mL	400	1,100,000	300,000	--	--

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted acute CTR water quality objective and assumed default translator.

Table 8-37. Smith Canal Dry Weather Water Quality Objective (WQO) Analysis from 2008 – 2009

Constituent	Units	WQO	DW13 ¹²		DW14	
			Urban Discharge	Urban Receiving Water	Urban Discharge	Urban Receiving Water
Aluminum (total)	µg/L	200	1,500	1,500	--	--
Copper (total)	µg/L	H	13	9.2	--	--
Iron (total)	µg/L	300	--	--	400	800
Fecal Coliform	MPN/100mL	400	--	--	7,000	500

Notes:

-- = There were no urban discharge water quality exceedances which likely contributed to receiving water quality exceedances.

H = WQO is based on receiving water hardness adjusted chronic CTR water quality objective and assumed default translator.

¹² The concentration of an aluminum exceedance was incorrectly reported in the exceedance letter for DW13. The urban discharge exceedance was reported as 770 µg/L, but is correctly reported here as 1,500 µg/L.

Figure 8-7 through **Figure 8-11** show the locations of aluminum, total iron, total copper, *E. coli*, and fecal coliform, respectively. The following sections discuss each constituent.

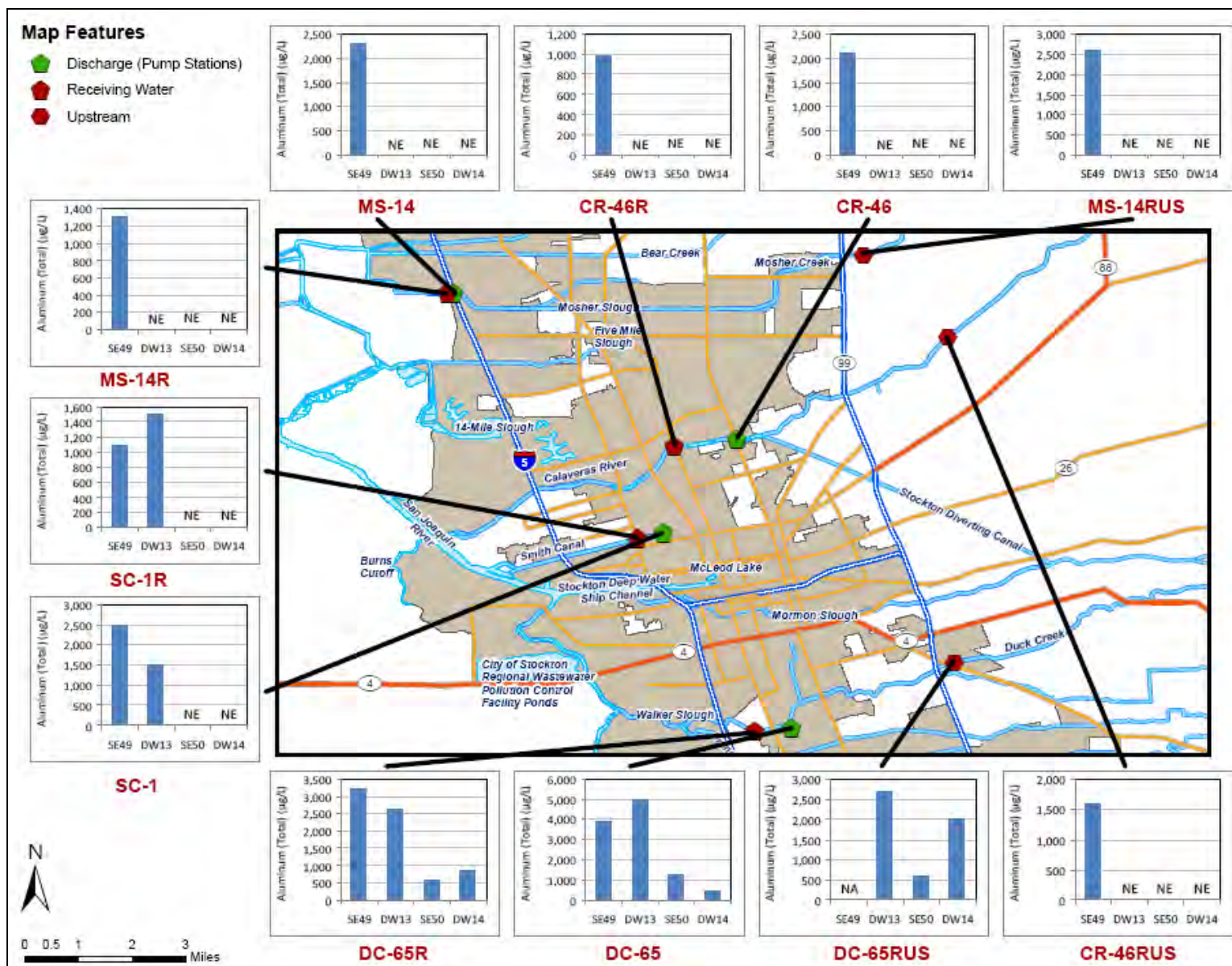


Figure 8-7. Locations of Cause and Contribute Aluminum Exceedances in 2009-2010

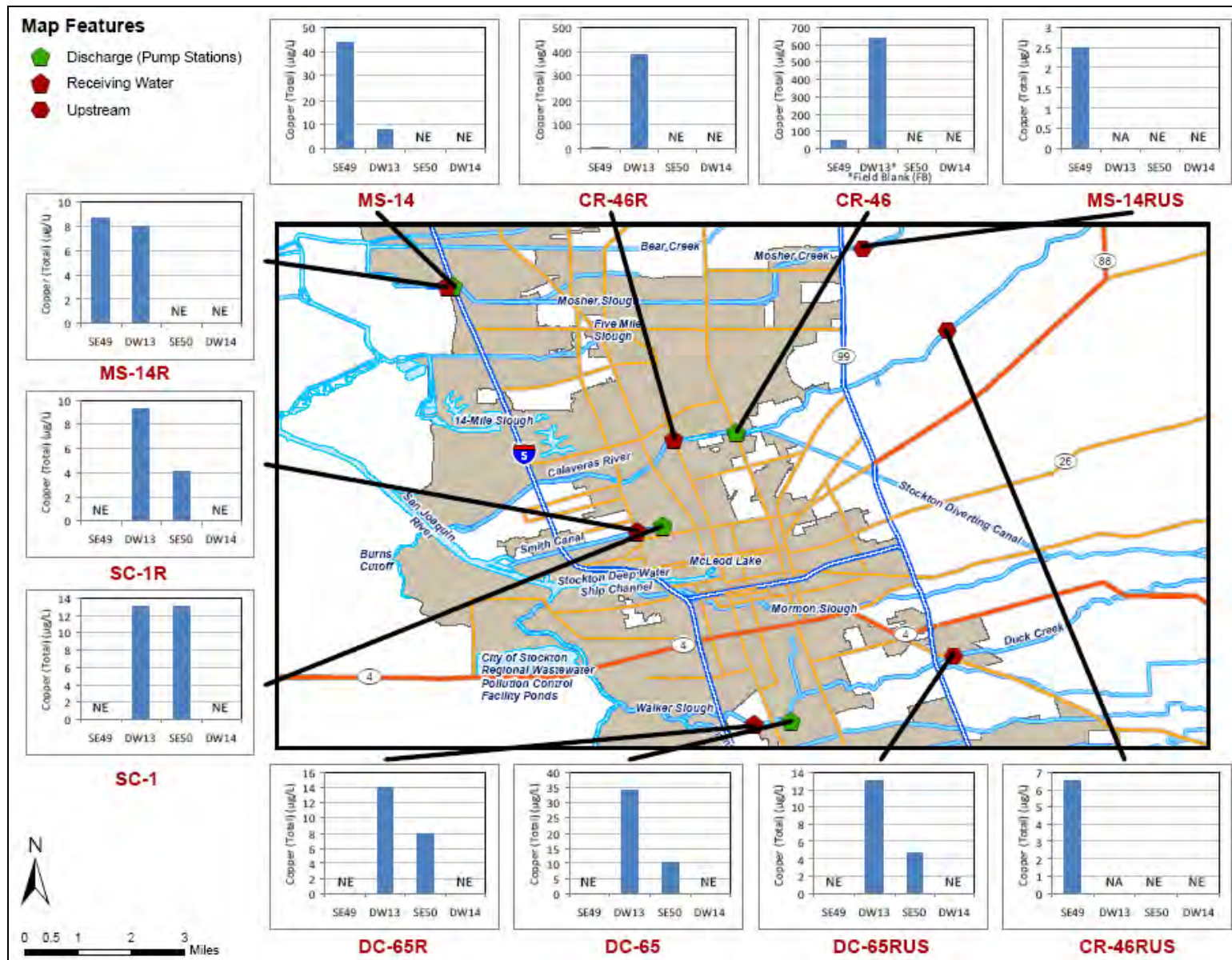


Figure 8-8. Locations of Cause and Contribute Total Copper Exceedances in 2009-2010

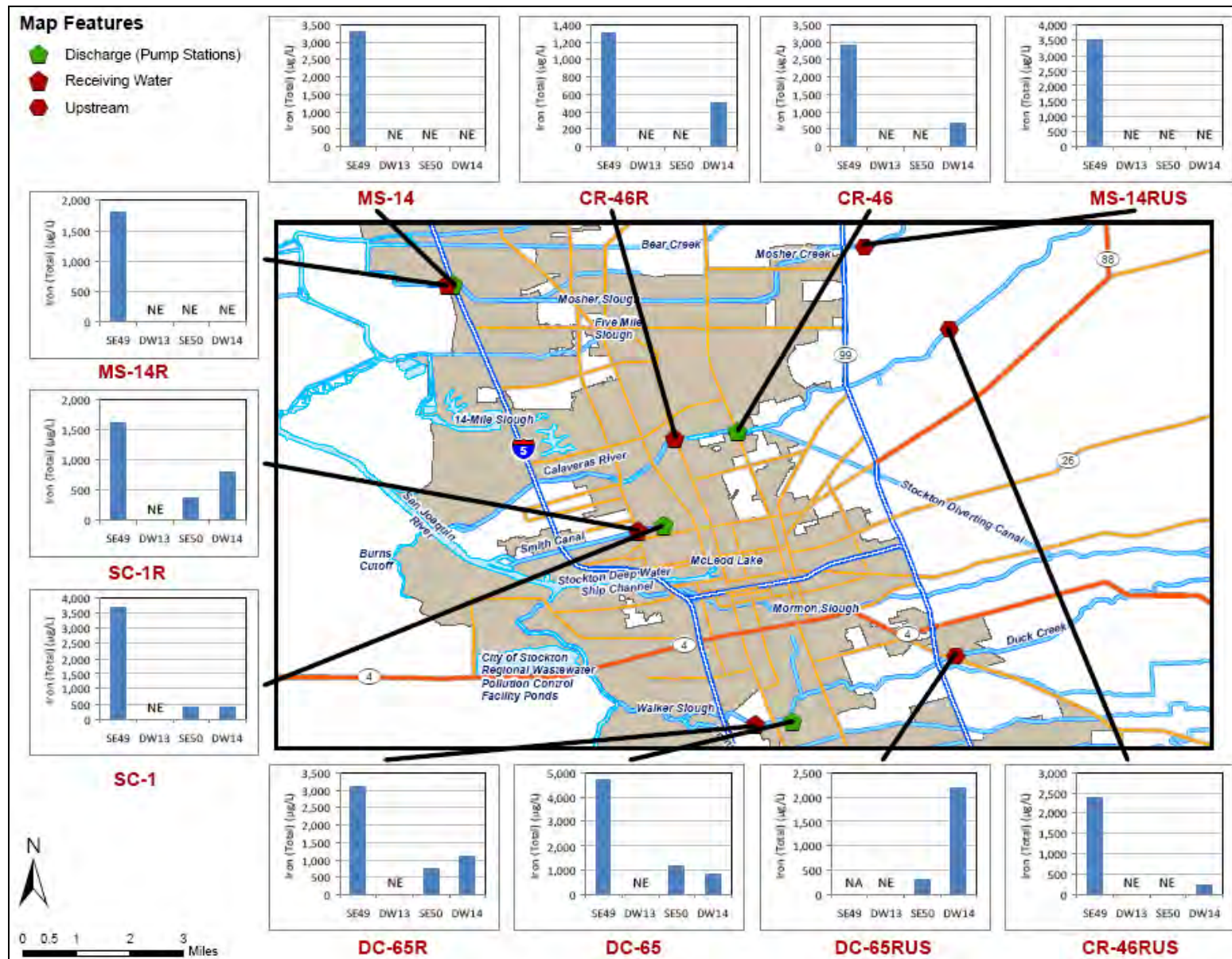


Figure 8-9. Locations of Cause and Contribute Total Iron Exceedances in 2009-2010

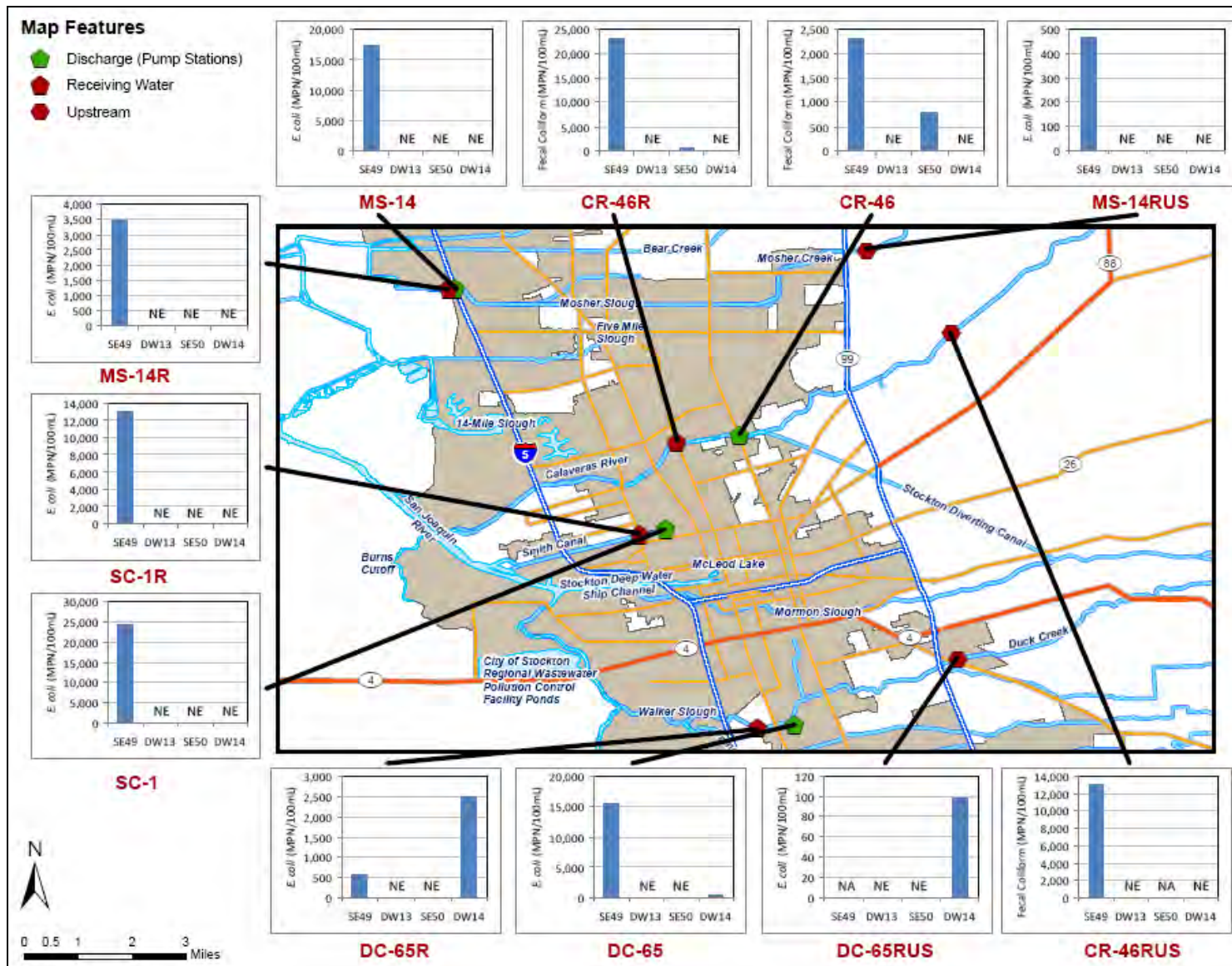


Figure 8-10. Locations of Cause and Contribute *E. coli* Exceedances in 2009-2010

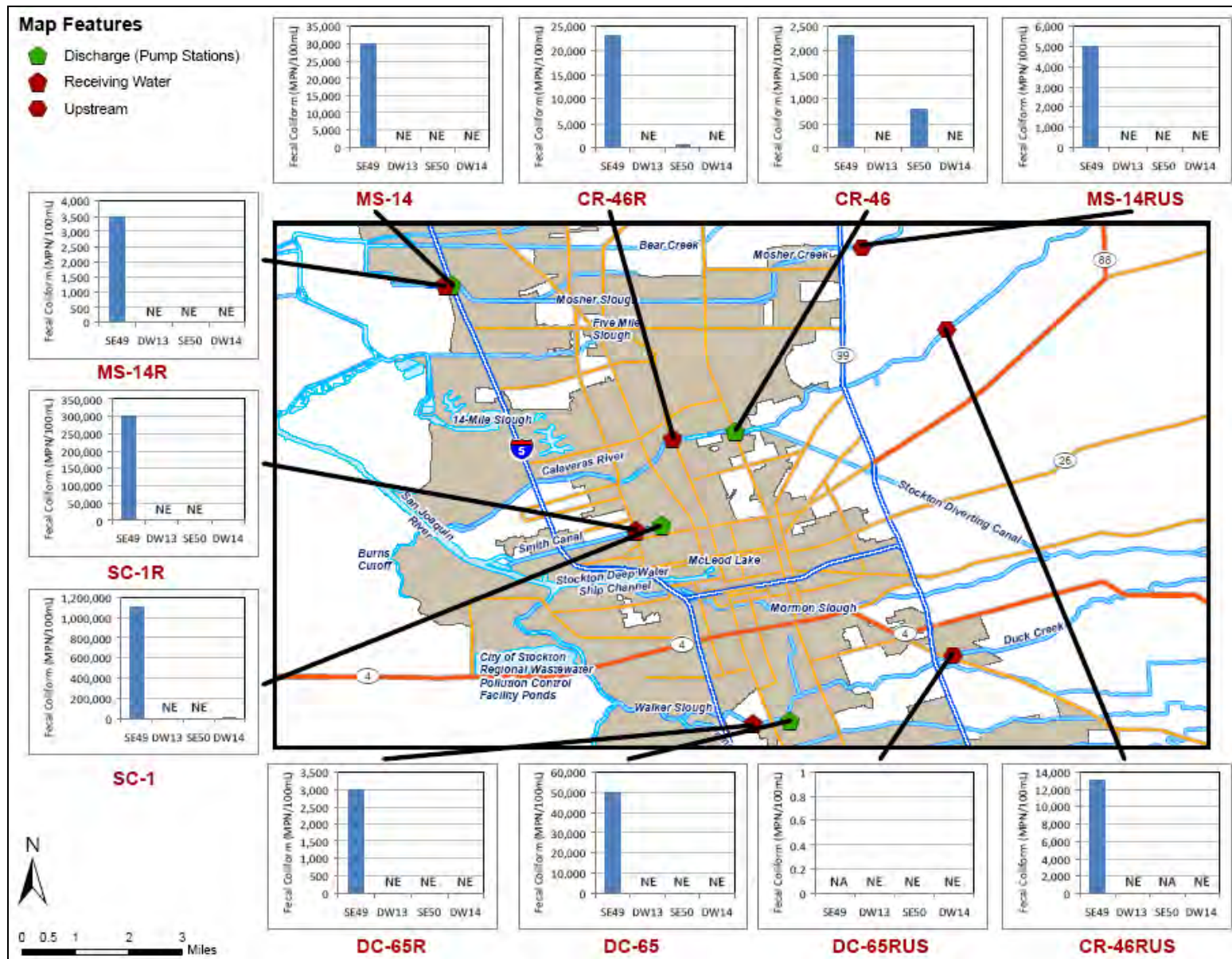


Figure 8-11. Locations of Cause and Contribute Fecal Coliform Exceedances in 2009-2010

8.4.1 Metals

For most metals, two aquatic life based toxicity criteria exist and depend upon the duration of the exposure: acute and chronic. Chronic criteria refer to 4-day average concentrations while acute criteria refer to the highest concentration to which aquatic life can be exposed for a short period (e.g., 24 hours). Consequently, chronic criteria are typically lower than acute criteria. Due to the dynamic hydrology during wet weather events and because the duration of the metals WQO exceedances in the receiving waters is unknown, it is reasonable to use the acute criterion for assessing the impact of wet weather discharges, and the chronic criterion for assessing dry weather inputs.

For aluminum and iron, the WQO is based on Title 22 maximum contaminant levels (MCLs). Title 22 MCLs are classified as primary or secondary, based on whether they protect long-term human health during consumption of water or simply drinking water taste and odor, respectively. For constituents that have both primary and secondary MCLs, the secondary MCL is often significantly lower. It is highly unlikely that any of the concentrations measured during urban discharge and receiving water monitoring represent levels at which long-term human health exposure occurs. As a result, it is unclear whether human health WQOs should be used for stormwater quality assessments. Nonetheless, the more conservative approach of comparing aluminum monitoring results to secondary MCLs was used for both wet and dry weather discharges.

Total and Dissolved Aluminum

Total aluminum concentrations exceeded the secondary MCL on all waterbodies during the first-flush storm event. During SE50 and DW14, exceedances were limited to Duck Creek. During DW13, exceedances occurred in Duck Creek and Smith Canal. Aluminum is one of the most common naturally occurring components of soil.¹³ Consequently, it is not surprising that the first-flush event, which is likely to cause erosion, would often result in aluminum exceedances. Control of naturally occurring aluminum is difficult and there are no specific stormwater program source control programs for aluminum. However, the stormwater program has a number of control measures and BMPs that address erosion. In the 2009 Stormwater Quality Control Criteria Plan (SWQCCP)¹⁴, Low Impact Development policies and objectives are given for new development and redevelopment sites. For example, the SWQCCP specifically discourages development in areas that are susceptible to erosion and encourages minimization of impervious cover. Reductions in impervious cover increase infiltration and decrease the velocity of runoff thereby preventing erosion. In addition, the City also requires BMPs to minimize and/or eliminate the discharge of sediment from construction sites (see **Section 6**). The City requires that all construction sites disturbing one or more acres comply with the State Water Resources Control Board's General Construction Permit.

The stormwater program also has control measures and BMPs that address metals in general. These control measures include street sweeping, catch basin cleaning, industrial and commercial inspections, illicit discharge elimination, household hazardous waste collection, and public education.

Total Iron

Like aluminum, total iron concentrations exceeded the secondary MCL on all waterbodies during the first-flush storm event. No exceedances occurred during DW13. Exceedances occurred on Duck Creek and Smith Canal during SE50 and DW14.

¹³ Hausenbuiller, R. L. *Soil Science: Principles and Practices*. Dubuque, Iowa: WM. C. Brown Company, 1974. Print.

¹⁴ The SWQCCP is available on the City's website at:
<http://www.ci.stockton.ca.us/mud/General/stormwater/SQCCP.cfm>

In all cases where upstream receiving water sites were sampled, upstream concentrations of aluminum and iron exceeded WQOs when there was a potential cause and contribute exceedance. Accordingly, it is highly likely that upstream sediments are also being washed into the SUA and that non-point sources are the cause. Another source of iron may be exposed metal architecture and metals storage, which would be more prevalent in industrial, commercial, and mixed-use areas. The program elements described in the previous section are designed to control erosion and therefore also reduce iron concentrations in stormwater. The stormwater program also has many control measures and BMPs that address metals in general and are described in the following section.

Total Copper

Copper exceedances did not show any clear trend in location or occurrence during wet versus dry weather. Exceedances occurred during one wet weather and one dry weather event on each waterbody. Copper can be introduced through atmospheric deposition, erosion, and water supply. Direct anthropogenic sources of copper include:

- Brake pads
- Tailpipe emissions
- Vehicle washing
- Motor oil
- Corrosion
- Auto repair/body shops
- Radiator repair
- Machine shops
- Metal finishers
- Metal fabricators
- Coil coaters
- Industrial facilities
- Wineries
- Food processors
- Printers
- Laboratories
- Dentists
- Medical service
- Plumbers
- Carpet cleaners
- Dry cleaners
- Pools and spas
- Restaurants
- Food waste
- Human waste
- Household products
- Root control
- Surface cleaners
- Laundry gray water
- Roof runoff
- Illegal dumping

Since copper can collect on streets due to tailpipe emissions, atmospheric deposition, and wear on brake pads, street sweeping is effective in preventing copper from entering storm drains. Catch basin and detention basin maintenance also removes sediments that enter the storm drains from street runoff. Because motor oil contains copper, the Permittees promotion of the used oil collection center, household hazardous waste collection, and curbside collection of used oil target residential automotive sources of copper. In addition, BMPs directed at auto repair/body shops and promoted through the stormwater program address a number of automotive sources of copper.

8.4.2 *E. coli* and Fecal Coliform

During epidemiological studies conducted by the USEPA in the early 1980s, total coliform and fecal coliform were deemed unreliable indicators of human health risks. Instead, *E. coli* and enterococcus were recommended as the preferred indicators for fresh and marine waters, respectively. In response to implementation guidance published by USEPA in 2003, a Basin Plan amendment was adopted by the Regional Water Board in 2003, which recommended that for protection of recreational water uses (REC-1), the single sample maximum objective of 400 MPN/100mL for fecal coliform be replaced with a single sample maximum objective for *E. coli* of 235 MPN/100mL. The amendment has yet to be approved by the State Water Board.

USEPA guidance also recommends the use of geometric mean concentrations, as opposed to single samples, for long-term waterbody assessments. However, the geometric mean is generally calculated with multiple samples collected within a 30-day period. For less frequent sampling, as conducted under the MRP, comparison to single sample WQOs is considered more appropriate. Thus, for the potential cause or contribute analysis herein, measured *E. coli* and fecal coliform concentrations were compared to the single sample maximum WQOs for protection of recreational waters.

The typical sources of indicator bacteria are:

- Soils
- Birds
- Wildlife
- Pet and livestock waste
- Sewage from leaks, spills, and illicit connections
- Trash and food waste
- Homeless encampments
- Diaper cleaning and disposal
- Regrowth of bacteria in soils and sediments

During the first flush storm, concentrations of *E. coli* and fecal coliform exceeded WQOs on all waterbodies. No exceedances occurred during DW13. During SE50, an *E. coli* exceedance occurred on the Calaveras River. During DW14, an *E. coli* exceedance occurred on Duck Creek and a fecal coliform exceedance occurred on Smith Canal. In all cases where upstream receiving water samples were taken, exceedances occurred upstream during potential cause and contribute exceedances suggesting non-point sources as a likely cause. The stormwater program has control strategies in place that directly address indicator bacteria concentrations in urban runoff. The existing programs include street sweeping, storm drain system cleaning and stenciling, illicit discharges inspection and elimination, and pet waste disposal stations at parks. In addition, the City has developed pet waste outreach including information in *Stockton Water News*, the City's utility billing insert, and a brochure which the City plans to send to registered pet owners. During 2010, the City installed 44 signs in parks encouraging proper pet waste disposal. (See **Section 3.5**).

Most notably, the stormwater program is currently implementing the Pathogen Plan; a comprehensive monitoring and analysis program that will focus on six different SUA watersheds through the 2012/13 monitoring year. A primary goal of the Pathogen Plan is to identify bacteria sources and to expand or modify the stormwater program to address those sources that are controllable. Characterization monitoring has been completed on both Smith Canal and Mosher Slough. Source identification monitoring has been completed on Smith Canal and is currently underway on Mosher Slough. The next phase of the program will be implemented on the Calaveras River later in the permit term.

Source identification monitoring in Smith Canal and Mormon Slough using *Bacteroidales* genetic markers to identify the source of fecal bacteria has indicated that other pathogen sources are agriculture (horse and/or cow), humans, and dogs. Agricultural sources may be largely upstream and outside of the City's jurisdiction. Human sources may be from homeless encampments or from improper disposal of wastes from houseboats. The Permittees are currently working on how best to address these more challenging sources. (See **Section 9** for a detailed discussion of the Pathogen Plan.)

Section 9

Water Quality Based Programs

9.1 OVERVIEW

The purpose of the Water Quality Based Programs is to address specific pollutants that have been identified as impacting or potentially impacting local receiving water quality in the SUA. Special studies addressing these pollutants are designed to characterize their fate and transport and to assist with source identification and selection of control measures. The individual pollutant-based plans are summarized in **Table 9-1**. Over the course of the reporting year, the following pollutant-specific plans were implemented:

- Pesticide Plan (continued from the 2002-2007 Permit)
- Pathogen Plan (continued from the 2002-2007 Permit)
- Mercury Plan (developed from the 2007-2012 Permit)
- Low Dissolved Oxygen Plan (continued from the 2002-2007 Permit)

A progress summary for each of the plans is provided below along with a summary of the findings from the monitoring that was completed and the activities implemented through June 30, 2010.

Table 9-1. 2009-2010 Efforts Completed for Water Quality Based Programs

Pollutant Specific Plan	Status
Pesticide Plan (Section 9.2)	<ul style="list-style-type: none"> • Provided public education/outreach to promote safe pesticide handling and uses of safer pesticide alternatives • Promoted integrated pest management (IPM) in municipal and public pest management practices • Conducted a survey to assess pesticide use and availability to the public • Monitored 2 storm events and once during the dry season, for chlorpyrifos, diazinon, and pyrethroids
Pathogen Plan (Section 9.3)	<ul style="list-style-type: none"> • Continued to implement three-phased approach to mitigate high indicator bacteria levels in six SUA waterbodies • Continued Phase I BMP Implementation • Continued Phase II Characterization Monitoring
Mercury Plan (Section 9.4)	<ul style="list-style-type: none"> • Promoted proper handling and disposal of mercury-containing products through public education/outreach • Completed municipal mercury survey to assess mercury use in municipal operations • Continued BMPs to minimize erosion, and transport of sediment-associated mercury • Monitored total mercury and methylmercury during 3 storm events and 2 dry weather sampling events
Low Dissolved Oxygen Plan (Section 9.5)	<ul style="list-style-type: none"> • Collected monthly grab samples for oxygen-demanding substances and nutrient analyses • Installed <i>in-situ</i> recorders at the following locations: Mormon Slough (downstream), Five-Mile Slough (downstream), and the Calaveras River (upstream and downstream). Identified a location for future installation of an upstream <i>in-situ</i> recorder on Mosher Slough • Performed continuous analysis of water quality parameters using <i>in-situ</i> recorders

9.2 PESTICIDE PLAN PROGRESS REPORT

The Permittees previously identified organophosphate pesticides (and in particular diazinon and chlorpyrifos) as problematic pollutants that impact local waterbodies. In order to address the organophosphate (OP) pesticide impairment of urban streams, and as specified in Provision D.18.a.v. of the second term NPDES Permit, the Permittees developed a Pesticide Plan that addressed the use of diazinon and chlorpyrifos by the City/County and others. The Pesticide Plan was provided to the public, interested parties, and the Regional Water Board for review. After the comments submitted to the Pesticide Plan were addressed, it was finalized with an addendum letter to Regional Water Board on September 22, 2004.

According to requirements in the second term permit, the following elements were incorporated into the Pesticide Plan:

- Public education and outreach programs
- Coordination with Household Hazardous Waste collection agencies
- Assessment of the relative contribution of urban stormwater runoff to diazinon and chlorpyrifos levels in waterbodies of concern within the City's jurisdiction
- A diazinon and chlorpyrifos mitigation program should City stormwater be a significant contributor

The City has implemented the Pesticide Plan since 2004. The results of the pesticide monitoring were summarized in detail in the 2005-2006 Annual Report and 2007 ROWD. Results suggested that diazinon and chlorpyrifos were no longer stormwater POCs in the SUA.

In December 2007, the Permittees received their third term municipal stormwater permit (Order No. R5-2007-0173), which included a requirement for the continued implementation of the Pesticide Plan (specified in Provision D.28.a). The focus of the plan is public outreach and integrated pest management (IPM), to protect water quality and promote safe, and minimal, pesticide use. The Permit also requires the Permittees to continue to monitor diazinon, chlorpyrifos and pyrethroids. An updated pesticide plan was submitted to the Regional Water Board on June 1, 2008 with the 2008 SWMP. The updated plan was subsequently revised and submitted to the Regional Water Board on April 15, 2009 with the 2009 SWMP.

The Pesticide Plan will continue to focus on public outreach and the promotion of IPM that was implemented during the 2004-2007 Plan and will extend its monitoring efforts to validate that organophosphate (OP) pesticides are no longer POCs. The Pesticide Plan includes the following components:

- Public education and outreach;
- Municipal operations;
- Effectiveness assessment; and
- Water quality monitoring.

The Pesticide Plan Approach is summarized in **Figure 9-1**. The Pesticide Plan components implemented during the 2009-2010 reporting year are summarized in sections 9.2.1-9.2.5.

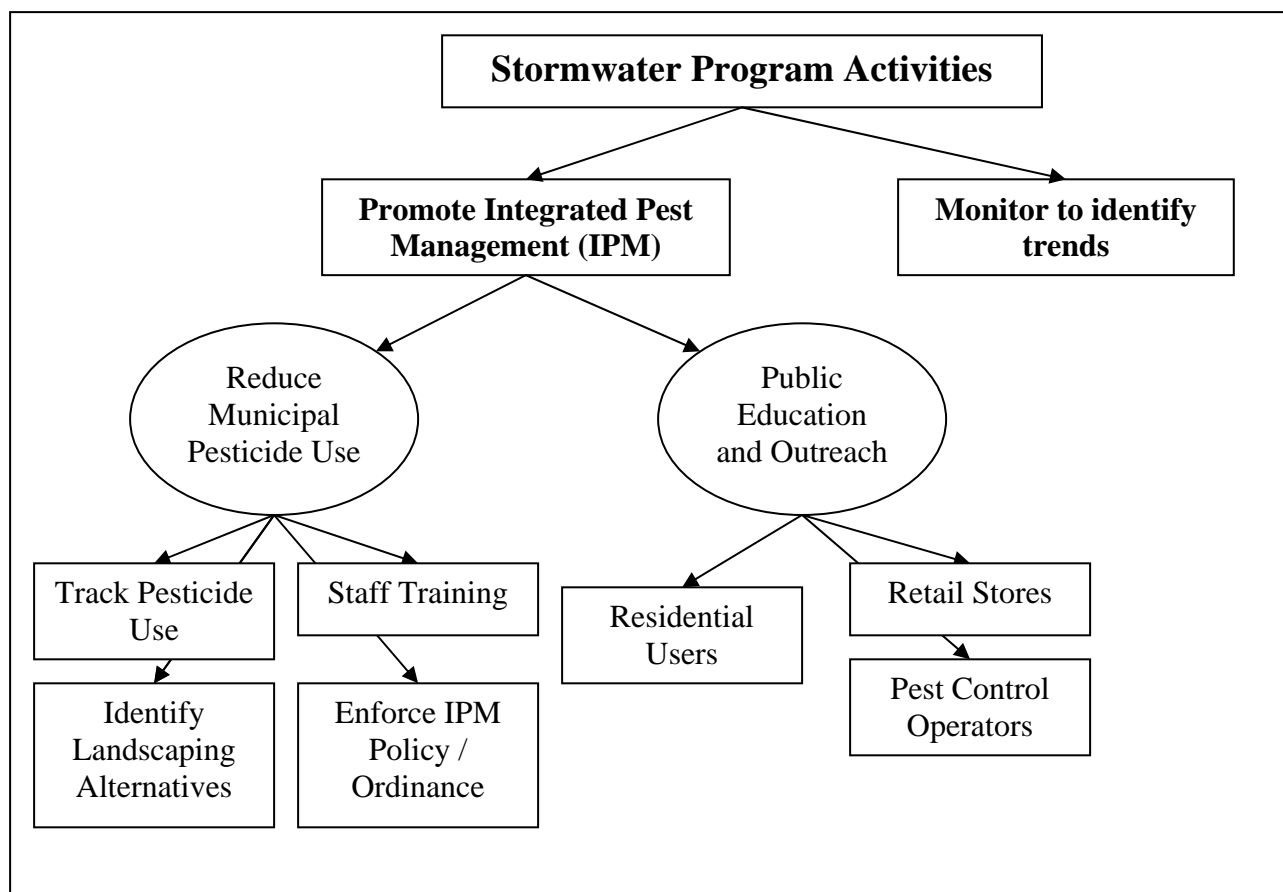


Figure 9-1. The Pesticide Plan Approach

9.2.1 Public Education and Outreach

The Pesticide Plan relies heavily on education and outreach efforts that promote less toxic pest control methods and use of IPM. As outlined in Section 3.0, education and outreach efforts have focused on public outreach to residential users via outreach materials distributed at local hardware stores, public events, and the web site. Public education and outreach includes the following components:

- “Our Water Our World” program outreach,
- Annual public outreach messages,
- Pest control workshops,
- Survey of pesticides available to the public, and
- Coordination with Household Hazardous Waste collection.

9.2.1.1 “Our Water Our World” Program Outreach

The City participates in the University of California (UC) Statewide Integrated Pest Management Program with Orchard Supply Hardware (OSH) to encourage the use of less toxic products and proper disposal of pesticides. Known as the “Our Water Our World” (OWOW) program, the program is now supported in all 82 California OSH stores (including OSH at 1015 West Hammer Lane, Stockton). The OWOW program provides over 20 different fact sheets on less-toxic pest management strategies to retail outlets that sell pesticides; holds community outreach events in stores to promote less toxic methods and products; and

trains store personnel in IPM principles. The City's focus is specifically at the sole Stockton store. The OWOW program is also part of the outreach efforts at community events.

In 2009-2010, the City distributed 700 OWOW IPM Fact Sheets (available in English and Spanish) to the general public. The OWOW program has expanded to some Home Depot stores, including the one in the Stockton area (3818 East Hammer Lane, Stockton). During 2010-2011 the City will distribute information to the public through the newly established relationship between OWOW and Home Depot as well as through the OSH store.

In 2009-2010 the program also promoted IPM with the use of an electronic kiosk. The kiosk is located in City Hall and provides residents with information on IPM, proper use and disposal of pesticides, pest identification, runoff, and water conservation. The kiosk also holds literature racks with additional fact sheets from the OWOW Program. During the reporting period, the IPM Kiosk located in City Hall was stocked with IPM brochures. Approximately 700 informational OWOW IPM brochures were provided and taken by the public.

9.2.1.2 Annual Public Outreach Messages

Through mailings, participation at public events, and bill inserts, the City delivered various types of educational materials to promote IPM practices. The materials that were distributed are summarized in more detail in Section 3 of the Annual Report.

Annual public outreach messages currently include newspaper articles and public service announcements prior to the growing season that educate the public about IPM and proper use and disposal of pesticides. Focused Spring Gardening IPM messaging ran on local area Citadel radio stations, Entrevision Spanish radio stations, and Spanish cable television stations, Telemundo and Univision, during the months of April, May, and June 2010. During these same months, Stockton's two local movie theaters ran an ad, and a bilingual (Spanish-English) print ad ran in the April 2010 edition of the Latino Times.

9.2.1.3 Pest Control Workshops

Workshops targeting the public have not yet been implemented, but will begin during the 2010-2011 reporting year. The Permittees will hold annual public workshops in the summer in order to promote safer pest control. These workshops will follow a similar format to the Our Water Our World program classes, but will be more widely advertised and will target the general public. Municipal staff and/or consultants will provide training on safer pesticide use, less-toxic pesticide alternatives, and the use of native plants to minimize the need for pesticides and reduce water use.

9.2.1.4 Survey of Pesticides Available to the Public

The Permittees are required to conduct a survey of the regional sales of residential and commercial pesticides that are available for the public on a bi-annual basis (i.e. once every two years). This survey will allow the Permittees to identify potential pesticide use and impacts before they occur. The survey was developed during 2008-2009¹, and the first survey was completed during the 2009-2010 reporting year.

The Permittees designed a three-tiered approach to address this requirement. The three components of the pesticide survey are as follows:

- Residential pesticide sales, assessed through shelf surveys of local retailers (completed November 2009);

¹ The survey design and protocols were submitted with the 2009 Annual Work Plan, and were included as Appendix I-1 in the 2008-2009 Annual Report

- Residential pesticide use, assessed by pesticide-specific questions in a telephone Public Opinion Survey (completed December 2009); and
- Commercial pesticide use, assessed through collaboration with the County Agriculture Commissioner's office and Department of Pesticide Regulation (DPR). These records were obtained for 2008.

The approach and results of each of the three survey components are summarized in the 2009 Pesticide Survey Assessment, included as **Appendix I-1**. The major conclusions from the pesticide survey are shown below in **Table 9-2**. The next survey will be completed by December 1, 2011.

Table 9-2. Summary of Main Conclusions from the 2009 Pesticide Survey

Survey Component	Main Conclusions
Shelf Survey	<ul style="list-style-type: none"> • Consumers are faced with a wide variety of options for pest and weed control and may not understand the differences between them. • Pyrethroids are the most prevalent type of pesticide available for home use. • Organophosphate pesticides are no longer widely available. • Less-toxic pesticides represent a significant portion of available products.
Residential Use Telephone Survey	<ul style="list-style-type: none"> • The majority of residents uses pesticides regularly, and stores multiple pest control products in their home. • Residents' awareness of proper disposal methods for pesticides has increased, as a significantly higher percentage reported using household hazardous waste collection events in 2009 compared to previous years. • Residents tend to store pest control products for greater than a year, and often don't remember when products were purchased.
Commercial Use Assessment	<ul style="list-style-type: none"> • Pyrethroids are among the most widely used commercial pesticides. • OP pesticides are applied commercially in San Joaquin County.

9.2.1.5 Coordination with Household Hazardous Waste Collection

The City promotes the County's Household Hazardous Waste Program on its Web site, through the distribution of Household Hazardous Waste Facility brochures, and in the City's utility bill newsletter. During 2009-2010, the Household Hazardous Waste Program, a joint effort of the City and County, collected pesticide liquids and solids, as described in Section 3 of the Annual Report.

9.2.2 Municipal Operations

The Permittees' efforts to track annual pesticide use and utilize IPM are described below. The Permittees' current and future municipal operations activities include the following:

- Review of pesticide application protocols,
- Implementation of IPM protocols, and

- Training for municipal employees.

9.2.2.1 Review of Pesticide Application Protocols and Landscaping Standards

During 2009-2010, the Permittees reviewed and modified their IPM protocols, including pesticide, herbicide, and fertilizer application protocols at park sites, landscaped medians, and golf courses. The City is working to formalize IPM protocols in an administrative directive. The City Manager administrative directive P&R-03 establishes standard procedures for the administration and use of pesticides, herbicides and fertilizers on City rights-of-way and other City-owned facilities. During 2009-2010, a draft update to P&R-03 was prepared to specify that each department using regulated pesticides, herbicides and/or fertilizers will insure that employees and/or contractors will utilize IPM and alternatives to pesticides whenever applicable. A supplementary IPM Guide refers to IPM policies in greater detail. Contract language was developed to specify that contracted pesticide applicators will utilize IPM. The draft administrative directive and IPM Guide is included as **Appendix I-2**. In 2010-2011, these protocols along with the IPM protocols will be utilized by City staff as well as contractors hired by the City.

9.2.2.2 Implementation of IPM Protocols

The IPM approach focuses on the long-term prevention and elimination of pests through a combination of approaches. The number of City owned acres utilizing IPM during previous reporting years are summarized in **Table 9-3**. The City no longer has a dedicated Parks and Recreation Department. The City's Public Works Department is now responsible for a limited amount of maintenance of City acreage. Park maintenance, including medians and landscape buffers, is contracted out. Maintenance contracts that started on January 1, 2010, and all future contracts/contract specifications, will require that the contractor use IPM techniques and practices and least toxic methods of pest control to achieve the expected/specified results. Information on IPM usage was not available from contractors during 2009-2010, but the City will reevaluate how it collects information from outside contractors during 2010-2011.

Table 9-3. City Acres Utilizing IPM

Year	Number of Acres Utilizing IPM		
	City Parks	City Golf Courses	Total City Acres
2004-2005	573	390	963
2005-2006	614	390	1,004
2006-2007	619	340	959
2007-2008	623.4	340	963.4
2008-2009		N/A	
2009-2010		N/A ¹	

Note:

1. This information was not available from the contractors for 2009-2010. In 2010-2011, the City will reevaluate how it requests and collects information from outside contractors on the maintenance done for City-owned parks and landscape medians and golf courses.

During 2009-2010, the City implemented protocols for routine and non-routine use of pesticides and fertilizers. In general, the City follows these procedures:

- Chemicals are stored in a central facility, meeting OSHA, HAZMAT, and County Agricultural Commissioner's requirements by providing secure storage and spill control.
- Landscaping is performed to maintain a healthy landscape, and a regular fertilizer program ensures healthy turf.
- Pesticides are used as a last resort, conforming to a sound integrated pest management program.
- To maximize the benefit of applications, all chemicals are applied at the minimum dose while avoiding runoff and wind drift.
- Native plants and trees are used whenever possible to reduce water needs while promoting resistance to disease and pests.

The City continues to implement the Landscaping Standards (Stockton Municipal Code Sections 16.56.040 and 16.72.240), which contain language that addresses water conservation and reduction of herbicide and pesticide use by means of appropriate plant selection and usage. Pesticide use by the Department of Public Works is reported in Section 4 of the Annual Report. To evaluate its municipal pesticide use over time, the City will maintain and expand its internal inventory on pesticide use and continue to track pesticide use by the Department of Public Works.

9.2.2.3 Training for Municipal Employees

Due to recent restructuring within the City departments, municipal employees are no longer directly responsible for pesticide application. The City's Public Works Department is responsible for a limited amount of maintenance of City acreage, but park maintenance, including medians and landscape buffers, is contracted out. Because pesticide application is now primarily performed by outside contractors, training for municipal employees on proper pesticide application protocols is no longer necessary. Contract language for outside contractors performing pest management and landscape maintenance promotes the use of IPM.

9.2.3 Effectiveness Assessment

Municipal pesticide use and acreage operated under IPM are tracked yearly to assess the effectiveness of the municipal component of the Pesticide Plan. In general, the types of data that are collected to assess the effectiveness of the Pesticide Plan include the following:

- Number of retail stores supporting OWOW or similar programs,
- Distribution of outreach messages, including numbers of brochures, television commercials, and newspaper articles, with an estimation of the number of people who were reached,
- Number of public workshops, with comments collected from attendees, and
- Number of pest control operators and municipal employees who participated in training workshops.

Data for these components is reported in Section 4. To date, there is not sufficient data collected to perform this assessment. Future Annual Reports will continue to assess the effectiveness of the Pesticide Plan.

9.2.4 Water Quality Monitoring

The Permittees submitted a Pesticide Plan Update in April 2009 with the 2009 SWMP, which included revised monitoring efforts to reflect requirements in the third term permit. Monitoring began in July 2008 and continued through the 2009-2010 monitoring year.

Consistent with the 2004 Pesticide Plan, monitoring was conducted in the Calaveras River (CR-2R), Mosher Slough (MS-14, MS-14R), Five-Mile Slough (5M-R), and Smith Canal (SC-5R). Monitoring is no longer required for Mormon Slough. The monitoring locations are shown in **Figure 9-2**. Monitoring was conducted for chlorpyrifos, diazinon and pyrethroids in urban runoff/discharges and within waterbodies during the following time periods:

- 1 Storm event during the dormant spray season: December – March
- 1 Storm event following the dormant spray season: March – June
- Once during the dry Season: June – October

The schedule of monitoring events completed during 2008-2010 is summarized in **Table 9-4**. The monitoring requirements allow the Permittees to discontinue monitoring if the Regional Water Board is satisfied that water quality objectives are met (see Section 9.2.5).

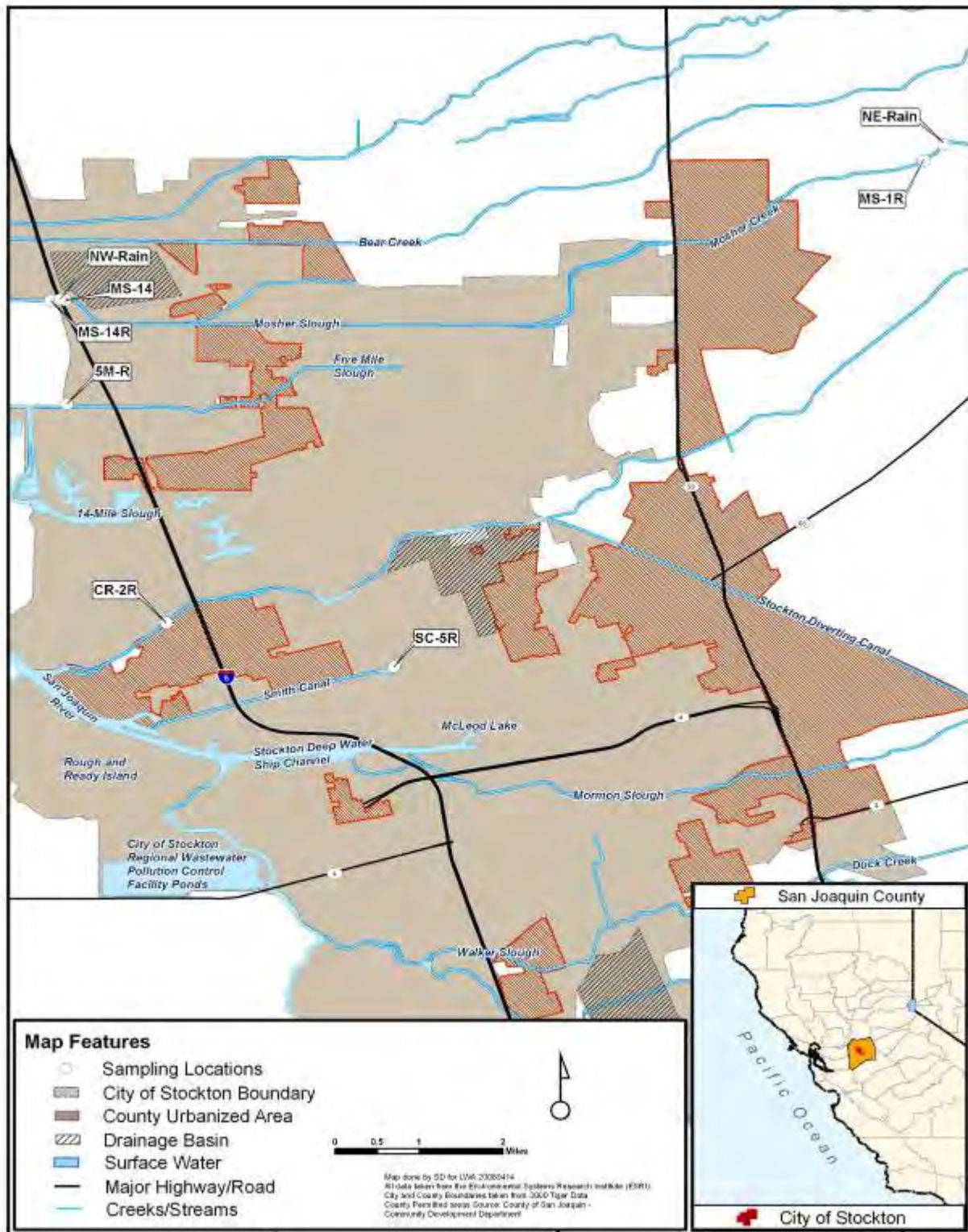


Figure 9-2. Pesticide Plan Monitoring Locations for 2007-2012

MS=Mosher Slough, 5M=Five-Mile Slough, CR=Calaveras River, SC=Smith Canal; R=Receiving Water

Table 9-4. Timing and Frequency of Pesticide Plan Monitoring Events

Waterbody	Site Type and Name	2008-2009 Monitoring Season			2009-2010 Monitoring Season		
		Dry Season (7/7/08)	Dormant Spray Season Storm (12/21/09)	Post Dormant Spray Season Storm (4/7/09)	Dormant Spray Season Storm (1/17/10)	Post Dormant Spray Season Storm (3/12/10)	Dry Season (6/8/10)
Mosher Slough – urban discharge	Pump Station: MS-14	√	√	√	√	√	√
Mosher Slough – upstream	Receiving Water: MS-1R/MS-14RUS	√	√	√	√	√	√
Mosher Slough – downstream	Receiving Water: MS-14	√	√	√	√	√	√
Five Mile Slough	Receiving Water: 5M-1R	√	√	√	√	√	√
Calaveras River	Receiving Water: CR-2R	√	√	√	√	√	√
Smith Canal	Receiving Water: SC-5R	√	√	√	√	√	√
Rainwater Within City Limits	Rainwater collection site: NW Rain	---	√	√	√	√	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	---	√	√	√	√	---

9.2.4.1 Pesticide Plan Monitoring Results

During 2008-2010 a total of 44 samples were collected and analyzed for diazinon, chlorpyrifos, and pyrethroids, as shown in **Tables 9-6, 9-7, and 9-8**, respectively. Complete 2009-2010 monitoring data are included in **Appendix I-3**. In cases of non-detection, results are reported as “less than” the reporting limit. All samples were analyzed by CRG Marine Laboratories of Torrance, CA, with method detection limits (MDL) of 0.001 µg/L for chlorpyrifos and 0.002 µg/L for diazinon, and reporting limits of twice the MDL.

The frequency of detection and the rate of WQO exceedances are shown in **Table 9-5**. The WQOs for diazinon and chlorpyrifos were the California Department of Fish and Game (CDFG) revised criteria of 0.16 µg/L and 0.025 µg/L (acute), and 0.10 µg/L and 0.015 µg/L (chronic) respectively, which are also the targets for the SSJD Diazinon and Chlorpyrifos Total Maximum Daily Load (TMDL). There are currently no WQOs for pyrethroids.

The WQOs for diazinon and chlorpyrifos were regularly achieved in the monitored waterbodies. This was especially the case for diazinon, which was detected in 59% of samples but only exceeded the WQO in 2% of samples. The one WQO exceedance for diazinon occurred in rainwater collected outside of the SUA. Chlorpyrifos was detected in fewer samples (25%), but exceeded the WQO in most samples where it was detected.

Table 9-5. Frequency of Detections and WQO Exceedances during the Pesticide Plan

Pesticide	Number of Samples	Number of Detections	Detection Rate	Number of Samples above the WQO ^a	WQO Exceedance Rate
Diazinon	44	26	59%	1 ^b	2.2%
Chlorpyrifos	44	11	25%	9	20%
Pyrethroids	44	17 ^c	38%	NA ^d	NA

Notes:

a = WQOs for diazinon and chlorpyrifos are 0.16 µg/L (acute)/0.10 µg/L(chronic) and 0.025 µg/L (acute)/ 0.015 µg/L (chronic), respectively.

b = The WQO exceedance occurred in rainwater that was collected outside of the Stockton Urbanized Area.

c = Number of samples where one or more pyrethroids were detected

d = There are no applicable water quality objectives for pyrethroids.

Table 9-6. Diazinon Concentrations Observed during Pesticide Plan Monitoring (µg/L)

Waterbody	Site Type and Name	2008-2009 Monitoring Season			2009-2010 Monitoring Season		
		Dry Season (7/7/08)	Dormant Spray Season Storm (12/21/08)	Post Dormant Spray Season Storm (4/7/09)	Dormant Spray Season Storm (1/17/10)	Post Dormant Spray Season Storm (3/12/10)	Dry Season (6/8/10)
Mosher Slough – urban discharge	Pump Station: MS-14D	0.065	0.0852	< 0.004	0.0339	0.0257	< 0.004
Mosher Slough – upstream	Receiving Water: MS-14RU	0.0445	0.0263	< 0.004	0.0389	0.0354	0.0036
Mosher Slough – downstream	Receiving Water: MS-14R	0.0906	0.0319	< 0.004	< 0.004	0.0232	0.0022
Five Mile Slough	Receiving Water: 5M-3R	< 0.004	< 0.004	< 0.004	< 0.004	0.0266	< 0.004
Calaveras River	Receiving Water: CR-2R	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.0074
Smith Canal	Receiving Water: SC-5R	< 0.004	0.0113	< 0.004	0.0435	0.0187	< 0.004
Rainwater Within City Limits	Rainwater collection site: NW Rain	---	0.0239	0.0125	0.0456	0.0312	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	---	0.2067	0.0099	0.0254	0.0312	---

Notes:

--- = No sample collected on this date

RED = Concentration above the acute WQO of 0.160 µg/L

Table 9-7. Chlorpyrifos Concentrations Observed during Pesticide Plan Monitoring (µg/L)

Waterbody	Site Type and Name	2008-2009 Monitoring Season			2009-2010 Monitoring Season		
		Dry Season (7/7/08)	Dormant Spray Season Storm (12/21/08)	Post Dormant Spray Season Storm (4/7/09)	Dormant Spray Season Storm (1/17/10)	Post Dormant Spray Season Storm (3/12/10)	Dry Season (6/8/10)
Mosher Slough – urban discharge	Pump Station: MS-14D	< 0.002	< 0.002	< 0.002	0.0455	0.0654	0.0056
Mosher Slough – upstream	Receiving Water: MS-14RU	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0314
Mosher Slough – downstream	Receiving Water: MS-14R	< 0.002	< 0.002	0.0077	< 0.002	0.0173	< 0.002
Five Mile Slough	Receiving Water: 5M-3R	< 0.002	< 0.002	< 0.002	< 0.002	0.0463	< 0.002
Calaveras River	Receiving Water: CR-2R	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Smith Canal	Receiving Water: SC-5R	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Rainwater Within City Limits	Rainwater collection site: NW Rain	---	< 0.002	0.0221	0.0668	0.1199	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	---	< 0.002	< 0.002	< 0.002	0.0381	---

Notes:

--- = No sample collected on this date

RED = Concentration above the acute WQO of 0.025 µg/L

BLUE = Concentration above the chronic WQO of 0.015 µg/L but below the acute WQO

Table 9-8. Pyrethroid Concentrations Observed during Pesticide Plan Monitoring (µg/L)

Waterbody	Site Type and Name	2008-2009 Monitoring Season			2009-2010 Monitoring Season		
		Dry Season (7/7/08)	Dormant Spray Season Storm (12/21/08)	Post Dormant Spray Season Storm (4/7/09)	Dormant Spray Season Storm (1/17/10)	Post Dormant Spray Season Storm (3/12/10)	Dry Season (6/8/10)
Mosher Slough – urban discharge	Pump Station: MS-14D	Bifenthrin, 0.05 Cyfluthrin, 0.0109 Cypermethrin, 0.0062 Esfenvalerate, 0.0017* Fenvalerate, 0.0012* Fluvalinate, 0.0026 L-Cyhalothrin, 0.0023	Bifenthrin, 0.2403 Cyfluthrin, 0.0496 L-Cyhalothrin, 0.0081 Permethrin, 0.2615	Bifenthrin, 1.0854 Cyfluthrin, 0.207 Cypermethrin, 0.1388 Esfenvalerate, 0.0049 Fenvalerate, 0.0048 L-Cyhalothrin, 0.1272 Permethrin, 1.1013	Bifenthrin, 0.0854 Cyfluthrin, 0.0077 Danitol, 0.0008* Fenvalerate, 0.0048 L-Cyhalothrin, 0.0389 Permethrin, 0.1531	Bifenthrin, 0.0953 Cyfluthrin, 0.0274 Esfenvalerate, 0.0149 Fenvalerate, 0.0024 L-Cyhalothrin, 0.0940 Permethrin, 0.775	ND
Mosher Slough – upstream	Receiving Water: MS-14RU	ND	Bifenthrin, 0.0099	Bifenthrin, 0.0141 Cyfluthrin, 0.0037 L-Cyhalothrin, 0.001*	Bifenthrin, 0.0350 Danitol, 0.0019* L-Cyhalothrin, 0.0041	Esfenvalerate, 0.0077 Fenvalerate, 0.0009* L-Cyhalothrin, 0.0205	ND
Mosher Slough – downstream	Receiving Water: MS-14R	ND	ND	Bifenthrin, 0.0033 Cyfluthrin, 0.0025 Permethrin, 0.0095*	Bifenthrin, 0.0249	ND	ND
Five Mile Slough	Receiving Water: 5M-3R	ND	Cypermethrin, 0.0025	ND	ND	ND	ND
Calaveras River	Receiving Water: CR-2R	ND	Cyfluthrin, 0.0013*	ND	ND	ND	ND
Smith Canal	Receiving Water: SC-5R	ND	ND	Bifenthrin, 0.0036 Cyfluthrin, 0.0035	Bifenthrin, 0.314 Cyfluthrin, 0.190 Cypermethrin, 0.0495 Danitol, 0.0122	ND	ND

Waterbody	Site Type and Name	2008-2009 Monitoring Season			2009-2010 Monitoring Season		
		Dry Season (7/7/08)	Dormant Spray Season Storm (12/21/08)	Post Dormant Spray Season Storm (4/7/09)	Dormant Spray Season Storm (1/17/10)	Post Dormant Spray Season Storm (3/12/10)	Dry Season (6/8/10)
					Esfenvalerate, 0.0105 Fenvalerate, 0.0084 L-Cyhalothrin, 0.0836 Permethrin, 0.296		
Rainwater Within City Limits	Rainwater collection site: NW Rain	---	ND	ND	ND	Esfenvalerate, 0.0005* L-Cyhalothrin, 0.0019*	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	---	ND	ND	ND	L-Cyhalothrin, 0.002*	---

Notes:

--- = No sample collected on this date

* = Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated

ND = Sample was non-detect for pyrethroids, with the following reporting limits (µg/L):

Pyrethroid	RL	Pyrethroid	RL
Allentrin	0.002	Fenvalerate	0.002
Bifenthrin	0.002	Fluvalinate	0.002
Cyfluthrin	0.002	L-Cyhalothrin	0.002
Cypermethrin	0.002	Permethrin	0.0025
Danitol	0.002	Prallethrin	0.002
Deltamethrin	0.002	Resmethrin	0.0025
Esfenvalerate	0.002		

Spatial and Temporal Trends Observed during Pesticide Plan Monitoring

To display the chlorpyrifos, diazinon, and pyrethroid data collected during the Pesticide Plan, and elucidate spatial and temporal variations in pesticide concentrations, a geographic information systems (GIS) tool was utilized, as shown in **Figures 9-3, 9-4, and 9-5**. A few general trends were observed, as discussed in the sections below.

Chlorpyrifos

Spatial and temporal trends observed for chlorpyrifos during 2008-2010 Pesticide Plan monitoring are shown in **Figure 9-3**. During 2008-2009, chlorpyrifos was detected very infrequently, with only one detection in Stockton waterways and one detection in rainwater. In 2008-2009, the one waterway detection was in Mosher Slough (MS-14R) during the post-dormant storm season at levels below the DFG WQO. Chlorpyrifos was detected in rainwater collected within the urban area (near MS-14R) during the post-dormant storm season at a level above the DFG chronic WQO, but below the acute WQO. The higher level of chlorpyrifos in rainwater and the absence of chlorpyrifos in urban runoff samples suggested that rainwater might have been a significant contributor of chlorpyrifos to receiving water during the post-dormant storm season.

Chlorpyrifos data collected during 2009-2010 pesticide monitoring, however, indicated that chlorpyrifos detections increased during 2009-2010. Of particular significance are the results from the post dormant storm on March 21, 2010. In this event, chlorpyrifos levels exceeded WQOs for rainwater, urban discharge, and receiving water. For the season, three of the four rainwater samples contained chlorpyrifos at levels above the DFG acute WQO. The pump station MS-14D, located on the western border of Stockton adjacent to agricultural areas, had chlorpyrifos levels exceeding the DFG acute WQO during both storm events. The upstream receiving water location on Mosher Slough, MS-14RU, exceeded the chlorpyrifos DFG acute WQO during the dry season event. Since the majority of detections are from upstream and agricultural locations in Stockton, the increased detections may be attributed to agricultural use; however, continued monitoring should focus on assessing possible stormwater contributions.

Previous monitoring results had indicated infrequent detection of chlorpyrifos in receiving water and absence of detection in urban runoff, suggesting that the phase-out by the USEPA (completed in 2005) had been effective in reducing chlorpyrifos impacts by stormwater. However, the increased detections and WQO exceedances of chlorpyrifos during 2009-2010 indicate that chlorpyrifos should continue to be monitored during 2010-2011.

Diazinon

Spatial and temporal trends observed for diazinon during 2008-2010 Pesticide Plan monitoring are shown in **Figure 9-4**. As discussed above, and consistent with previous monitoring results, data collected during 2008-2010 pesticide monitoring indicate that WQOs for diazinon are consistently attained in Stockton waterways. The only case where diazinon was detected at levels above the WQOs was for the rainwater sample collected outside of the urban area during the dormant spray season (December 2008). Diazinon did not exceed either the chronic or acute DFG WQO in any samples during 2009-2010.

Diazinon was detected in 45% of samples from 2008-2009 and 64% of samples from 2009-2010. Similar to chlorpyrifos, diazinon was detected most frequently in both rainwater sampling locations, at the upstream location MS-14RUS, and the discharge and receiving water locations MS-14D and MS-14R bordering agricultural areas west of Stockton. The consistent presence of diazinon in rainwater after the phase-out of diazinon by the USEPA is surprising, and suggests that in some cases rainwater may have already been enriched above the DFG WQO before it even falls to the ground.

Since all detections (except for the one rainwater sample on December 21, 2008) were at levels below relevant WQOs, the monitoring results offer further evidence that diazinon is no longer a pollutant of concern in Stockton waterways. Due to diazinon's widespread use prior to its phase-out of diazinon, it can be expected that diazinon will persist at low levels and may not disappear completely in the near future. Diazinon will be monitored for one additional year, and if additional monitoring indicates that diazinon is not a water quality concern, the Permittees will consider whether to discontinue monitoring.

Pyrethroids

Pyrethroids were monitored in water column samples from urban discharge and receiving water. Spatial and temporal trends are shown in **Figure 9-5**. Pyrethroids were most frequently detected during the storm events, with pyrethroids only detected during one dry season event. Cyfluthrin (in 5 of 8 locations), L-cyhalothrin (4 of 8 locations) and bifenthrin (4 of 8 locations) were detected most often, while permethrin, fenvalerate, esfenvalerate, danitol and cypermethrin were also detected at multiple locations.

Pyrethroids were most prevalent at the urban discharge location on Mosher Slough, MS-14D. Pyrethroids were detected at this location during five of the six sampling events, with 9 different compounds detected. This was the only location with detected pyrethroids during the dry season, when 7 different compounds were present in the 2008-2009 dry event (no pyrethroids were detected during the 2009-2010 dry event). The highest levels of pyrethroids were present during the post-dormant storm season in both monitoring years. Pyrethroids were only detected in the associated receiving water (MS-14R) during the 2008-2009 post-dormant storm and the 2009-2010 dormant spray storm event.

Multiple pyrethroids were present in the urban receiving water location on Smith Canal, SC-5R, during the 2009-2010 dormant spray season storm events. A total of 8 pyrethroids were detected during that event.

During 2009-2010, pyrethroids were added to the constituents monitored in rainwater to more comprehensively characterize sources of pyrethroids to the water column. Pyrethroids were detected during the post-dormant storm event in both rainwater sampling locations in 2010.

Most studies on pyrethroids to date have focused on pyrethroids in sediment samples, as pyrethroids tend to bind with sediments. However, recent research has begun to focus on pyrethroids in the water column, and a recent publication has shown that they are ubiquitous in urban runoff within the Central Valley².

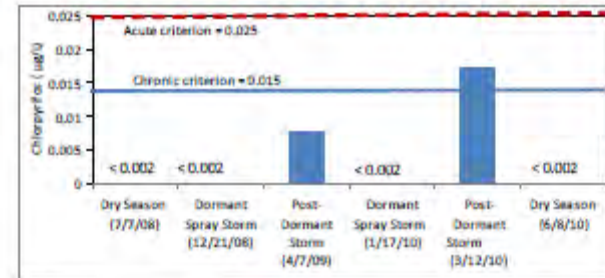
The Pesticide Plan 2008-2010 results confirm that pyrethroids are present in Stockton area waterways. Continued Pesticide Plan monitoring should focus on pyrethroids.

² Weston, DP, Lydy, MJ. 2010. Urban and agricultural sources of pyrethroid insecticides to the Sacramento-San Joaquin Delta of California. *Environmental Science and Technology* 44, 1833-1840.

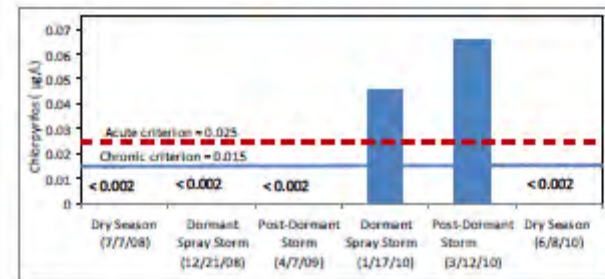
Map Features

- Sampling Locations
- Water Body
- Stream or River
- Drainage Basin
- City Boundary

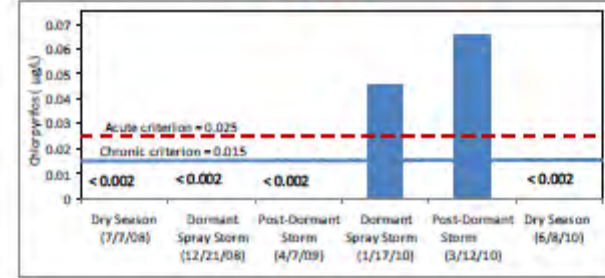
MS-14R



MS-14D



FM-3R



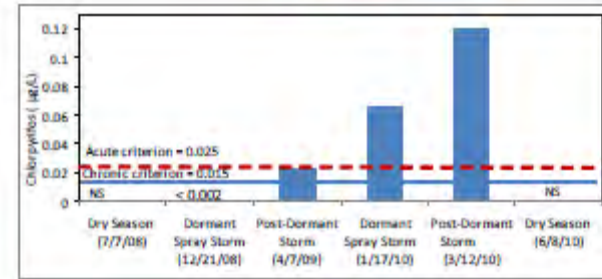
CR-2R

all events non-detect

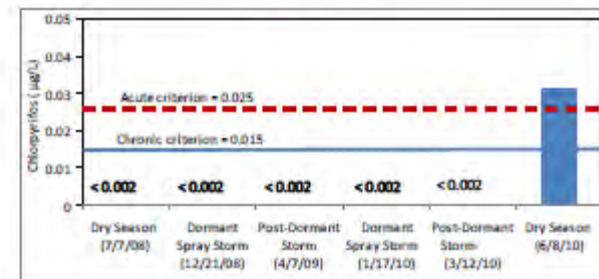
SC-5R

all events non-detect

NW-Rain



MS-14RU



NE-Rain

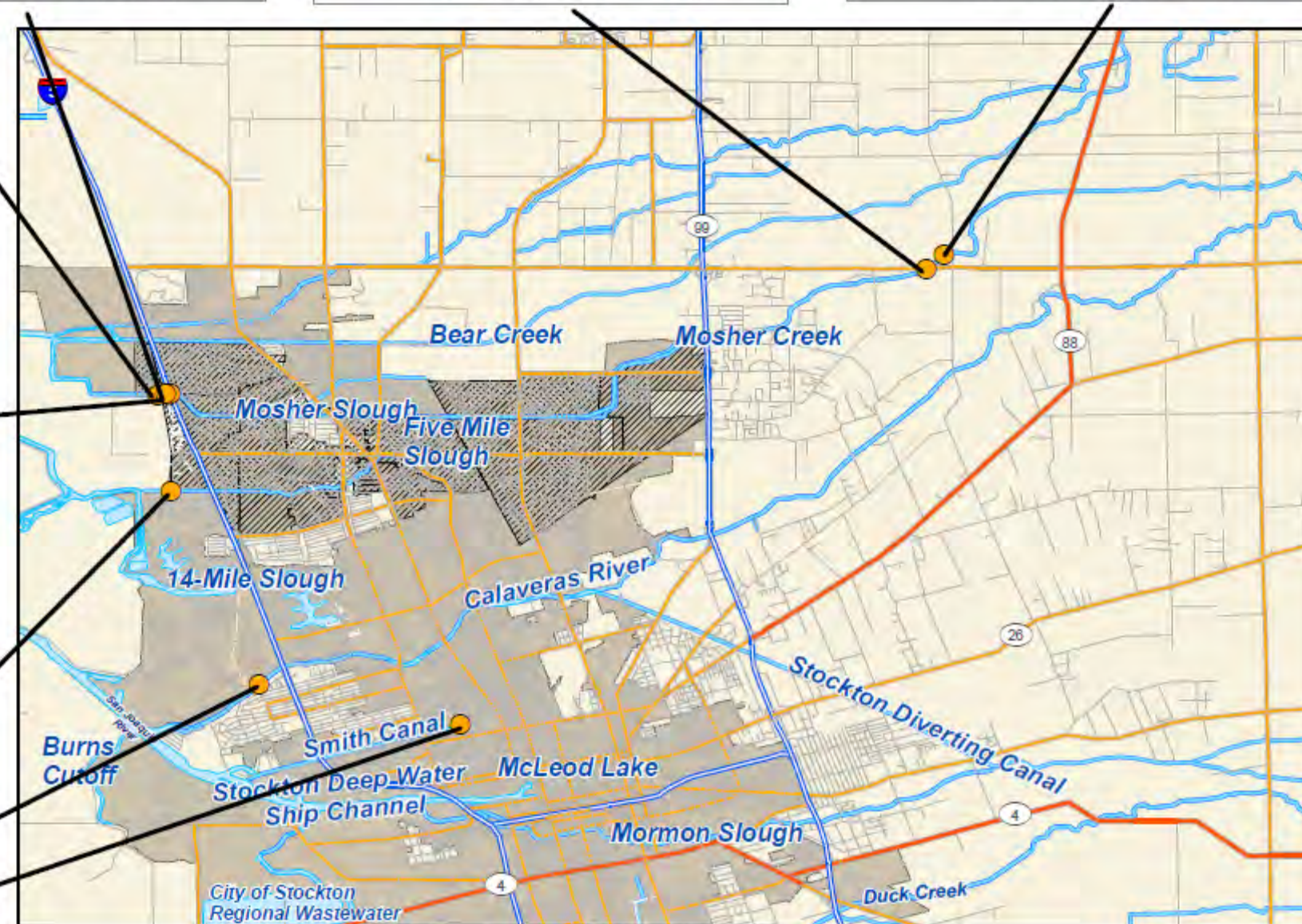
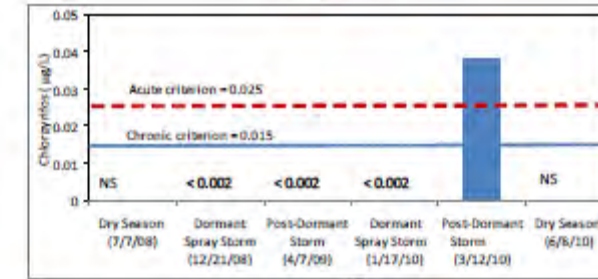


Figure 9-3. Chlorpyrifos Concentrations Observed During 2008-2010 Pesticide Plan Monitoring

Map Features

- Sampling Locations
- Water Body
- Stream or River
- Drainage Basin
- City Boundary

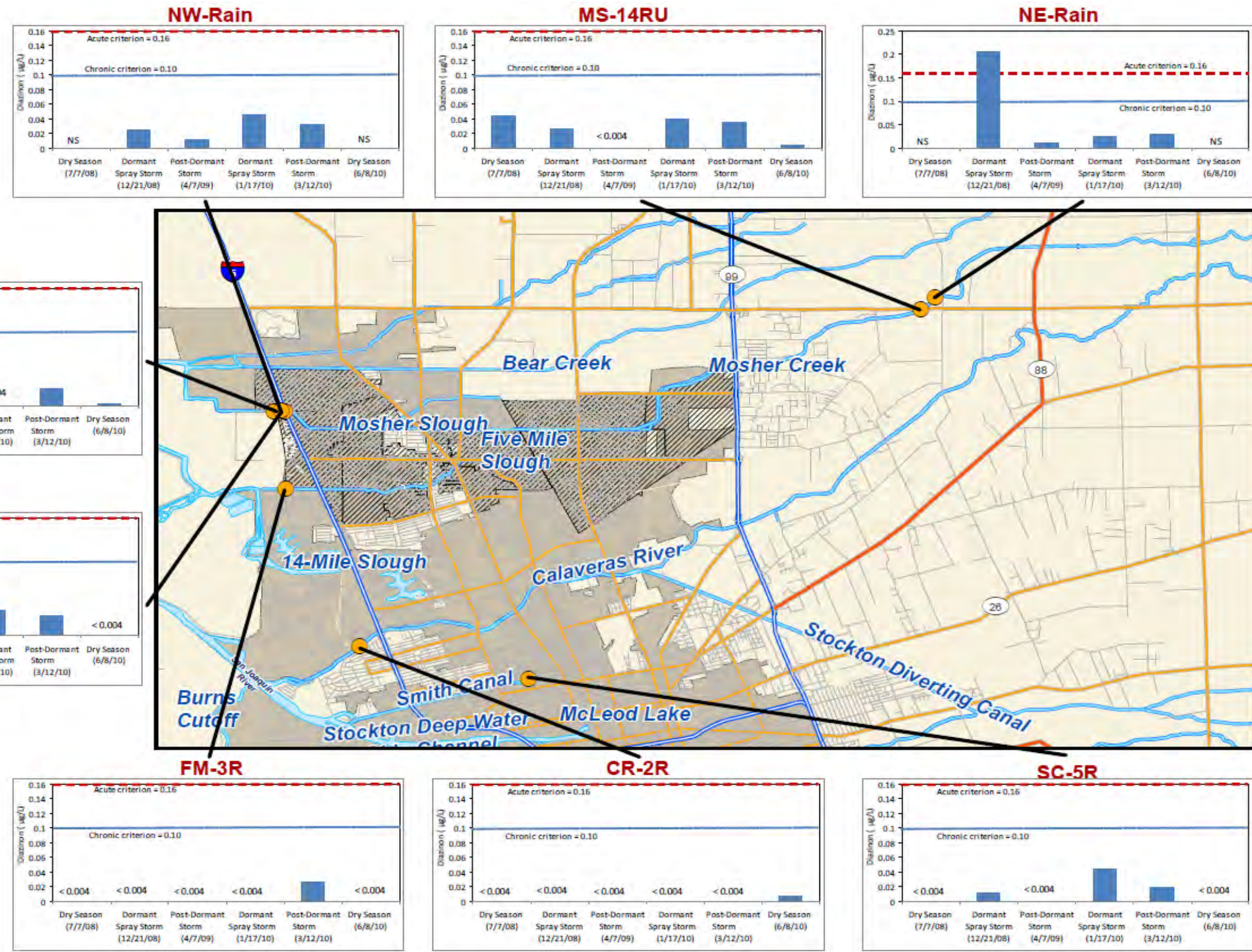


Figure 9-4. Diazinon Concentrations Observed During 2008-2010 Pesticide Plan Monitoring

Map Features

- Sampling Locations
- Water Body
- Stream or River
- Drainage Basin
- City Boundary

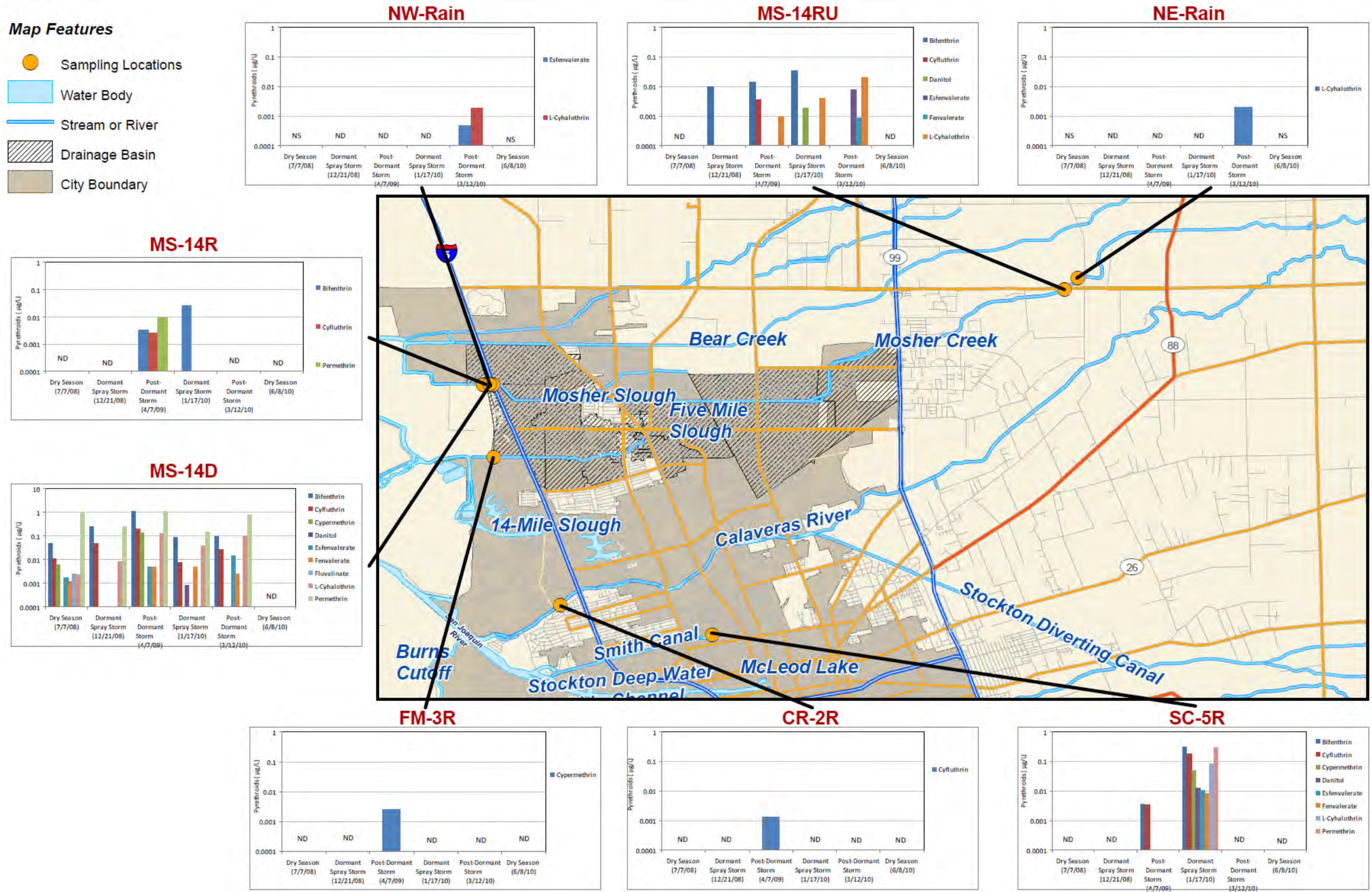


Figure 9-5. Pyrethroid Concentrations Observed During 2008-2010 Pesticide Plan Monitoring

9.2.5 2010-2011 Pesticide Plan Activities

Pesticide Plan activities for the 2010-2011 reporting year will include the following:

- **Public Outreach:** Continue OWOW outreach, annual public outreach messages. Begin to implement pest control workshops for the public.
- **IPM and Municipal Operations:** Formally adopt IPM/pesticide application protocols, implement IPM protocols, and enforce IPM standards for contracted landscapers.
- **Effectiveness Assessment:** Continue to track pesticide use and acreage managed under IPM, pest control workshops and training, public outreach and OWOW participation.
- **Monitoring:** Continued monitoring for chlorpyrifos, diazinon, and pyrethroids at monitoring locations at the Calaveras River, Mosher Slough, Five-Mile Slough, and Smith Canal.

Monitoring requirements for the Pesticide Plan specify that the Permittees shall conduct pesticide monitoring until they can demonstrate that the WQOs are being met or that the cause of exceedances of WQOs is not related to the Permittees' discharge. In the monitoring section of the Pesticide Plan, the Permittees noted that the monitoring effort will be considered two years into the Permit term (2009-2010). Since 2008-2010 monitoring found regular detection of chlorpyrifos and pyrethroids, and since chlorpyrifos detections exceeded the WQO, monitoring will continue for those pesticides during 2010-2011. Monitoring for diazinon will continue as well, to further ensure that it is no longer a pollutant of concern.

9.3 PATHOGEN PLAN PROGRESS REPORT

The focus of the Pathogen Plan is the San Joaquin River tributaries within the SUA that are classified as impaired due to the presence of fecal indicator bacteria. The City and County developed a Pathogen Plan in accordance with Provision D.18.b of the second term permit, which required the Permittees to identify, monitor, and mitigate bacteria sources.

The overall goals of the Pathogen Plan are to identify, monitor and mitigate the controllable sources of bacteria. The Plan was designed to accomplish these goals and satisfy permit requirements through the following components:

Characterization Monitoring (using traditional indicator bacteria) to determine the magnitude of bacterial contamination at various points in each waterbody

Source Identification (ID) Studies to identify the host (human, cow/horse, or dog) that contributed to fecal contamination

BMP Development and Implementation to identify effective BMPs to reduce fecal contamination

Effectiveness Monitoring and Plan Assessment to determine whether BMPs have effected fecal contamination

The Pathogen Plan will be conducted over three phases until 2018. The Plan addresses six waterbodies, and is implemented in a phased approach that focuses on two waterbodies for each phase (**Table 9-9**).

Table 9-9. Pathogen Plan Implementation Phases

Monitoring Phase	Waterbody	Start Date	End Date
Phase I (9.3.1)	Smith Canal Mormon Slough	July 1, 2004	June 30, 2012
Phase II (9.3.2)	Mosher Slough Five Mile Slough	July 1, 2007	June 30, 2015
Phase III (9.3.3)	Lower Calaveras River Walker Slough	July 1, 2010	June 30, 2018

Phases I and II were both in progress during the 2009-2010 reporting year. Each phase includes the following elements.

Characterization Monitoring

The goal of the characterization monitoring is to determine long-term trends in bacteria loading and identify bacteria “hot spots” that contribute to significant bacteria loadings. Monitoring of traditional indicator bacteria (total coliform, fecal coliform, and *E. coli*) is conducted at strategic locations along impaired waterbodies. All monitored sites are examined to determine if any sites consistently exceed bacteria criteria. Those sites that consistently exceed bacteria criteria are considered primary candidates for Source Identification Studies.

Source Identification Studies

Microbial Source Tracking (MST) Studies employ analytical methods to evaluate the organisms (e.g., human or non-human) from which the indicator bacteria likely originated. The MST method is based on species-specific techniques that target *Bacteroidales-Prevotella* (*Bacteroidales*), which are anaerobic bacteria that are highly abundant in the intestines of warm-blooded animals. Their anaerobic nature is desirable because environmental persistence is thought to be much less than aerobic microbes (e.g., fecal

coliform) which can persist for years, and perhaps even regrow in the environment. It should be noted that *Bacteroidales* were shown to be the most reliable human marker in comparison studies³ of microbial source tracking methods that were performed by the Southern California Coastal Waters Research Program (SCCWRP). In addition, USEPA utilized *Bacteroidales* during a recent epidemiological study⁴, and found a positive correlation between *Bacteroidales* concentrations and gastrointestinal illness in swimmers.

Researchers at the University of California, Davis have developed the polymerase chain reaction (PCR) methods⁵ that were used for this Pathogen Plan. These methods allow for identification of unique deoxyribonucleic acid (DNA) sequences, which are used to selectively monitor *Bacteroidales-Prevotella* from specific hosts. At this time, methods have been developed to quantify bacteria from the following hosts:

- General warm-blooded animal inputs (called “universal”)
- Humans
- Cow and horses
- Dogs

Current MST assays do not directly discriminate between viable and non-viable cells since DNA of both live and dead cells, as well as extracellular DNA, can be amplified. Yet, it is paramount for a meaningful interpretation of source tracking data to distinguish between recent and older contamination events. Although *Bacteroidales* cannot survive for prolonged periods in the aerobic environment, their DNA can persist in the environment after cells have died. It is known that DNA of selected pathogens can persist after cell death for up to 3 weeks.

Researchers at UC Davis recently developed an assay to detect sequences only from live cells, based on application of a compound that penetrates dead cell membranes and inhibits polymerase chain reaction (PCR) amplification⁶. Recent data from UC Davis suggested that the assay for viable *Bacteroidales* cells detects fecal contamination that occurred within the previous 28 hours, whereas assays for all *Bacteroidales* could detect extracellular DNA that persists in the environment for as long as 177 hours. Therefore, the detection of viable *Bacteroidales* provides more useful information for MST. For this reason, analysis of viable *Bacteroidales* was added to source ID analyses during Phase II.

In addition, samples are analyzed for concentrations of human-specific viruses known as entero- and adenovirus. These viruses are known to be epidemiologically-relevant indicators of water that has been impacted by human waste⁷. Direct quantification of viruses (instead of bacteria only) provide important

³ Griffith, J. F. et al., 2003. “Evaluation of microbial source tracking methods using mixed fecal sources of aqueous test samples.” *J. Water Health*. Vol.4, No. 1, p.141-151.

⁴ Wade, Tet al., 2006. Rapidly Measured Indicators of Recreational Water Quality Are Predictive of Swimming-Associated Gastrointestinal Illness. *Environ Health Perspect* 114:24-28.

⁵ Kildare, B., Leutenegger, C., McSwain, B., Bambic, D., Rajal, V., Wuertz, S. 2007. 16s rRNA-based assays for quantitative detection of universal, human-, cow-, and dog-specific fecal *Bacteroidales*: A Bayesian approach. *Water Research*, 41: 3701-3715.

⁶ Bae, S., Wuertz, S. 2009. Discrimination of viable and dead fecal *Bacteroidales* bacteria by quantitative PCR with propidium monoazide. *Applied and Environmental Microbiology*, 75:2940-2944.

⁷ Rajal, V., McSwain, B., Thompson, D., Leutenegger, C., Wuertz, S., 2007. Molecular quantitative analysis of human viruses in California stormwater. *Water Research*, 41: 4287-4298.

information about health risks, and allow for prioritization of Program resources to address bacteria sources that pose the greatest health risks to recreational water users.

BMP Implementation

The ultimate goal of the Pathogen Plan is to mitigate bacterial impairment by gaining specific information about sources of fecal bacterial contamination, and implementing BMPs which focus on specific sources. Targeted BMPs are selected based on the dominant controllable sources of fecal contamination determined from source ID monitoring.

Effectiveness Monitoring

After BMPs have been implemented for a sufficient time period, the effectiveness of control programs is assessed. Assessment includes monitoring fecal indicator bacteria levels to determine if BMPs impacted the impairment of the waterbodies.

9.3.1 Phase I Activities

Monitoring Phase	Waterbody	Start Date	End Date
Phase I	Smith Canal Mormon Slough	July 1, 2004	June 30, 2012

Phase I waterbodies and monitoring locations are shown in **Figure 9-6**. Pathogen Plan components underway during 2009-2010 are depicted below, and discussed in the following sections.

Phase I Component	2004	2005	2006	2007	2008	2009	2010	2011
Characterization Monitoring	■	■				■	■	
Source ID Monitoring		■	■	■	■	■	■	
Preliminary BMP Implementation				■	■	■	■	■
Effectiveness Monitoring						■	■	■

9.3.1.1 Phase I Characterization Monitoring

Characterization monitoring was completed during 2004-2005, and a detailed analysis of characterization monitoring results for was presented in the 2005-2006 Annual Report. Receiving water concentrations of indicator bacteria exhibited a pattern where geometric mean concentrations increased with increasing distance from the San Joaquin River, with concentrations near the terminal ends of Smith Canal and Mormon Slough consistently higher than WQOs.

The indicator bacteria concentrations in Smith Canal suggested that bacteria sources to the stormwater system are ubiquitous, with the geometric mean concentrations observed at all discharge sites were above the relevant WQOs.

In Mormon Slough, due to accessibility and insufficient flow issues, only one discharge site was consistently monitored during characterization monitoring, so it is unknown how indicator concentrations varied between discharge sites. However, the fecal coliform concentrations at the monitored discharge location (MR-2D) were relatively low and in compliance with geometric mean WQOs. Moreover, based on current knowledge, there are no known stormwater outfalls that flow during dry weather upstream of MR-1R, which exhibited some of the highest bacteria concentrations observed during the characterization study. Together these observations suggest that sources other than stormwater, including homeless encampments, which are common along Mormon Slough, may be the most important.

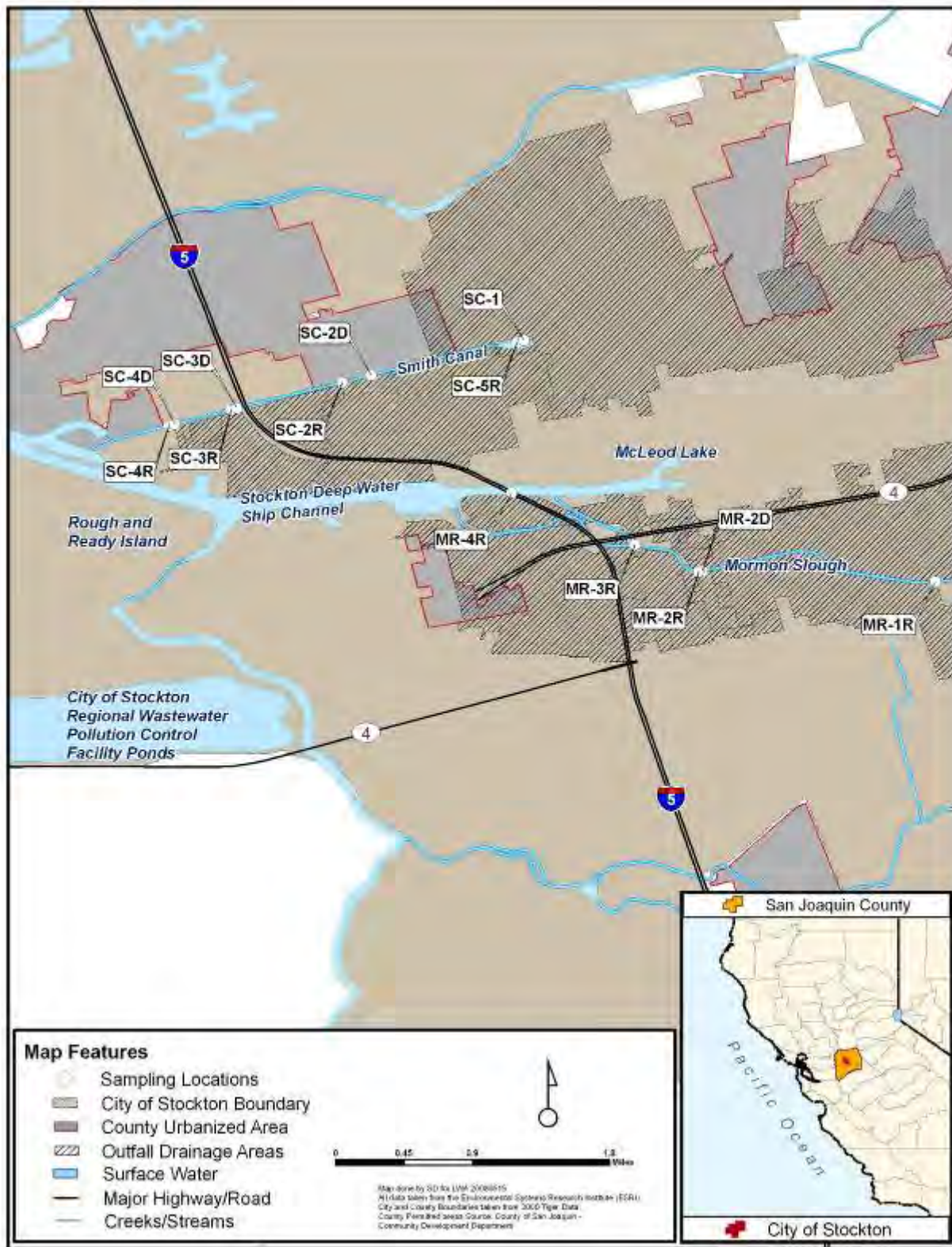


Figure 9-6. Phase I Waterbodies and Monitoring Locations

9.3.1.2 Source Identification Monitoring

After Phase I characterization monitoring was completed, sites were selected for Source ID studies, and MST monitoring began in January 2006. The locations of sites selected for Phase I Source ID monitoring were based on both accessibility and patterns observed during characterization monitoring. The final source ID event was completed on 11/1/2008. Results of the 7 events completed prior to 2008-2009 were reported in the 2007-2008 Annual Report. The complete set of Phase I source ID results will be presented in the Pathogen Plan Phase I Report, which will be submitted at the completion of Phase I.

Universal *Bacteroidales* were detected in most samples (all except one sample each at the receiving water location MR-1R and discharge locations SC-1). Human *Bacteroidales* concentrations were highest at the Legion Park pump station (SC-1). In Mormon Slough human *Bacteroidales* were consistently detected at the receiving water locations, although they were not detected frequently at the Mormon Slough discharge location, suggesting that human sources may not be primarily contributed through the storm drain system at Mormon Slough. Cow/horse *Bacteroidales* were detected in samples from the Smith Canal SC-2D and MR-1R discharge locations. Dog *Bacteroidales* were consistently detected in Mormon Slough receiving water, but not at the discharge location MR-2R. Most detections occurred during storm events.

9.3.1.3 BMP Implementation

Targeted BMPs were selected based on the dominant controllable sources of fecal contamination determined from the source ID monitoring. BMPs were implemented to focus on the following specific sources: dog waste, horse/cow fecal input, and human fecal input.

Pet Waste Control

To date, the City has implemented public education and outreach efforts to control pet waste. The City provided outreach and literature on the proper disposal of pet waste in the February 2010 *Stockton Water News*, the City's utility billing insert. This mailer reached more than 46,000 utility customers, including pet-related organizations and businesses. In addition, the City developed a new, draft brochure with language discussing the problem of pet waste pollution and possible actions pet owners can take to properly dispose of pet waste and help reduce pollution to local waterways. The brochure will be completed by December 31, 2010. When complete, the brochure will be mailed to registered pet owners, as well as distributed at veterinary facilities, animal adoption agencies, and kennels. A bilingual (Spanish-English) article also ran in the February 2010 edition of the *Latino Times*, which has a monthly readership of 60,000.

As described in Section 3, the City developed language for and produced new Pet Waste Signs during 2009-2010. A total of 44 new signs were installed at 10 existing parks that have stormwater inlets leading directly to waterways in the Smith Canal and Mormon Slough drainage areas. Signs were installed at Victory Park (9 signs), American Legion Park (5 signs), Louis Park (19 signs), Caldwell (4 signs), Lafayette Square (2 signs), Gleason (3 signs), Columbus Square (2 signs), Liberty Square (2 signs), Union Square (2 signs), and Stribley (5 signs).

Horse/Cow Source Control

Source identification monitoring identified horse/cow fecal input in Phase I waterbodies. The City identified significant industrial users, tracked by its wastewater pretreatment program, which could be potential sources of livestock fecal contamination. One facility, Islamic Meat and Poultry, was previously identified as a potential source within the Mormon Slough drainage area. Industrial inspections during 2005 identified numerous stormwater concerns at the facility, including overflowing refuse bins with

manure and facility waste and manure on the ground. Manure exposure to the storm drain was noted, and a notice of violation was sent to the facility on March 22, 2005. A subsequent inspection in 2005 noted that the stormwater concerns had been addressed.

During the 2010 industrial inspections, no stormwater concerns were noted at the facility, and no live animals were present at the property. It is possible that Islamic Meat and Poultry contributed to horse/cow fecal contamination during the Phase I Source ID monitoring period. The facility will continue to be monitored during industrial inspections to ensure that they continue to implement proper BMPs to prevent fecal contamination.

No additional facilities holding live cattle or horses were identified in the Smith Canal or Mormon Slough drainage areas. However, the Permittees will continue to investigate other potential sources for livestock fecal contamination.

Human Source Control

Human-derived fecal contamination was identified in Phase I waterbodies through source identification monitoring. BMPs for human fecal source control were identified in the updated Pathogen Plan submitted with the Permittees' SWMP. To date, the Permittees have investigated houseboats on Smith Canal as a possible contributor of human fecal pollution. Houseboats located north of the San Joaquin River are regulated by the Central Valley Flood Control Board, and houseboats located on the south levee are the responsibility of the County. Initial permits are issued for houseboats, but no further inspections are conducted after the initial permit issuance.

During 2009-2010, the Permittees investigated sanitary sewer overflows as a possible alternative source of human-derived fecal contamination in the Smith Canal and Mormon Slough drainage areas.

9.3.1.4 Phase I Effectiveness Monitoring

Effectiveness monitoring for Phase I waterbodies is scheduled to begin in 2010-2011 to allow time for further targeted BMP implementation. Effectiveness monitoring will focus on indicator bacteria at sampling locations in Smith Canal and Mormon Slough.

9.3.2 Phase II Activities

Monitoring Phase	Waterbody	Start Date	End Date
Phase II	Mosher Slough Five Mile Slough	November 1, 2007	June 30, 2015

Phase II waterbodies and monitoring locations are shown in **Figure 9-7**. Pathogen Plan components underway during 2009-2010 are depicted below, and discussed in the following sections.

Phase II Component	2007	2008	2009	2010	2011	2012	2013	2014
Characterization Monitoring								
Source ID Monitoring								
Preliminary BMP Implementation								
Effectiveness Monitoring								

9.3.2.1 Characterization Monitoring

Characterization monitoring was initiated for the Phase II sites (Mosher Slough and Five-Mile Slough) in November 2007, and was completed in May 2009. In addition to the Phase II waterbodies, four locations upstream of the SUA (on Mosher Slough, the Calaveras River, and Duck Creek) were also monitored in

order to assess the upstream contribution of indicator bacteria. In total, 24 dry weather and 5 wet weather events were conducted.

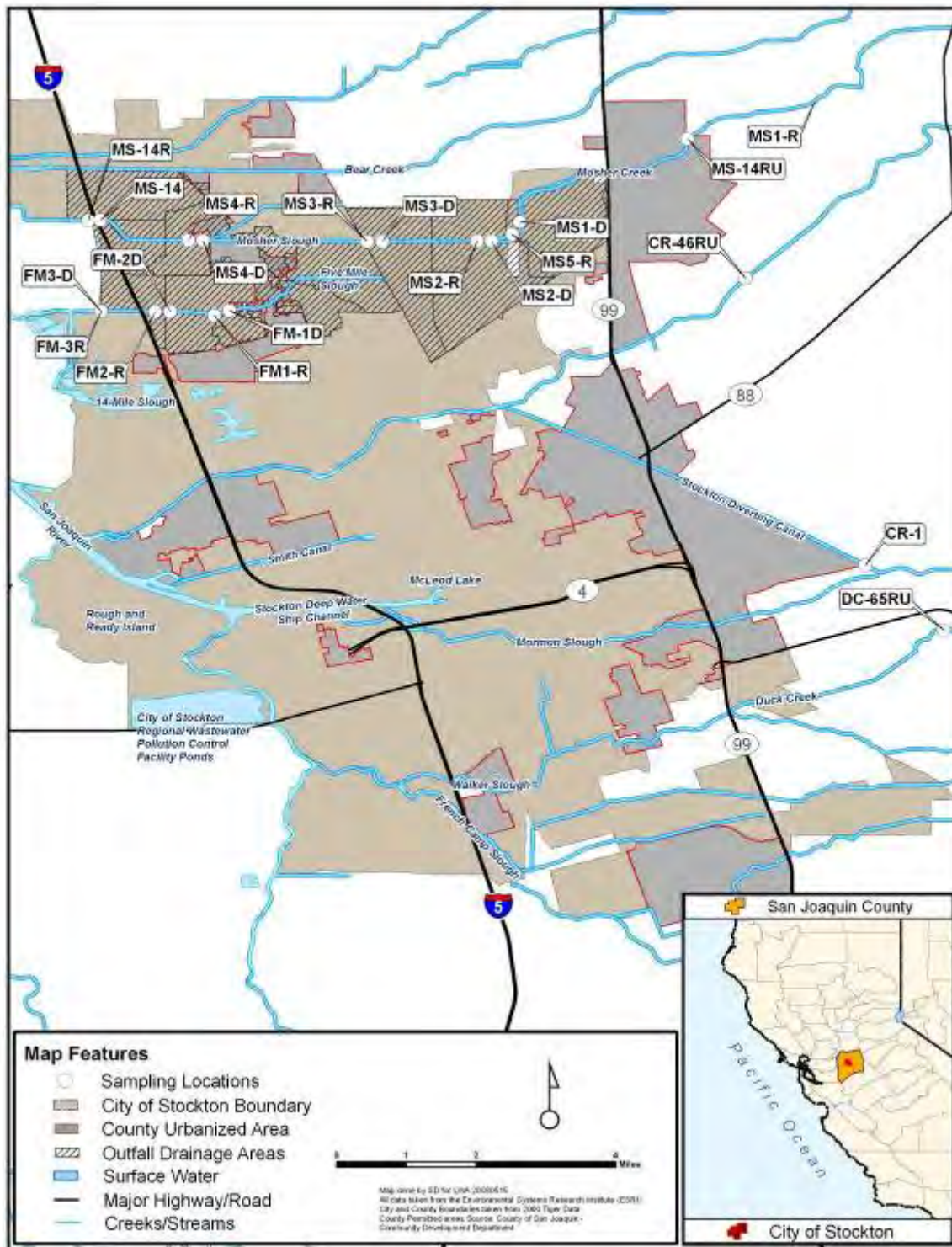


Figure 9-7. Phase II Characterization Monitoring Locations

To highlight the spatial and temporal patterns of fecal indicator bacteria concentrations in the Smith Canal and Mormon Slough watersheds, indicator data collected during 2007-2009 characterization monitoring were entered into a GIS decision-support tool. Figures depicting the trends in indicator bacteria were included in the 2008-2009 Annual Report. Key findings included:

- In general, when compared to Phase I characterization monitoring (presented in the 2005-2006 Annual Report), Phase II waterbodies had a lower frequency of exceedances of single sample WQOs -- 64% of dry weather and 84% of wet weather Phase I samples exceeded single sample WQOs, compared to 43% of dry weather and 65% of wet weather Phase II samples that exceeded single sample WQOs. In other words, the water quality regarding indicator bacteria contamination is better in Mosher Slough and Five Mile Slough than in the Phase I waterbodies, Mormon Slough and Smith Canal.
- For Mosher Slough, concentrations of indicator bacteria in receiving water were lowest near the San Joaquin River (SJR), as mixing with the SJR dilutes and reduces the concentrations of indicator bacteria, and at site MS-5R which is just downstream of the Morada detention basin. Indicator bacteria levels were similar at all other receiving water sites. Levels were generally higher in urban discharge relative to receiving water, except for urban discharge site MS-1D, which has the lowest levels of indicator bacteria of any site except for receiving water site MS-14R (near the SJR). These trends are apparent in both dry weather and storm event samples.
- Concentrations of indicators in the Mosher Slough location upstream of the SUA, MS-14RU, are slightly higher overall than the locations directly downstream within the SUA, indicating that there are sources of indicator bacteria to Mosher Slough that are upstream of the SUA.
- For Five-Mile Slough, concentrations of indicator bacteria followed a similar pattern to Mosher Slough. Concentrations were lowest at the furthest downstream locations (FM-3R), and slightly higher in receiving water locations upstream. Indicator levels were highest in urban discharge samples further upstream (FM-2D and FM-1D).

9.3.2.2 Source Identification Monitoring

Sites were selected for Source ID monitoring based on trends in characterization monitoring data. Sites were targeted that had consistent high levels of indicator bacteria. The urban discharge location furthest downstream on Mosher Slough, MS-14D, was specifically selected to screen for possible livestock input to Mosher Slough from the nearby agricultural area.

Phase II source identification monitoring began in February 2009. Three events were completed during 2008-2009, and five events were completed during 2009-2010. The one remaining wet weather event will be completed during 2010-2011. A summary of completed source identification monitoring events is shown in **Table 9-10**. Complete Source ID monitoring data are included in **Appendix I-4**.

Table 9-10. Completed Phase II Source Identification Monitoring Events

Water Body	Site Name	Site Type	2008-2009 Monitoring Year			2009-2010 Monitoring Year				
			Wet Season	Wet Season	Dry Season	Wet Season	Wet Season	Wet Season	Wet Season	Dry Season
			Storm Event (2/22/09)	Dry Event (3/11/09)	Dry Event (5/14/09)	Storm Event (10/13/09)	Storm Event (12/12/09)	Storm Event (1/17/10)	Storm Event (4/20/10)	Dry Event (6/24/10)
Mosher Slough	MS-14D	Urban Discharge	✓	✓	✓	✓	✓	✓	✓	✓
	MS-4D		✓	✓	✓	✓	✓	✓	✓	✓
	MS-3D		✓	✓	✓	✓	✓	✓	✓	✓
	MS-2D		✓	✓	✓	✓	✓	✓	✓	✓
	MS-14RU	Upstream Location	✓	---	✓	✓	✓	✓	✓	✓
Five-Mile Slough	FM-1D	Urban Discharge	✓	✓	✓	✓	✓	✓	✓	✓
	FM-2D		✓	✓	✓	✓	✓	✓	✓	✓
	FM-2R	Receiving Water	✓	✓	✓	✓	✓	✓	✓	✓

Due to the extensive analysis required for the source tracking samples and laboratory delays caused by equipment maintenance, all analyses could not be completed in time for this report. The analysis of the traditional *Bacteroidales* markers for the first five events is presented in this Annual Report. The complete data from the completed Phase II Source ID events will be submitted to the Regional Water Board by December 31, 2010 in a supplemental memorandum.

At this stage of the monitoring effort it is not appropriate to suggest conclusions regarding the data, rather only present the data. In addition, the techniques that are utilized during MST are rather sophisticated, and it is beyond the scope of this annual report to detail the methods used (and assumptions required) to generate quantitative MST datasets. Detailed information regarding the *Bacteroidales* and human virus techniques applied to the Pathogen Plan can be found in the following publications by the Wuertz laboratory at UC Davis:

- Bae, S., Wuertz, S. 2009. Discrimination of viable and dead fecal *Bacteroidales* bacteria by quantitative PCR with propidium monoazide. *Applied and Environmental Microbiology*, 75:2940-2944.
- Kildare, B., Leutenegger, C., McSwain, B., Bambic, D., Rajal, V., Wuertz, S. 2007. 16s rRNA-based assays for quantitative detection of universal, human-, cow-, and dog-specific fecal *Bacteroidales*: A Bayesian approach. *Water Research*, 41: 3701-3715.
- Rajal, V., McSwain, B., Thompson, D., Leutenegger, C., Wuertz, S., 2007. Molecular quantitative analysis of human viruses in California stormwater. *Water Research*, 41: 4287-4298.

The type of data generated during MST monitoring, graphs of measured concentrations of universal, human, cow/horse, and dog *Bacteroidales* are shown in **Figures 9-8 to 9-11**. It may be misleading to attempt to characterize general patterns in the MST results without a complete dataset; therefore, these results represent a progress report of analyses completed to date, and a full analysis will be performed when the remaining Phase II sampling events are completed.

Universal Bacteroidales

Universal *Bacteroidales*, which are representative of inputs by all warm-blooded animals, were detected in nearly every sample. This is typical of studies in other watersheds. They were detected in all samples analyzed on Five-Mile Slough, and at the Mosher Slough locations MS-14D and MS-4D. They were detected in 4 of 5 events at Mosher Slough locations MS-3D and MS-2D, and at 3 events at the upstream Mosher Slough location MS-14RU.

Human Bacteroidales

Human *Bacteroidales* are generally present in mixed-sources of human contamination. A small proportion of fecal samples from “individual humans” may be non-detect, but the human marker is nearly always detected in mixed sources like wastewater influent.

- Human *Bacteroidales* were detected in most samples from the sampling locations on Five-Mile Slough, with similar levels at all sites. Fewer detections occurred during 2009-2010 compared to 2008-2009.
- On Mosher Slough, urban discharge location MS-14D was positive for human *Bacteroidales* in all samples during 2008-2009, but did not have any detections during 2009-2010. Locations MS-4D, MS-3D, and MS-2D showed similar frequency of detections for human *Bacteroidales*. The highest observed concentration was at location MS-4D during the 2/22/09 storm event. The upstream location MS-14RU did not have any detections of human *Bacteroidales*.

Cow/Horse Bacteroidales

Cow/horse *Bacteroidales* are generally present in fecal samples from both cows and horses.

- During 2008-2009, cow/horse *Bacteroidales* were detected in at least one event for all urban discharge locations on both Mosher Slough and Five-Mile Slough, and detected in two events at FM-2D, MS-14D, and MS-2D. No cow/horse *Bacteroidales* were detected from the second dry weather sample from 5/14/09. There were no detections of cow/horse from the 10/13/09 or 12/12/09 sampling events.

Dog Bacteroidales

Dog *Bacteroidales* are generally present in mixed fecal samples from dogs. Some individual fecal samples from dogs will be non-detect, and there is slight overlap with human sequences.

- Dog *Bacteroidales* were only detected in one sample during 2008-2009 – receiving water location FM-2R on Five-Mile Slough during the first dry weather sample (3/11/09). Sample limits of detection were low (in the order of 10^{-1} to 10 gene copies/mL) for the two dry weather events, indicating that the assay was sensitive enough to extrapolate that non-detects were indicative of actual conditions. However, sample limits of detection were higher (10 to 10^3 gene copies/mL) for the storm event – therefore, some non-detects should be interpreted with caution. During 2009-2010, dog *Bacteroidales* was detected during the 12/12/09 storm event at 5 of the 8 locations.
- There was no dog *Bacteroidales* detected in any of the samples at the FM-1D, MS-2D, or MS-14RU locations.

Viruses

During the previous reporting year, all Source ID samples were analyzed for viruses. Human virus concentrations (enterovirus and adenovirus) were measured with each collected sample. Virus detections further confirm the presence of human, or high-risk, fecal sources. Since viruses are generally present in such low numbers, 100 liter samples are collected during the MST studies, and subsequently filtered to concentrate samples. Quantification of viruses requires time-consuming assays based on cell culturing and counting of a surrogate bacteriophage (a virus that infects bacteria), which is used to calculate recovery after filtering.

Virus assays for four types of adenovirus and for enterovirus were performed for all samples, and no viruses were detected.

Viable Bacteroidales Analyses

Analysis of genetic markers for viable *Bacteroidales*, as described in the 2008 Pathogen Plan update, is scheduled to occur at selected locations and sampling events for Phase II Source ID monitoring in order to provide additional information on the health risk associated with fecal pollution. Researchers at UC Davis recently developed the assay to detect sequences only from live cells, based on application of a compound (PMA) that penetrates dead cell membranes and inhibits polymerase chain reaction (PCR) amplification. The method is currently being optimized for application to the Pathogen Plan samples, and the PMA-qPCR results for the quantification of DNA from intact cells could not be provided by the Wuertz Laboratory in time for inclusion in the 2009-2010 Annual Report. Although all samples were analyzed via PMA-qPCR, the Wuertz lab needed additional time to set up the routine QA/QC methodology for treating qPCR data with this new method. Results for viable *Bacteroidales* analyses will be reported in a supplemental memorandum submitted to the Regional Water Board during by December 31, 2010.

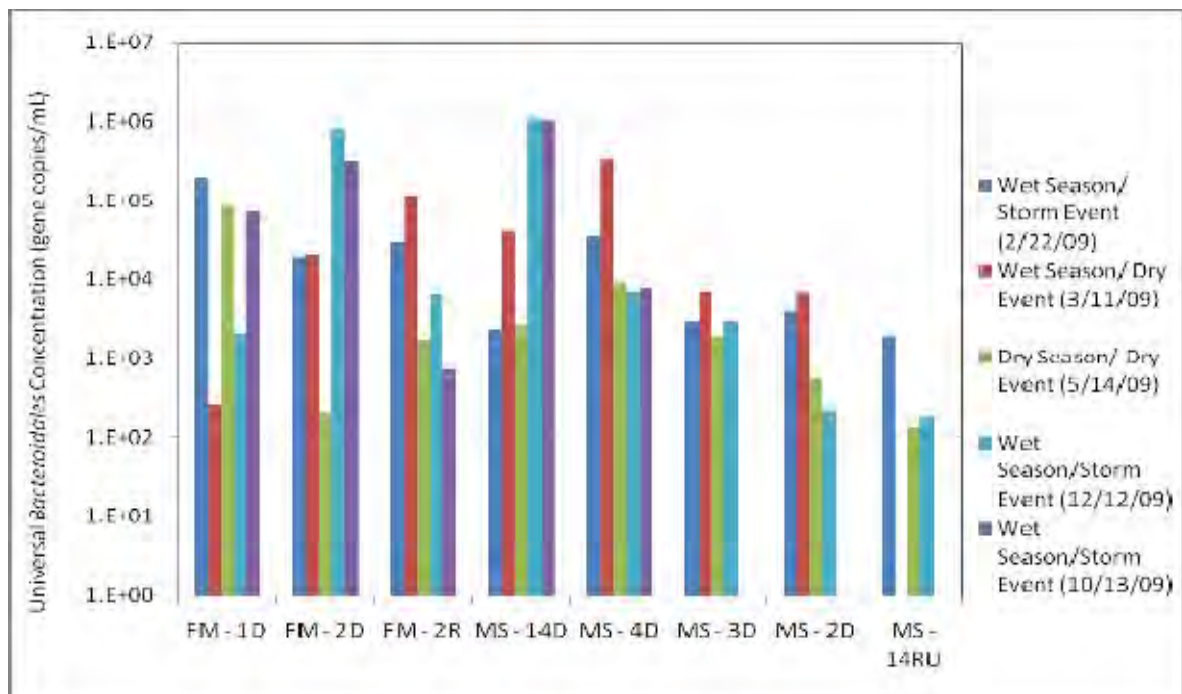


Figure 9-8. Universal *Bacteroidales* Concentration Observed during 2009-2010 Phase II Source Identification Monitoring. Note: If no bar is shown, then the sample was non-detect (below the sample limit of detection).

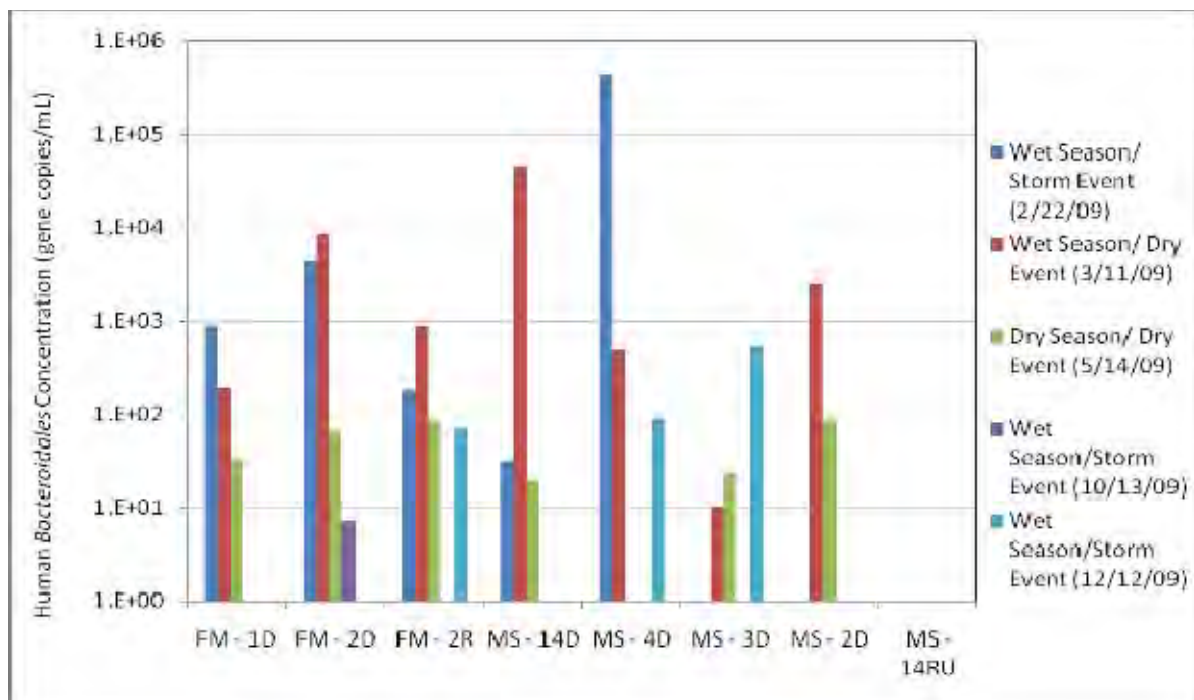


Figure 9-9. Human *Bacteroidales* Concentration Observed during 2009-2010 Phase II Source Identification Monitoring. Note: If no bar is shown, then the sample was non-detect (below the sample limit of detection).

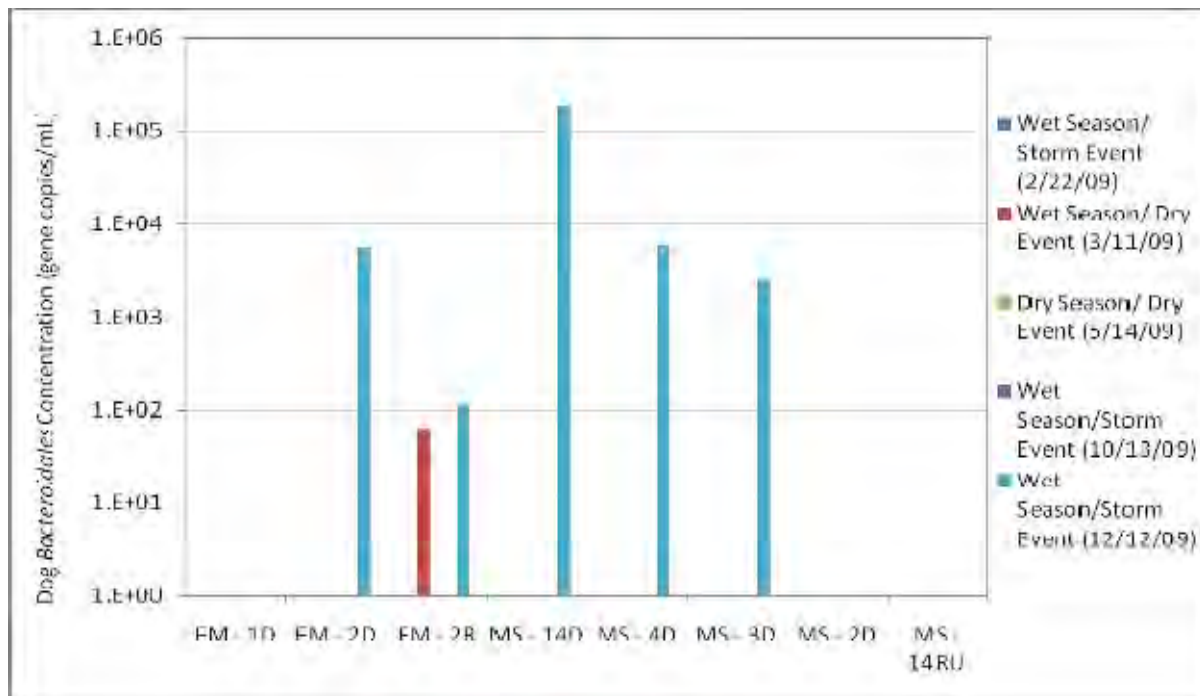


Figure 9-10. Dog *Bacteroidales* Concentration Observed during 2009-2010 Phase II Source Identification Monitoring. Note: If no bar is shown, then the sample was non-detect (below the sample limit of detection).

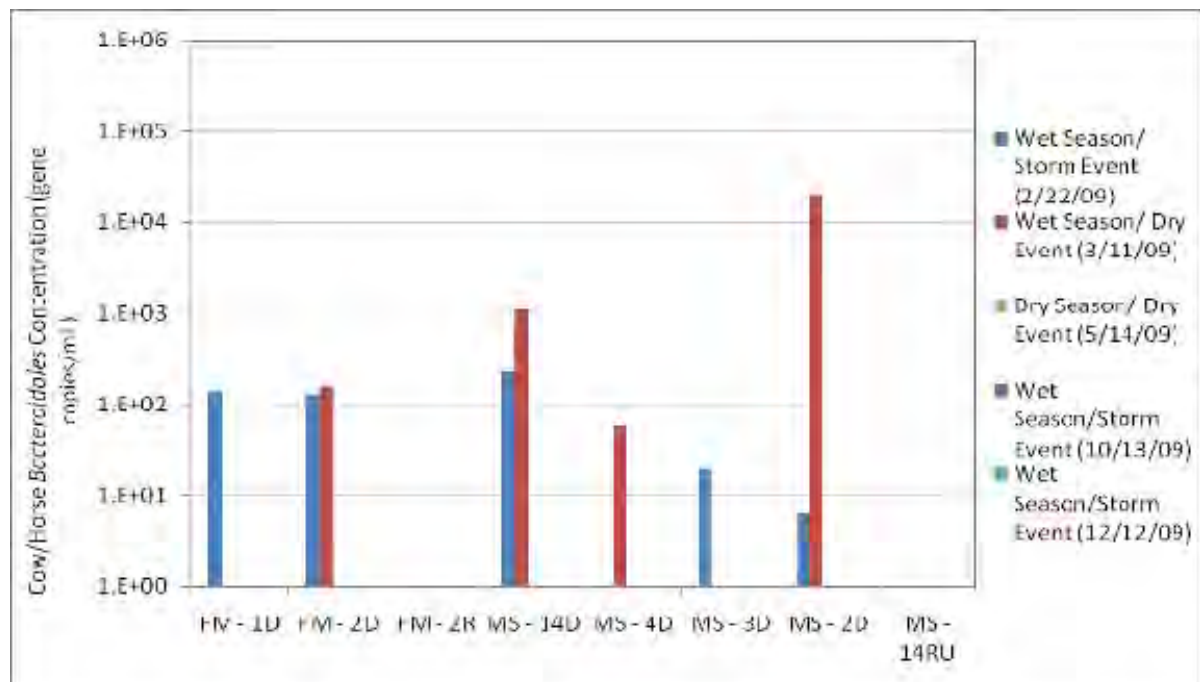


Figure 9-11. Cow and/or horse *Bacteroidales* Concentration Observed during 2009-2010 Phase II Source Identification Monitoring. Note: If no bar is shown, then the sample was non-detect (below the sample limit of detection).

9.3.2.3 BMP Implementation

BMP implementation for the Mosher Slough and Five-Mile Slough watersheds is scheduled to begin in 2010-2011.

9.3.2.4 Phase II Effectiveness Monitoring

Effectiveness monitoring for Phase II waterbodies will begin in 2012-2013.

9.3.3 Phase III Activities

Monitoring Phase	Waterbody	Start Date	End Date
Phase III	Lower Calaveras River Walker Slough	July 1, 2010	June 30, 2018

Phase III, focusing on the Lower Calaveras River and Walker Slough, will begin in the Fall of 2010. Phase III waterbodies and monitoring locations are shown in **Figure 9-12**. Pathogen Plan components underway for Phase III during 2010-2011 are depicted below.

Phase III Component	2010	2011	2012	2013	2014	2015	2016	2017
Characterization Monitoring								
Source ID Monitoring								
Preliminary BMP Implementation								
Effectiveness Monitoring								

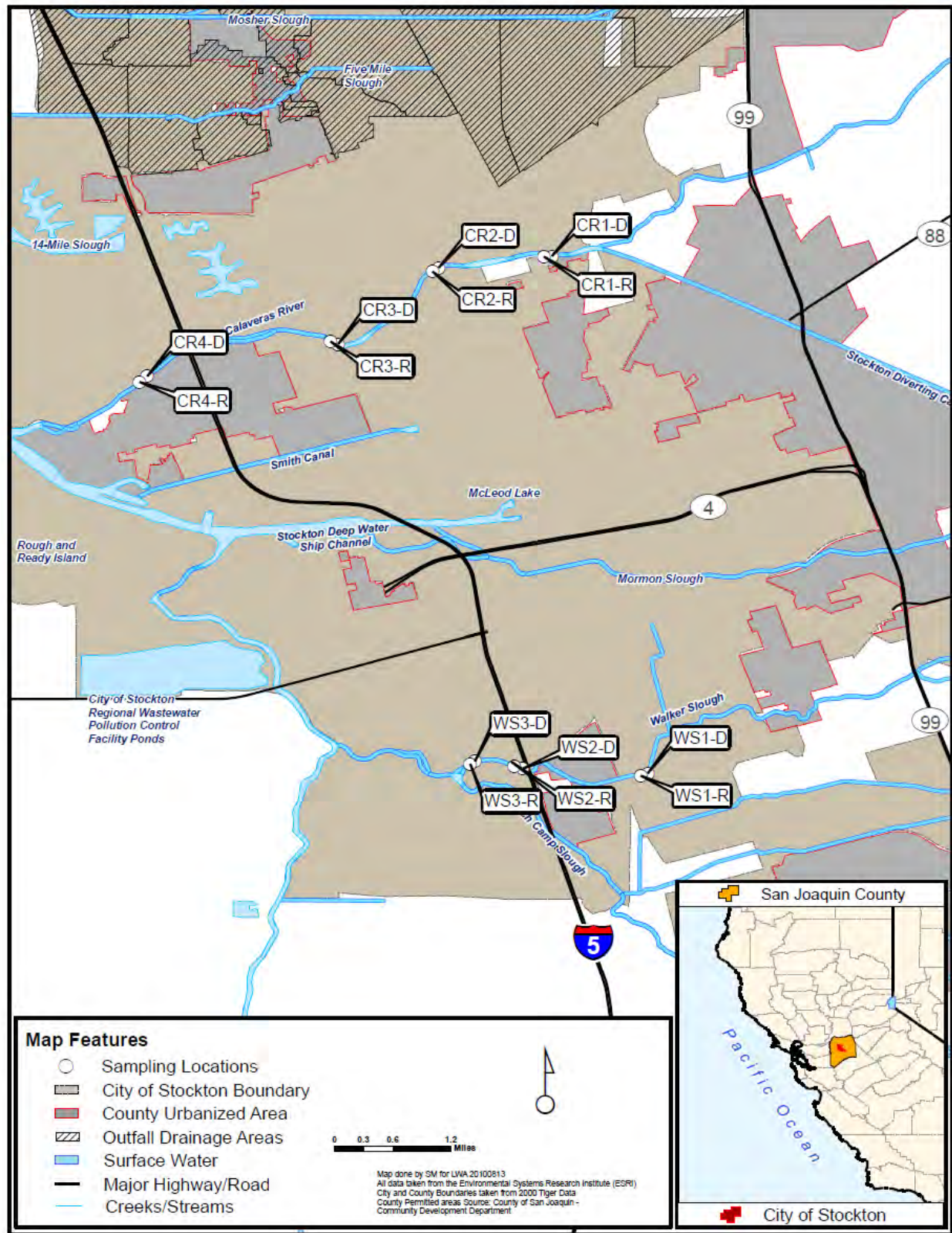


Figure 9-12. Pathogen Plan Phase III Characterization Monitoring Locations

9.3.4 2010-2011 Pathogen Plan Activities

The complete schedule for Pathogen Plan activities is shown in **Figure 9-13**, with the activities to be conducted during 2010-2011 highlighted.

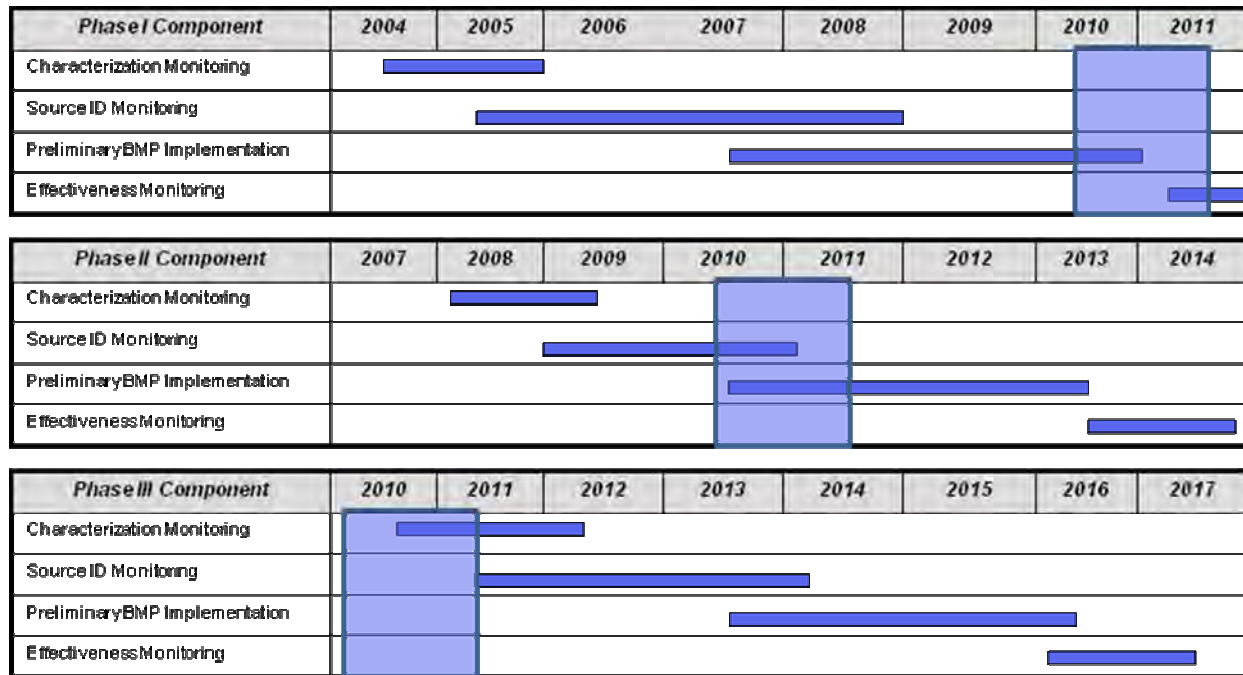


Figure 9-13. Pathogen Plan Schedule. 2010-2011 activities are shown in the blue highlighted boxes.

9.4 MERCURY PLAN

The Sacramento-San Joaquin Delta Estuary (the Delta) is on the Clean Water Act Section 303(d) List of Impaired Water Bodies because of elevated levels of methylmercury in fish. To address mercury impairment in the Delta, the Permittees developed a Mercury Pollution Prevention Plan (Mercury Plan) that included a mercury monitoring program (Methylmercury Monitoring Plan). The Plans identified the Permittees' strategy to reduce methylmercury exposure to human and wildlife in the Delta and to prevent the creation or maintenance of toxic hot spots. In 2008, the Permittees developed and submitted the Mercury Plan and monitoring program according to Provision 28.d of the Permittees' Municipal Stormwater NPDES Permit (Order No. R5-2007-0173).

The focus of the Mercury Plan is to reduce mercury in urban runoff. The Plan identifies possible sources of mercury to urban runoff and describes public outreach and education strategies to mitigate the controllable sources of mercury pollution. It addresses the following goals:

- Public outreach to promote proper use and disposal of products containing mercury, including coordination with household hazardous waste facilities and commercial and industrial outreach
- Assessment and reduction of municipal use of mercury-containing products
- Support of sediment and erosion control efforts
- Characterization of total mercury and methylmercury in Stockton waterbodies and stormwater discharges

9.4.1 Mercury Plan Components

The Mercury Plan approach is shown in **Figure 9-14**, and includes the components described below.

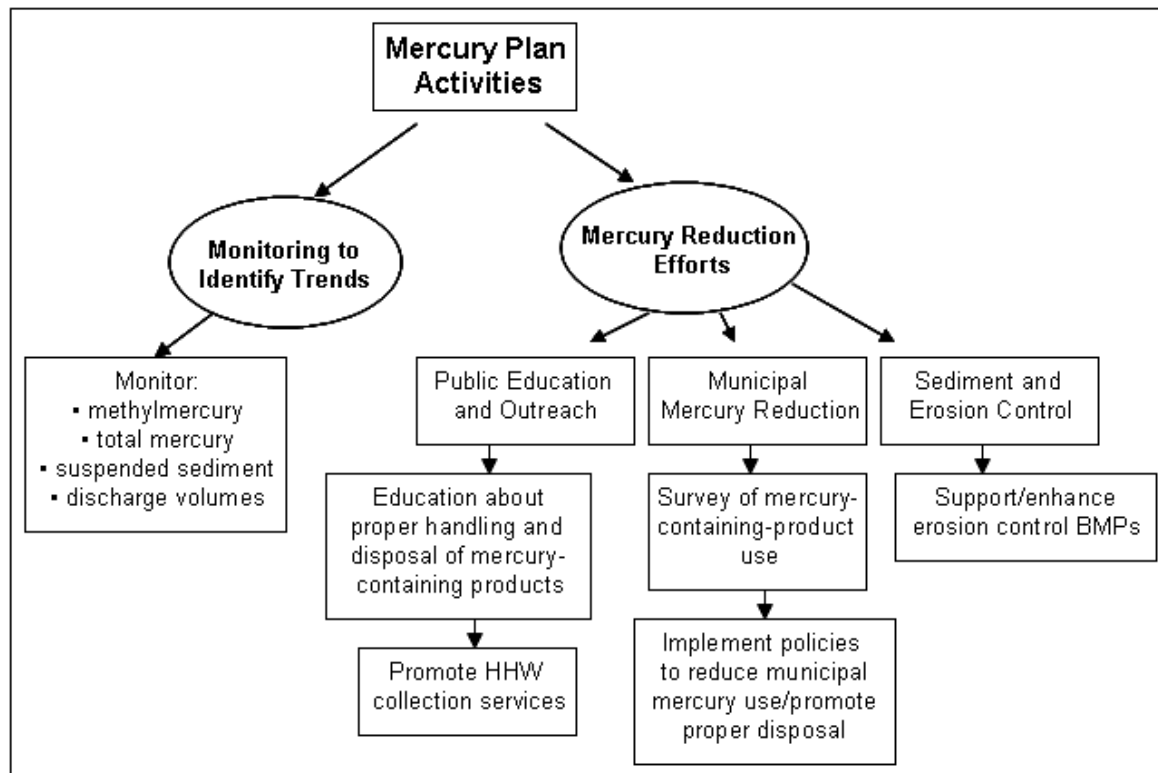


Figure 9-14. The Mercury Plan Approach

9.4.1.1 Public Outreach

The goal of public outreach is to promote public awareness about mercury pollution prevention, as well as inform the public of the health risk of mercury contamination in fish and DHS fish consumption advisories. A major component is to inform the public about common products that contain mercury and safe disposal options using various media. General information regarding mercury in the environment is available on the City's stormwater web site.^[1]

The Permittees jointly conduct an annual mixed media campaign, consisting of radio and government access cable channel public service announcements. During 2009-2010, mercury outreach was provided through an insert in the *Stockton Water News* utility billing newsletter in December 2009 focusing on mercury awareness. This mailer reached more than 46,000 utility customers.

Finally, the City promotes the County's hazardous waste collection program on its Web site, through the distribution of Household Hazardous Waste Facility brochures, and in the City's utility bill newsletter. During 2009-2010, the Household Hazardous Waste Program, a joint effort of the City and County, collected mercury-containing products, as described in Section 3 of the Annual Report.

9.4.1.2 Commercial and Industrial Outreach

The City of Stockton contracts inspections of commercial and industrial with the purpose of helping local businesses become better aware of what can be done to reduce or eliminate stormwater pollutants. The City Stormwater Program provided information on mercury and mercury disposal to businesses during 2009-2010 as part of the Commercial and Industrial Business Program Inspections. The form for the industrial business inspections was modified to specifically inquire about and review the mercury management plan of each of the businesses inspected.

There are no industrial and commercial inspections planned for 2010-2011. However, outreach to target businesses will be developed and posed on the City's stormwater web site. These outreach materials will be distributed during future inspections. Business-specific fact sheets will contain information specific to each business, listing products that contain mercury, along with proper handling and disposal procedures.

9.4.1.3 Municipal Operations

The Permittees are required to identify the extent of their use of mercury containing products. This was accomplished through a mercury use survey, administered to municipal departments during 2009-2010.

During 2008-2009, the Permittees designed a survey to be administered internally to assess municipal use and handling procedures for mercury-containing products. The purpose of the survey is to identify mercury-containing products used by the Permittees to develop guidelines for a mercury policy to require elimination of mercury from municipal operations when possible, and to ensure the proper management of mercury-containing products.

The survey was completed by at least one representative from each municipal department during fall and winter of 2009/2010. The survey includes a list of commonly used mercury containing products, and representatives were asked to identify which products are used, quantities used, and how products are disposed. Supplemental questions were included to identify whether procedures conform to DTSC guidance for Universal Waste handling and disposal, under the California Universal Waste Rule (UWR). The municipal mercury survey was included as an appendix to the 2008-2009 Annual Report. The completed Municipal Mercury Use Survey Report is included in **Appendix I-5**.

^[1] <http://www.stocktongov.com/mud/>

Key findings from the survey include the following:

- The most commonly used mercury-containing products included fluorescent lamps, button cell batteries, thermostats, and compact fluorescent lamps.
- The majority of City respondents (70%) were not aware of the Universal Waste Rule.
- Despite limited awareness of the UWR, no mercury-containing products are disposed of as solid waste.
- Since City departments conform to UWR procedures, a specific policy specifying conformance with the UWR is not necessary at this time. However, increased awareness of the UWR should be promoted through outreach to municipal departments.

The Permittees also continued to implement a Storm Drainage System Maintenance Control Measure, which prioritizes catch basins for cleaning based on the required level of maintenance, labels all with a storm drain message, and includes special event requirements to prevent debris accumulation in catch basins and storm drains. This control measure is described in Section 4 of the Annual Report.

9.4.1.4 Erosion Prevention BMPs

Sediment-associated elemental mercury from historic mining activity is a prevalent mercury source within the Central Valley. Erosion control BMPs are implemented at construction sites within the SUA to avoid increased erosion and transport of mercury-contaminated soil into receiving waters via runoff.

The City implements the Construction Program Element to coordinate programs and resources to effectively reduce pollutants in runoff from construction sites during all construction phases. The Program provides inspection to ensure proper BMP implementation and specific practices which minimize sediment runoff from construction sites, and minimize the potential for erosion in the construction of new development. Efforts conducted during 2008-2009 are described in Section 6 of the Annual Report.

9.4.1.5 Mercury Characterization Monitoring

The Permit requires monitoring to characterize the concentrations and loads of methylmercury entering the Delta from Stockton urban runoff. Characterization studies will focus on total and methylmercury concentrations in receiving waters and discharges (including detention basins). The objective of the Mercury Plan and the Methylmercury Monitoring Plan at this stage is to conduct baseline monitoring to determine the methylmercury and total mercury concentrations and loads discharged to the Delta by the SUA.

The specific monitoring activities are outlined below:

- A combination of discharge outfalls, major upstream tributaries of the SUA and or downstream locations will be monitored for total mercury, methylmercury, and suspended sediment;
- Three storm events and two dry weather events will be monitored each year for three years, including a range of storm intensities; and
- The instantaneous discharges will be estimated at the sampled locations during the time of sampling, and used to estimate the annual discharge volumes from the Stockton area within each watershed.

Baseline mercury monitoring commenced in 2008. Monitoring locations are shown in **Figure 9-15**, and in **Table 9-11** below.

Table 9-11. Mercury Plan Monitoring Locations

Waterbody	Monitoring Location	Monitoring Sites	
		Discharge Site ID	Receiving Water Site ID
Smith Canal	Legion Park pump station at Yosemite Lake	SC-1	SC-5R
Mosher Slough	Morada Basin	MS-1D	MS-5R
Calaveras River	Upstream receiving location at Solari Ranch Road		CR-46RU
	West Lane (South side of river)	CR-46D	
	Downstream discharge and receiving location, at Brookside	CR-39D	CR-39R
Mormon Slough	Weber Avenue Overpass		MR-4R
	Lift station wet well at Commerce Street	MR-2D	

During 2009-2010, five monitoring events were completed. The schedule of completed events is shown in **Table 9-12**. During each event, samples were collected for analysis of total mercury, methylmercury, and suspended sediment concentration.

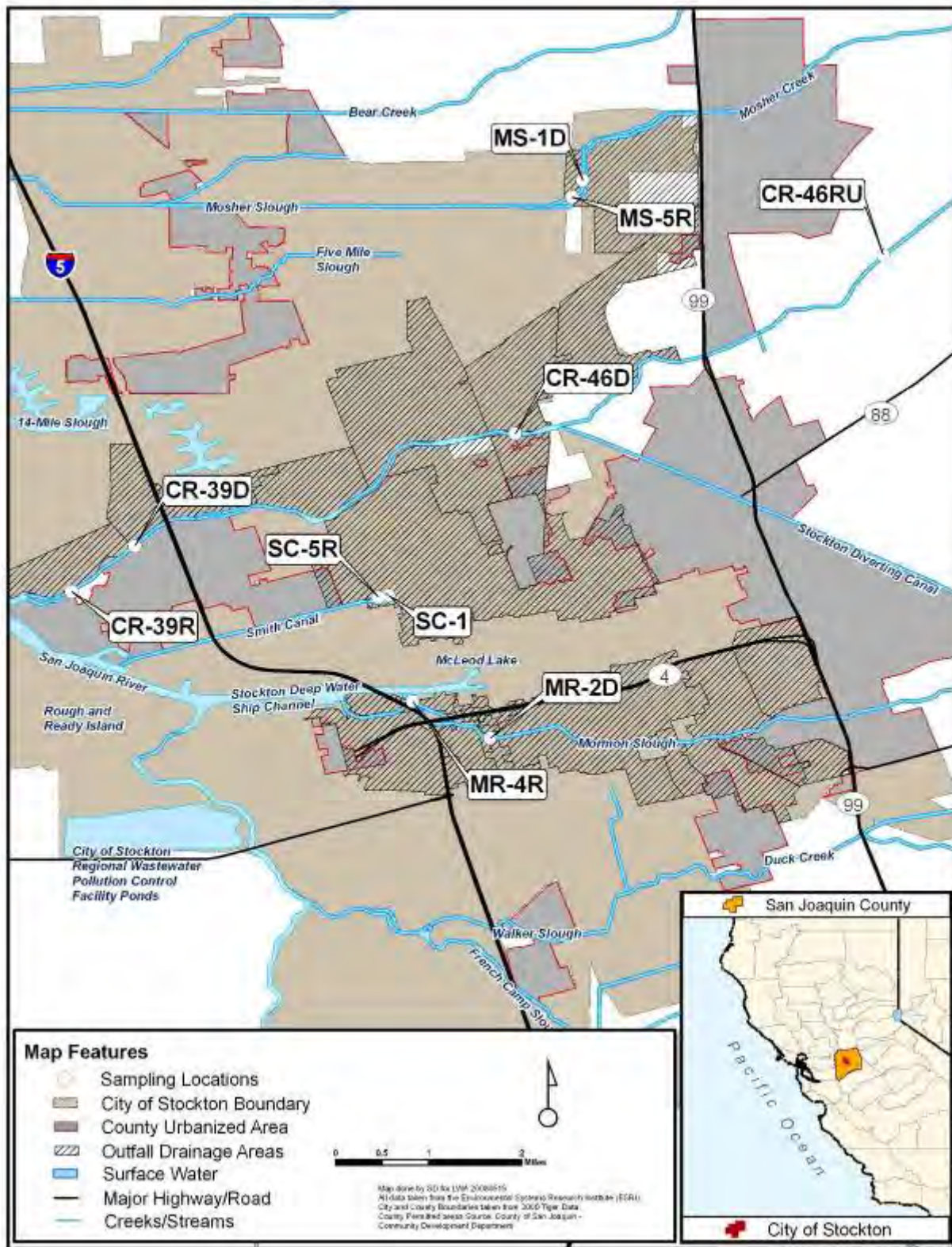


Figure 9-15. Mercury Plan Monitoring Locations

Table 9-12. Schedule of Completed Monitoring Events for the Mercury Plan during 2008-2010

Water-body	Site Type and Name	2008-2009 Monitoring Year					2009-2010 Monitoring Year				
		Dry Weather #1 (1/21/09)	Dry Weather #2 (2/4/09)	Storm Event #1 (2/5/09)	Storm Event #2 (2/22/09)	Storm Event #3 (4/7/09)	Storm Event #1 (10/13/09)	Storm Event #2 (1/17/10)	Dry Weather #1 (2/17/10)	Storm Event #3 (4/11/10)	Dry Weather #2 (6/8/10)
Smith Canal	Discharge: SC-1	√	√	√	√	√	√	√	√	√	√
	Receiving Water: SC-5R	√	√	√	√	√	√	√	√	√	√
Mosher Slough	Detention Basin Effluent: MS-1D	√	√ ^c	√	√	√	√	√	√	√	√
	Receiving Water: MS-5R	√	√ ^c	√	√	√	√	√	√	--- ^b	√
Calaveras River	Upstream location: CR-46RU	--- ^a	--- ^a	--- ^a	√	--- ^a	√	--- ^a	--- ^a	--- ^a	√
	Discharge: CR-46D	√	√	√	√	√	√	√	√	√	√
	Discharge: CR-39D	√	√ ^c	√	√	√	√	√	√	√	√
	Receiving water: CR-39R	√	√ ^c	√	√	√	√	√	√	√	√
Mormon Slough	Discharge: MR-2D	√	√ ^c	√	√	√	√	√	√	√	√
	Receiving water: MR-4R	√	√ ^c	√	√	√	√	√	√	√	√

Notes:

---^a = Not sampled due to dry channel

---^b = Not sampled due to discontinuous flow

c = Not sampled during 2008-2009 due to laboratory miscommunication. A dry weather monitoring event was conducted on 9/3/2009 for these sample locations.

2009-2010 Mercury Monitoring Results

Total mercury, methylmercury, and SSC were monitored during the sampling events described in **Table 9-12**. Results are given in **Tables 9-13, 9-14, and 9-15**, for total mercury, methylmercury, and SSC, respectively. There are no applicable water quality objectives for mercury or methylmercury in the monitored waterbodies, so data is discussed qualitatively in the sections below. Complete 2009-2010 monitoring data are included in **Appendix I-6**.

Table 9-13. Total Mercury Concentrations (µg/L) Observed during 2009-2010

Waterbody	Site Type and Name	Storm Event #1 (10/13/09)	Storm Event #2 (1/17/10)	Dry Weather #1 (2/17/10)	Storm Event #3 (4/11/10)	Dry Weather #2 (6/8/10)
Smith Canal	Discharge: SC-1	0.040	0.0321	0.011	0.003	0.0039
	Receiving Water: SC-5R	0.0058	0.013	0.0029	0.0030	0.0039
Mosher Slough	Detention Basin Effluent: MS-1D	0.0028	0.0023	0.0024	0.0022	0.0063
	Receiving Water: MS-5R	0.0032	0.0053	0.0027	--- ^b	0.0035
Calaveras River	Upstream location: CR-46RU	0.0079	--- ^a	--- ^a	--- ^a	0.0016
	Discharge: CR-46D	0.017	0.081	0.0033	0.0092	0.002
	Discharge: CR-39D	0.020	0.0026	0.0011	0.0076	0.0023
	Receiving water: CR-39R	0.0022	0.0019	0.0047	0.0024	0.0013
Mormon Slough	Discharge: MR-2D	0.018	0.117	0.0053	0.0082	0.0043
	Receiving water: MR-4R	0.0030	0.0026	0.0052	0.016	0.0022

Notes:

---^a = Not sampled due to dry channel

---^b = Not sampled due to discontinuous flow

Table 9-14. Methylmercury Concentrations (ng/L) Observed during 2009-2010

Waterbody	Site Type and Name	Storm Event #1 (10/13/09)	Storm Event #2 (1/17/10)	Dry Weather #1 (2/17/10)	Storm Event #3 (4/11/10)	Dry Weather #2 (6/8/10)
Smith Canal	Discharge: SC-1	0.402	0.322	0.176	0.166	0.151
	Receiving Water: SC-5R	0.111	0.118	0.057	0.039	0.07
Mosher Slough	Detention Basin Effluent: MS-1D	<0.05	0.138	0.090	0.095	0.71
	Receiving Water: MS-5R	0.0631	1.33	0.722	--- ^b	0.028
Calaveras River	Upstream location: CR-46RU	0.164	--- ^a	--- ^a	--- ^a	0.128
	Discharge: CR-46D	0.204	0.493	0.056	0.188	0.123
	Discharge: CR-39D	0.485	0.189	0.059	0.124	0.822
	Receiving water: CR-39R	0.0567	0.068	0.152	0.044	0.042
Mormon Slough	Discharge: MR-2D	0.390	0.241	0.093	0.039	0.115
	Receiving water: MR-4R	<0.05	0.032	0.117	0.062	0.183

Notes:

ND = Non-detect (less than the RL of 5×10^{-5} µg/L)

---^a = Not sampled due to dry channel

---^b = Not sampled due to discontinuous flow

Table 9-15. Suspended Sediment Concentration (mg/L) Observed during 2009-2010 Mercury Plan Monitoring

Waterbody	Site Type and Name	Storm Event #1 (10/13/09)	Storm Event #2 (1/17/10)	Dry Weather #1 (2/17/10)	Storm Event #3 (4/11/10)	Dry Weather #2 (6/8/10)
Smith Canal	Discharge: SC-1	70	92	25	<10	<10
	Receiving Water: SC-5R	35	64	16	30	38
Mosher Slough	Detention Basin Effluent: MS-1D	20	12	<10	10	140
	Receiving Water: MS-5R	17	24	<10	--- ^b	13
Calaveras River	Upstream location: CR-46RU	18	--- ^a	--- ^a	--- ^a	<10
	Discharge: CR-46D	44	390	<10	25	<10
	Discharge: CR-39D	114	18	<10	<10	<10
	Receiving water: CR-39R	9	<10	<10	<10	<10
Mormon Slough	Discharge: MR-2D	60	170	17	99	61
	Receiving water: MR-4R	24	<10	<10	<10	<10

Notes:

---^a = Not sampled due to dry channel

---^b = Not sampled due to discontinuous flow

To display the spatial and temporal variation of the total mercury, methylmercury, and SSC data collected during the Mercury Plan, a geographic information systems (GIS) tool was utilized, as shown in **Figure 9-16**. A comprehensive analysis of mercury monitoring results will be presented in the Baseline Characterization Report in 2011, which will include statistical analyses and mercury load estimates. A qualitative analysis of the data is presented below.

Total Mercury

There are no applicable WQOs for mercury in Stockton waterways; however, total mercury concentrations were relatively low, and were consistently below the California Toxics Rule (CTR) criterion of 0.05 µg/L for total recoverable mercury for freshwater sources of drinking water⁸. The

⁸ The CTR does not specify duration or frequency, but the Regional Water Board has previously employed a 30-day averaging period with an allowable exceedance frequency of once every three years. Mercury in urban runoff can

highest mercury concentrations were observed at the Calaveras River 46-D discharge location and the Mormon Slough MR-2D discharge location during the second storm event (1/17/10), which were higher than the CTR criterion. Generally, mercury concentrations were more variable and somewhat higher during storm events. Concentrations of total mercury were not significantly different between receiving water and urban discharge sampling locations.

Methylmercury

Methylmercury was detected in very low concentrations at all locations except for the Mormon Slough receiving water location MR-4R and the detention basin effluent MS-1D during the first storm event (10/13/09). Generally, levels did not vary substantially among urban discharge and receiving water locations, or between the upstream location and locations with the urban area.

Suspended Sediment Concentration

Suspended sediment concentrations appeared to show similar trends to total mercury and methylmercury data; however, due to the limited dataset, trends were not statistically significant. Concentrations of SSC were generally less than 100 mg/L, except surprisingly at site MS-1D during the second dry weather event, and at sites CR-46D and MR-2D during the second storm event. Most locations (SC-1, MS-5R, CR-46D, CR-39D, and MR-2D) appeared to have elevated SSC during storm events compared to dry weather.

be compared to CTR standards, but there may be too little urban runoff and receiving water concentration data to evaluate compliance with the CTR.

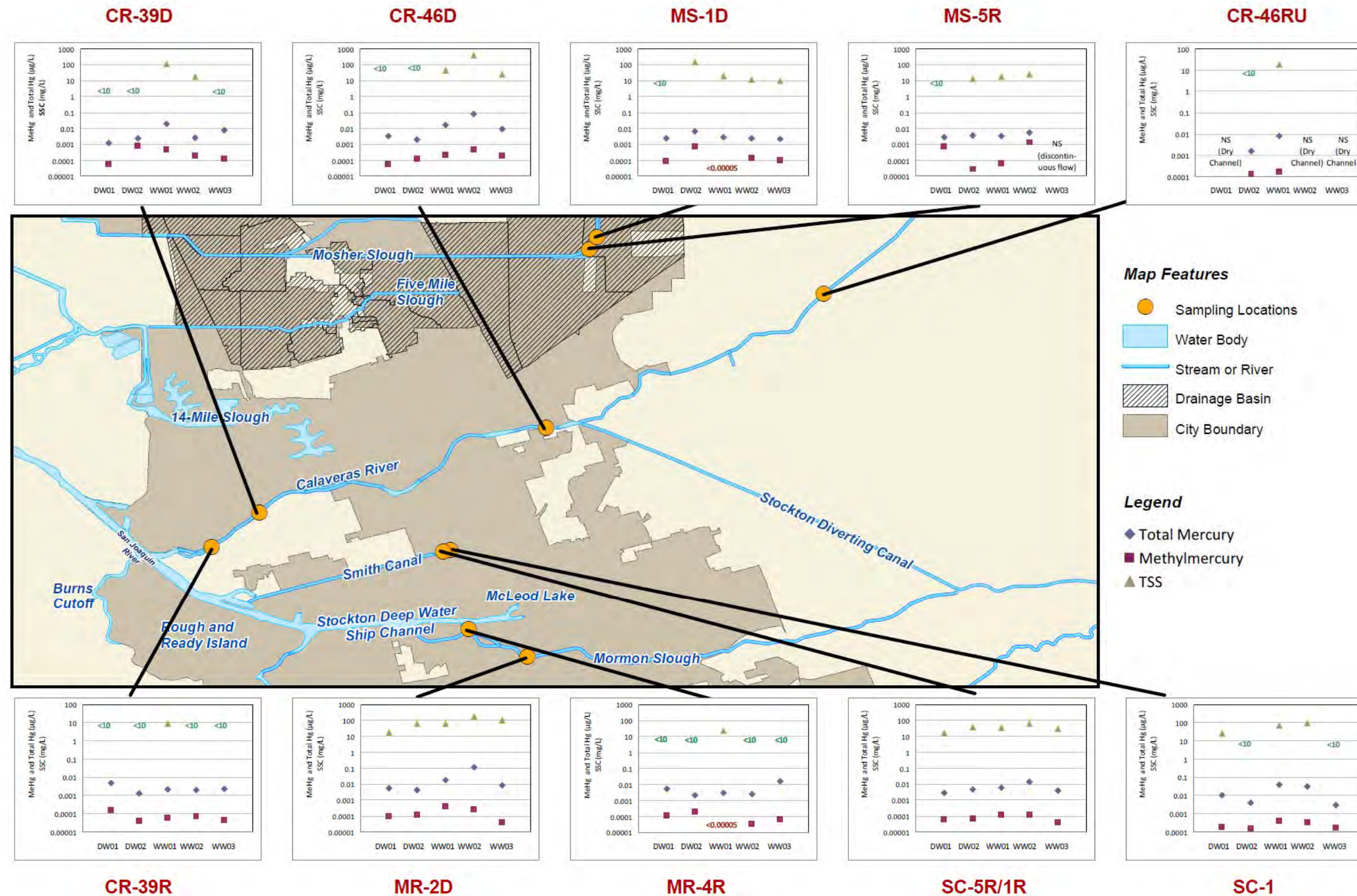


Figure 9-16. Concentrations of total mercury (Total Hg), methylmercury (MeHg), and suspended sediment concentration (SSC) observed during 2009-2010 Mercury Plan monitoring. DW01 = 2/17/10 Dry Weather Event; DW02 = 6/8/10 Dry Weather Event; WW01 = 10/13/09 Storm Event; WW02 = 1/17/10 Storm Event; WW03 = 4/11/10 Storm Event

9.4.2 2010-2011 Mercury Plan Activities

Mercury Plan activities for the 2010-2011 reporting year will include the following:

- **Public Outreach:** Continue to coordinate with Household Hazardous Waste Program to promote proper disposal of mercury-containing products.
- **Commercial and Industrial Outreach:** Develop fact sheets to be distributed during commercial and industrial inspections.
- **Municipal Operations:** Provide outreach to municipal departments on Universal Waste Rule guidelines for safe handling and disposal of mercury-containing products.
- **Characterization Monitoring:** Continue characterization monitoring for one more year, through 2010-2011. The Permittees will develop annual load estimates based on characterization monitoring results and estimated flows, and begin drafting the Baseline Mercury Monitoring report (to be submitted in December 2011).

9.5 LOW DISSOLVED OXYGEN PLAN

The 13267 Letter and Permit Provision D(28)(b)(iii) require the City and County to develop and implement a low dissolved oxygen (DO) monitoring and assessment work plan (Low DO Work Plan⁹). The purpose of the Low DO Work Plan is to assess the impacts from urban runoff on receiving water quality within the SUA. The City and County using Condor Earth Technologies, Inc. (Condor) conducted low DO monitoring activities for the 2009-2010 fiscal year in general conformance with the Low DO Work Plan, dated April 3, 2009.

The following summarizes the Low DO Work Plan monitoring program efforts through June 30, 2010. Data for 2009-2010 Low DO Plan monitoring efforts are included in **Appendix I-7**.

9.5.1 2009/2010 Low DO Work Plan

The Low DO Work Plan provided for a two-year sampling and continuous monitoring program (one year for Smith Canal) for the six SUA waterbodies classified under the Federal Clean Water Act (CWA) Section 303(d) as low DO impaired. One receiving water and one urban discharge location was identified for Smith Canal and Mormon Slough; two receiving water and two urban discharge locations were identified each for Calaveras River, Stockton Deep Water Ship Channel (Stockton Channel), Five-Mile Slough, and Mosher Slough. An implementation schedule was proposed in Section 8 of the Low DO Work Plan; however, this schedule was modified due to issues regarding site access, equipment security, and construction activities.

During 2009-2010, water quality *in-situ* data recorders (*in-situ* recorders) were installed and monthly grab samples were collected in five of the six SUA waterways as shown in **Figure 9-17**. *In-situ* data recorders were installed at one receiving water location in Mormon Slough (MM-4R) and Five-Mile Slough (5M-25R) and in two receiving water locations in the Calaveras River (CR-42R, upstream; CR-39R, downstream). During the 2008-2009, *in-situ* data recorders had been installed in Smith Canal at Yosemite Lake (SC-5R) and in the Stockton Channel (DW-1R, upstream; DW-2R, downstream). Implementation of the monitoring program in Mosher Slough, as summarized in the Low DO Work Plan, was suspended pending regulatory approval of requested modifications (see following Section 9.5.2). Monthly water quality grab samples were collected at each active receiving water and corresponding urban discharge monitoring location, conditional upon active flow and absence of tidal impact, for oxygen-demanding substances and nutrient analyses. In addition sediment samples were collected at the Smith Canal, Calaveras River, and Mormon Slough receiving water locations for BOD₅, COD, sediment oxygen demand (SOD), and total organic carbon (TOC).

⁹ City of Stockton and County of San Joaquin *Low Dissolved Oxygen Monitoring and Assessment Work Plan*, dated April 3, 2009

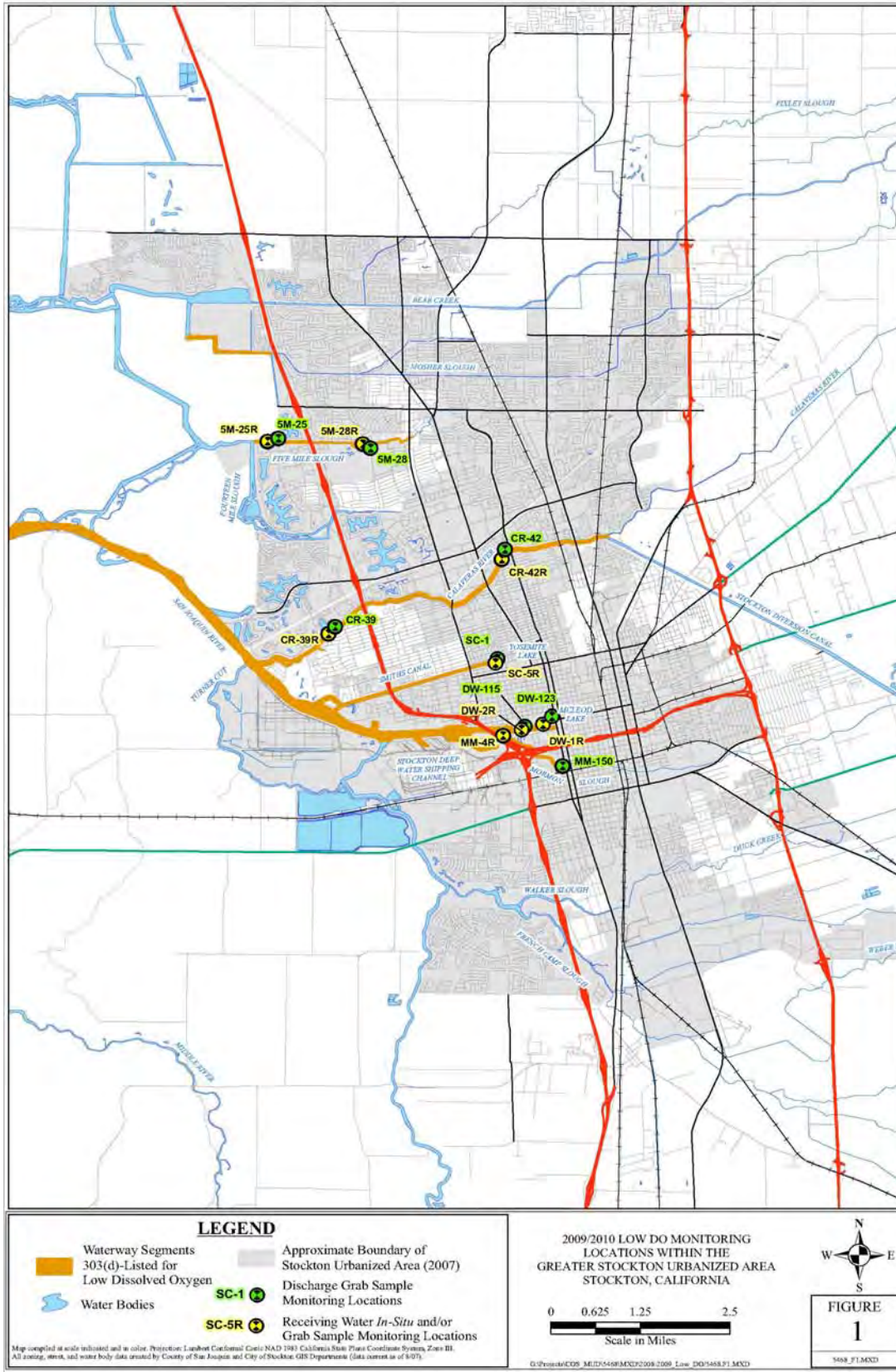


Figure 9-17. Low DO Plan *In-situ* Recorder Locations

9.5.2 Monitoring Challenges and Modifications

Equipment and personnel security is a principal concern along all of the SUA waterways and has hampered commencement of the *Low DO Work Plan* monitoring program at the Mosher Slough and upstream Five-Mile Slough locations. Installed equipment has twice been vandalized at Mosher Slough, and field personnel have been verbally threatened by a local property owner. Relocation of the proposed Mosher Slough and upstream Five-Mile Slough (5M-2R) monitoring locations (see Figure 4, Attachment A, Low DO Work Plan) is limited by property boundaries, access, and available water. Implementation of the monitoring program in Mosher Slough was suspended pending regulatory/Permittee agreement and approval of plan modification.

The entire length of Five-Mile Slough is highly urbanized and very shallow. Relocating the proposed upstream location east is limited by available water (insufficient water column) and the fact that moving the proposed location any further west would encroach upon the downstream monitoring location. Consequently, the following modification to the Five-Mile Slough low DO monitoring program was implemented¹⁰: the upstream monitoring location was moved east, immediately downstream of the Alexandria Place Pump Station (5M-28) located in the northeast corner of Swenson Park. The average water depth at the Alexandria Place/Five-Mile upstream receiving water site (5M-28R) did not support installation of an *in-situ* data recorder; however, monthly field parameters including date, time, water temperature, depth, DO, pH, turbidity and electrical conductivity (EC) were collected.

9.5.3 Field Monitoring

During 2009/2010, *in-situ* data recorders were installed and grab sampling commenced at the receiving water and urban discharge monitoring locations shown in **Table 9-16**. Stockton Channel discharge points are tidally influenced gravity outfalls. Due to tidal impact and/or lack of active discharge during scheduled sampling events, grab samples were not collected at DW-115 and DW-123 outfalls.

¹⁰ Informal Response to City of Stockton's MS4 Request to Modify the Low Dissolved Oxygen Work Plan, provided in an email correspondence from the Regional Water Quality Control Board, TMDL Group, dated May 25, 2010.

Table 9-16. 2009/2010 In-Situ and Grab Sample Monitoring Locations

Waterbody	Monitoring Location (nearest urban/ geographic feature)	(Site ID)	Field Activity	
			Grab Sample Collection Start Date	<i>In-Situ</i> Recorder Installation Date
Smith Canal	Yosemite Lake	SC-5R	12/19/2008	11/14/2008
	Legion Park Pump Station	SC-1	12/19/2008	NA
Stockton Channel	Stockton Marina Dock D	DW-2R	7/06/2009	6/24/2009
	Harrison Street ^a	DW-115	NS	NA
	Stockton Marina Dock H	DW-1R	7/06/2009	6/24/2009
	McLeod Lake ^a	DW-123	NS	NA
Mormon Slough	Weber Avenue Bridge	MM-4R	9/09/2009	9/02/2009
	Commerce Street P.S.	MM-150	10/06/2009	NA
Five-Mile Slough	Fourteen-Mile Slough	5M-25R	3/12/2010	3/05/2010
	Lighthouse Drive P.S.	5M-25	3/12/2010	NA
	Swenson Park NE Corner	5M-28R	3/12/2010	NA
	Alexandria Place P.S.	5M-28	3/12/2010	NA
Calaveras River	Stockton Yacht Club	CR-39R	10/22/2009	9/14/2009
	Brookside Pump Station	CR-39	10/22/2009	NA
	El Dorado Street Bridge	CR-42R	1/08/2010	1/08/2010
	Bianchi P.S.	CR-42	1/08/2010	NA

Notes:

NA = Not Applicable

NS = Not Sampled due to tidal impact, dry conditions, or insufficient flow

P.S. = Pump Station Wet Well

a = Stormwater System Gravity Outfall

Grab samples collected from the receiving waters and pump station wet wells were analyzed for oxygen demanding substances including: biochemical oxygen demand (BOD₅), chemical oxygen demand (COD), total suspended solids (TSS), total ammonia-nitrogen (N), nitrate, nitrate as N, nitrite, nitrite as N, orthophosphate, total phosphorous, and volatile suspended solids (VSS).

In-situ data are recorded on continuous 15-minute intervals for the water quality field parameters listed in **Table 9-17**.

Table 9-17. Low DO Work Plan - *In-Situ* Water Quality Parameters

Constituent	Units	Recording Method	Monitoring Schedule and Process
Date	mm/dd/yy	Recorded	Every 15 minutes; field
Time	hh:mm:ss	Recorded	Every 15 minutes; field
Temperature	°C	Recorded	Every 15 minutes; field
Depth	m	Recorded	Every 15 minutes; field
Dissolved Oxygen (DO)	mg/L	Recorded	Every 15 minutes; field
pH	Std. Units	Recorded	Every 15 minutes; field
Oxidation Reduction Potential (ORP)	mV	Recorded	Every 15 minutes; field
Turbidity	NTU	Recorded	Every 15 minutes; field
Electrical Conductivity (E.C.)	mS/cm	Recorded	Every 15 minutes; field
Salinity	ppt	Calculated*	Every 15 minutes; field
Total Dissolved Solids (TDS)	g/L	Calculated*	Every 15 minutes; field
Resistivity	Kohm/cm	Calculated*	Every 15 minutes; field

Note:

*Values calculated by the data recorder software

During 2009/2010, sediment samples were collected at the Smith Canal, Calaveras River, and Mormon Slough receiving water locations for BOD₅, COD, sediment oxygen demand (SOD), and total organic carbon (TOC). Sediment sample locations and dates are provided in **Table 9-18**. Sediment sampling occurs once following a wet season storm event and once during the dry season (anticipated May through August). Sediment sample analytical results for the 2009-2010 low DO monitoring program are provided in **Table 9-19**.

Table 9-18. 2009/2010 Low DO Work Plan Sediment Sample Monitoring Locations and Sample Dates

Waterbody	Monitoring Location	(Site ID)	Wet Season	Dry Season
Smith Canal	Yosemite Lake	SC-5R	10/23/2009	7/8/2009
Mormon Slough	Weber Avenue Bridge	MM-4R	10/23/2009	*
Calaveras River	Stockton Yacht Club	CR-39R	10/22/2009	6/21/2010
	El Dorado Street Bridge	CR-42R	**	6/21/2010

* Sampled after June 30, 2009

** Site was not yet established during 2009 wet season

Table 9-19. 2009/2010 Low DO Work Plan Sediment Sample Analytical Results

Waterbody	Site ID	Date	Laboratory Analytical Results			
			BOD ¹ mg/kg	COD ² mg/kg	TOC mg/kg	SOD g/m ² /day
Smith Canal	SC-5R	7/8/2009	880	31,000	15,000	0.59
		7/8/2009 ^{FD}	860	36,000	15,000	0.61
		10/23/2009	14,000	34,000	12,000	1.2
Mormon Slough	MM-4R	10/23/2009	5,200	5,600	8,900	0.98
Calaveras River	CR-39R	10/22/2009	9,600	13,000	13,600	0.93
		6/21/2010	1,100	3,600	13,500	0.58
		6/21/2010 ^{FD}	1,100	3,700	20,300	0.63
		6/21/2010	570	1,000	15,600	0.92

Notes:^{FD} = Field Duplicate

BOD = Biochemical Oxygen Demand

COD = Chemical Oxygen Demand

TOC = Total Organic Carbon

SOD = Sediment Oxygen Demand

Units:

mg/kg – milligram per kilogram – parts per million (ppm)

g/m²/day – grams per meter squared per day

1. The method for BOD in soils is a modified method of SM5210B described as SM5210B (M) in which the soil is extracted with DI water and then an aliquot of the extract is analyzed as a water sample (EPA 405.1).

2. The method for COD in soils is a modified method of SM5220D described as SM5220D (M) in which the soil is extracted with DI water and then an aliquot of the extract is analyzed as a water sample (SM5220D).

Grab samples were collected at the urban discharge and receiving water sites during dry weather¹¹ and between two and four days following a qualifying storm event¹². Laboratory analytical results for oxygen demanding substances and nutrient concentrations are provided in **Appendix I-7**.

9.5.4 Results and Discussion

At this preliminary stage of the monitoring effort it is too early to draw conclusions regarding the data. As a consequence, only the data is presented. A full analysis of the data will be performed for the final report due for delivery to the Regional Water Board in December 2012.

Graphical presentations of detected laboratory analytical results and recorded precipitation data for Smith Canal (SC-1 and SC-1R), Mormon Slough (MM-150 and MM-4R), and the Calaveras River (CR-39 and CR-39R) are presented in **Figure 19-18** through **Figure 19-29**. These three waterbodies were selected to illustrate different inputs from different land uses. The CR-439 and MM-4R sites receive much more mixing from other water sources than the SC-5R site which receives almost exclusively urban discharge

¹¹ Dry weather monitoring events are preceded by at least seven (7) dry days (defined as typically 0.10 inches of rainfall or less).

¹² Timing of storm event sampling is based on data presented in the *Smith Canal Drainage Area Analysis and Dissolved Oxygen Work Plan Final Report*, dated October 2, 2006. A qualifying storm event is defined as a storm with a 70% probability of at least 0.25 inches of precipitation forecasted a minimum of 72 hours prior to the event and preceded by a continuous three day period with no measurable precipitation (defined as less than 0.10 inch of precipitation during the previous 72 hours).

and groundwater flows. CR-39R is located approximately two miles upstream of the Calaveras River's confluence with the San Joaquin River; CR-39 discharges urban runoff from a younger, predominantly upscale residential area. MM-4R is located approximately 400 feet south of the confluence with the Stockton Channel; MM-150 discharges urban runoff from a mixed use area consisting of older residential, commercial and industrial properties. With the exception of nitrate concentrations in Mormon Slough (MM-4R) and the Calaveras River (CR-39R), concentrations of nutrients and oxygen demanding substances were generally higher in the wet well samples relative to that detected in the corresponding receiving water samples.

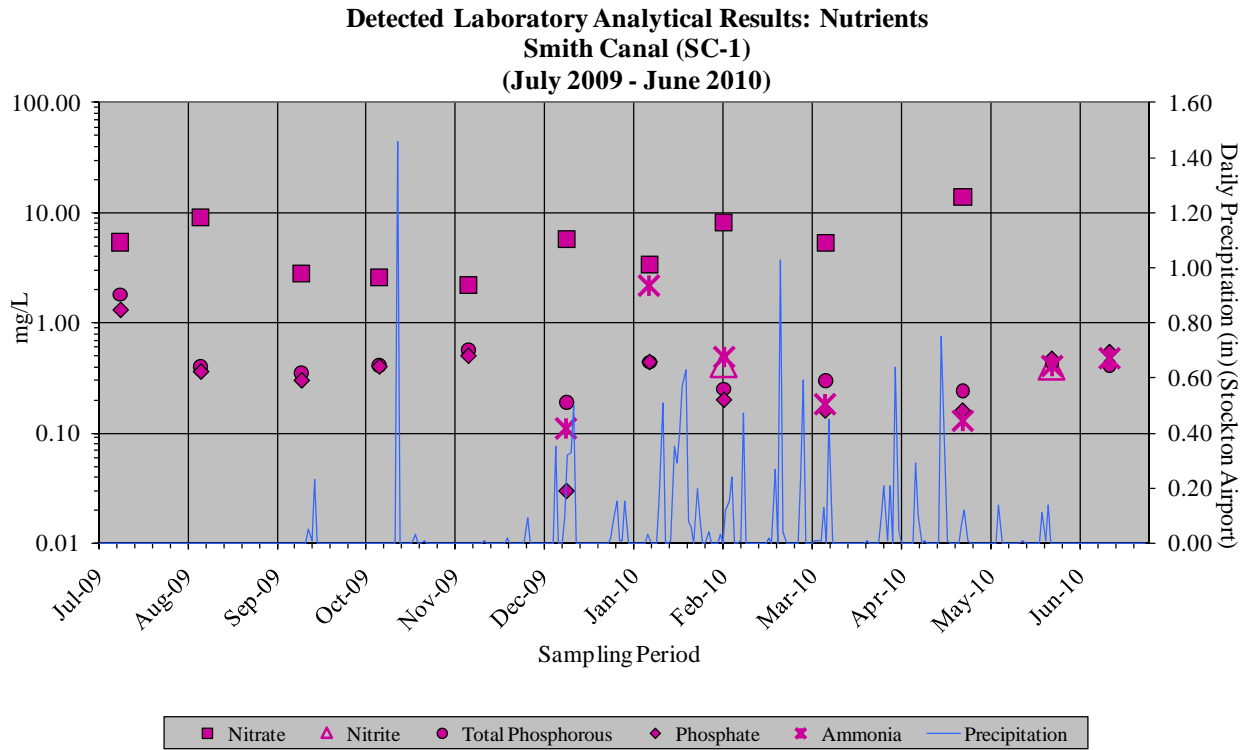


Figure 9-18. Yosemite Lake (SC-1)

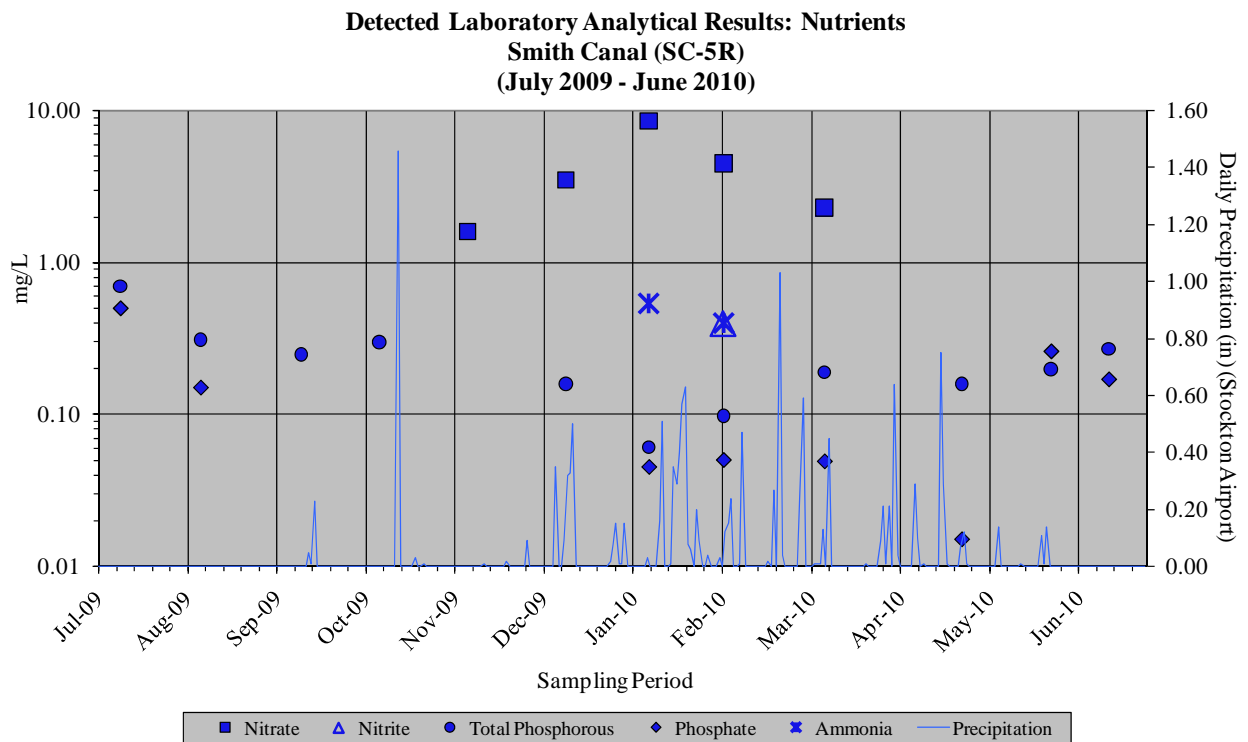


Figure 9-19. Yosemite Lake (SC-5R)

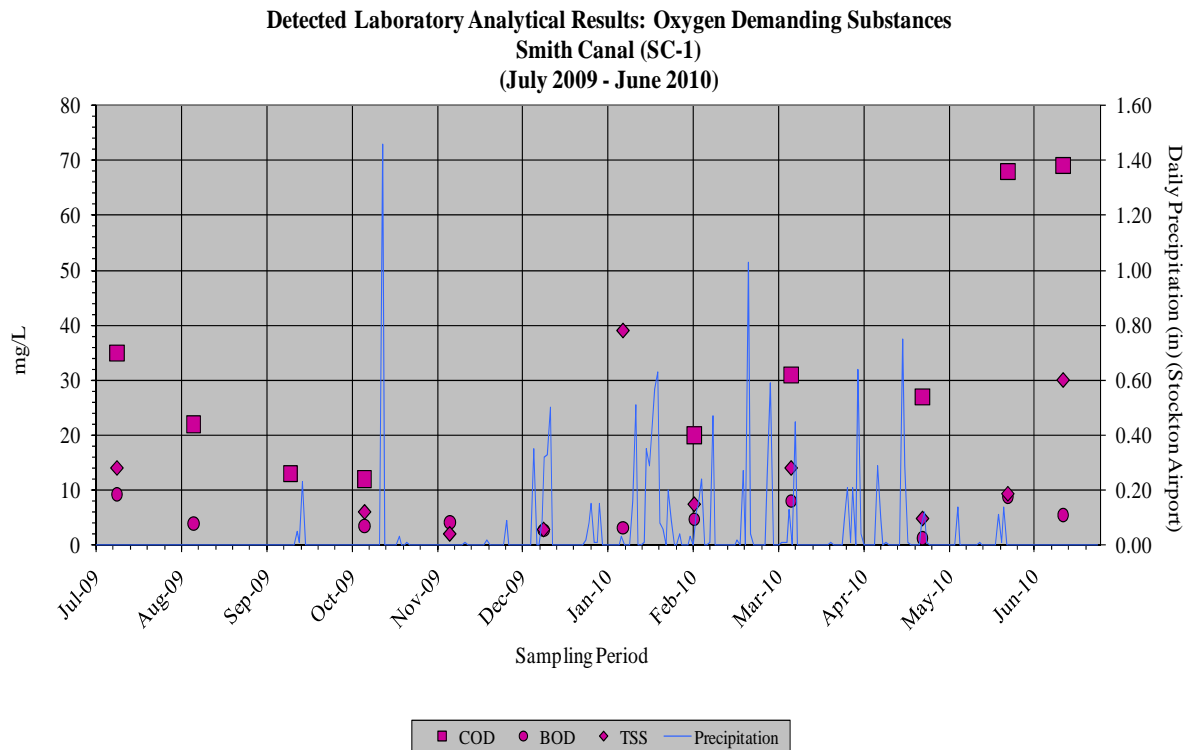


Figure 9-20. Yosemite Lake (SC-1)

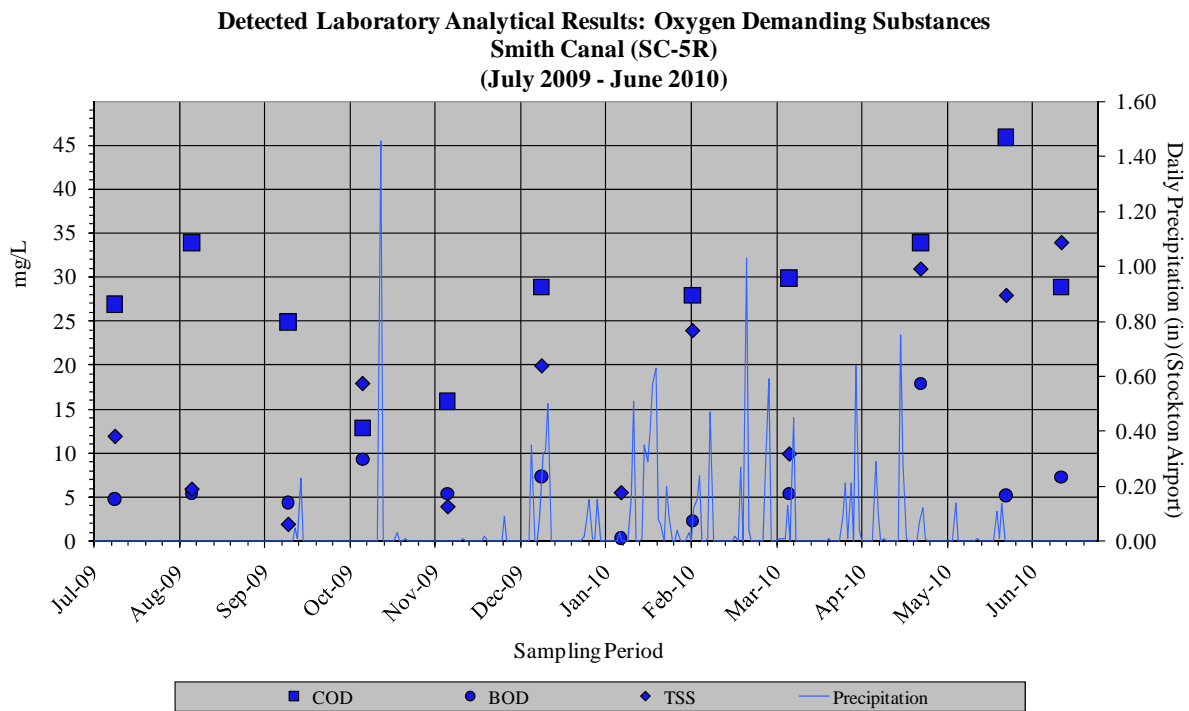


Figure 9-21. Yosemite Lake (SC-5R)

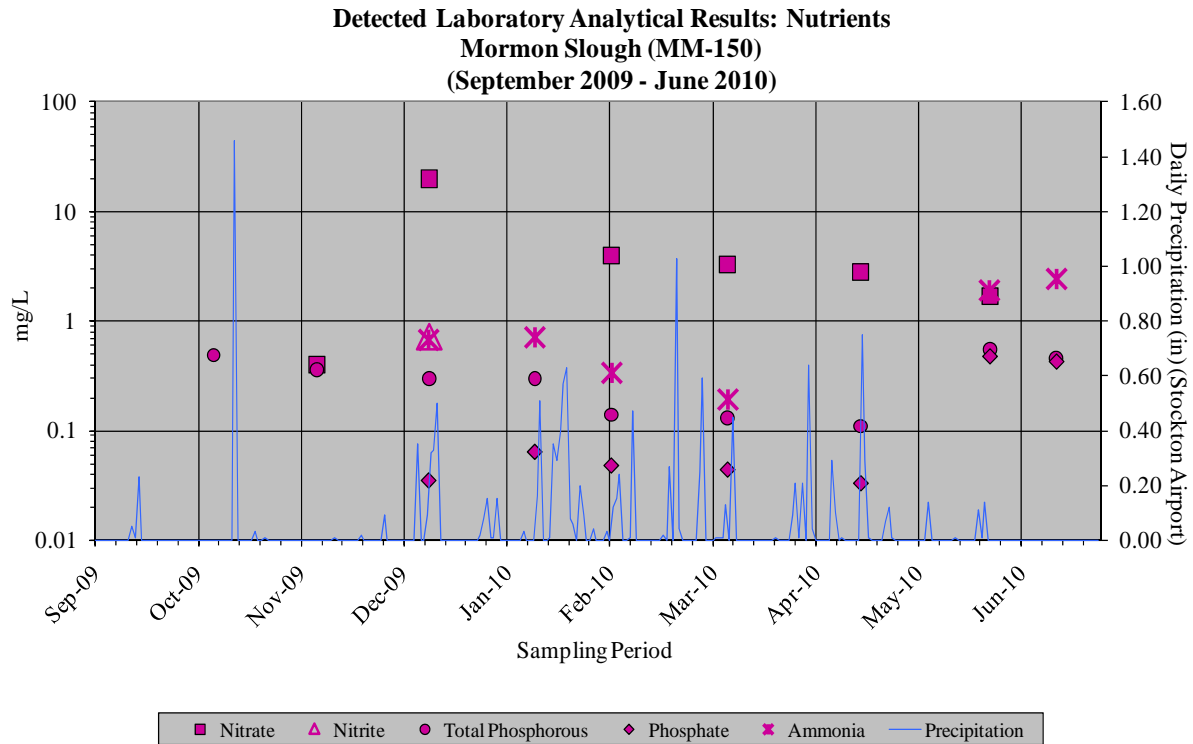


Figure 9-22. Mormon Slough (MM-150)

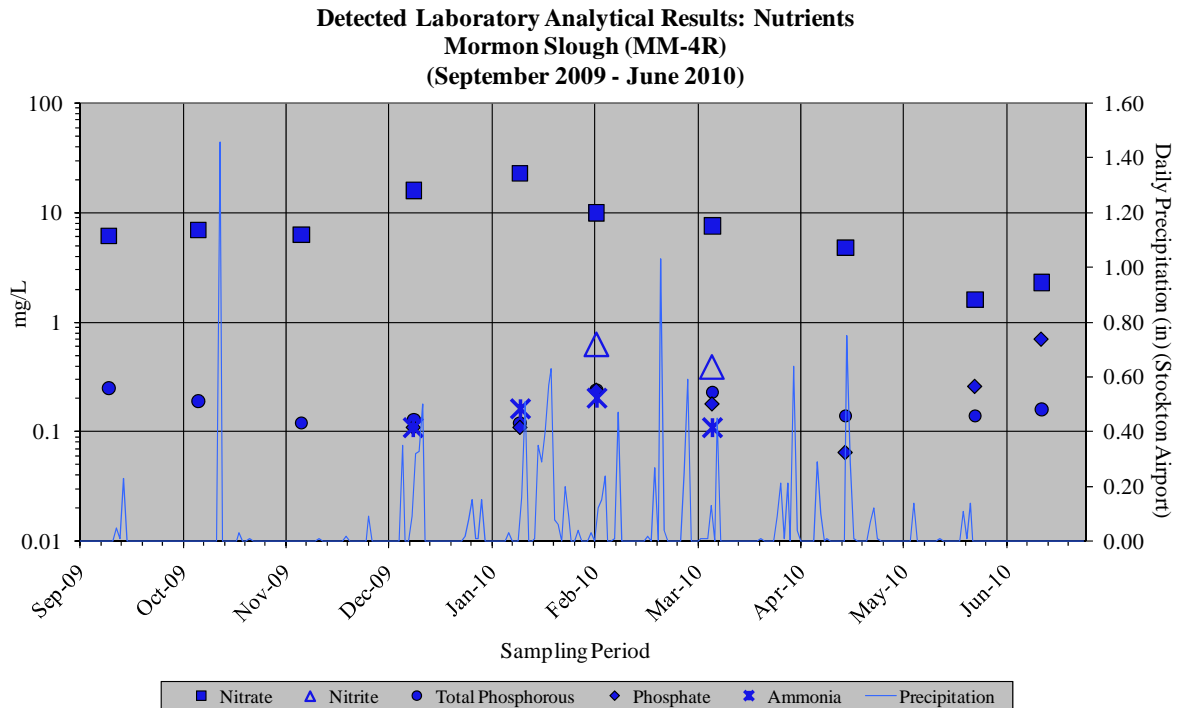


Figure 9-23. Mormon Slough (MM-4R)

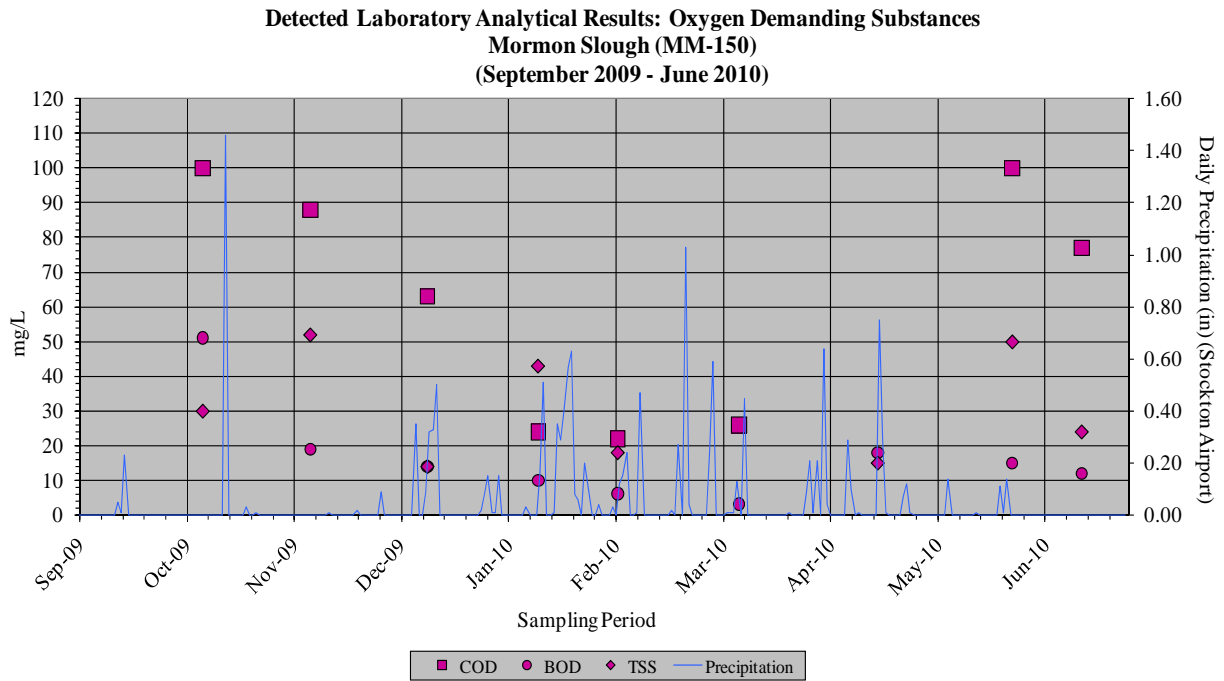


Figure 9-24. Mormon Slough (MM-150)

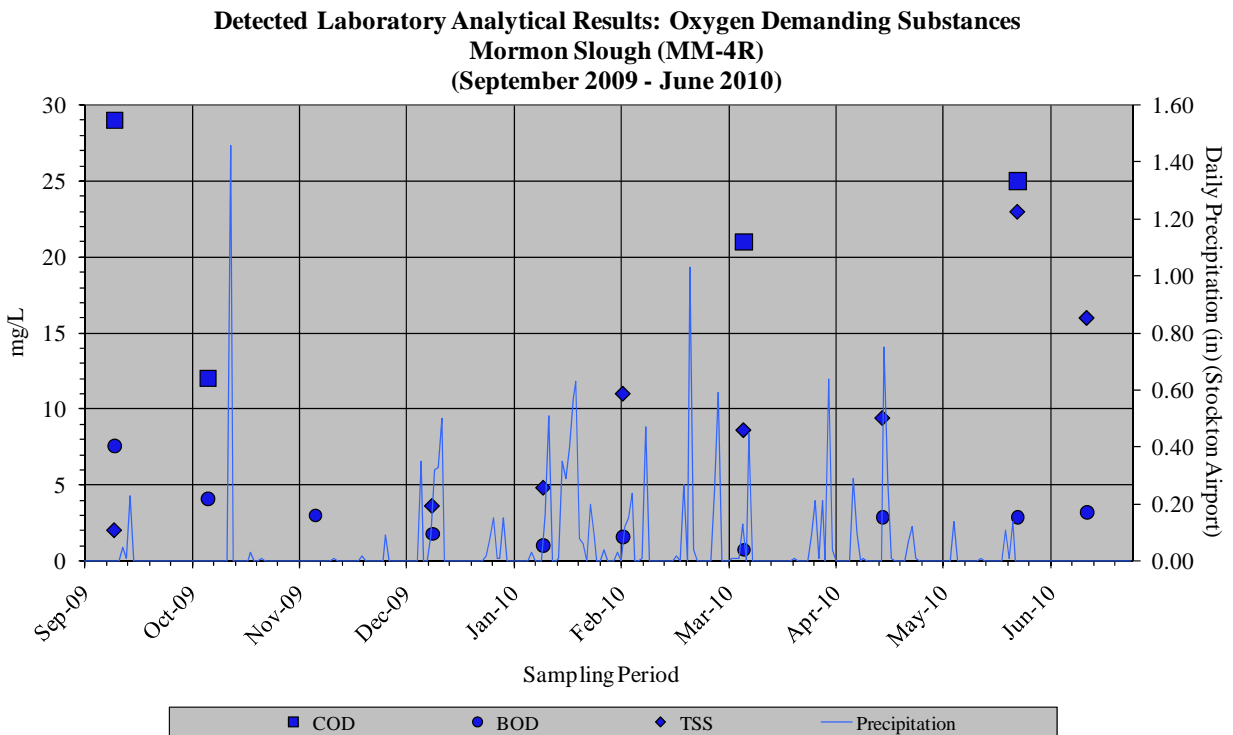


Figure 9-25. Mormon Slough (MM-4R)

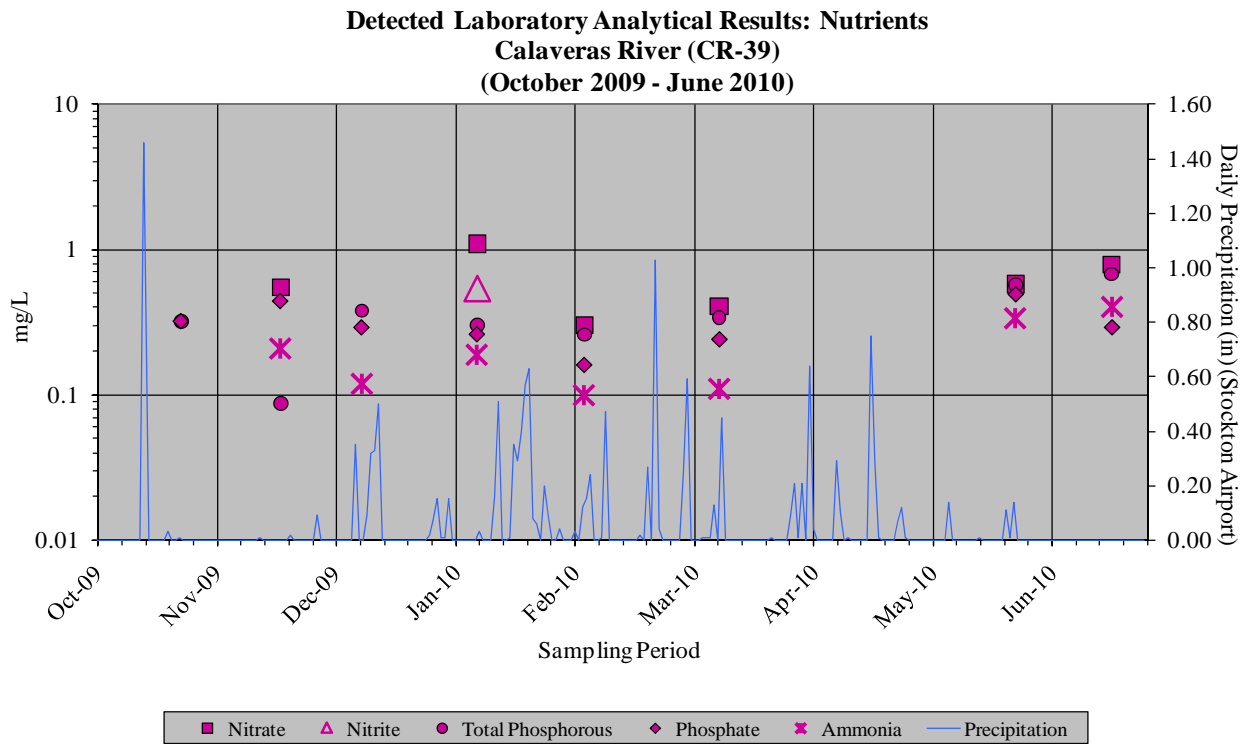


Figure 9-26. Calaveras River (CR-39)

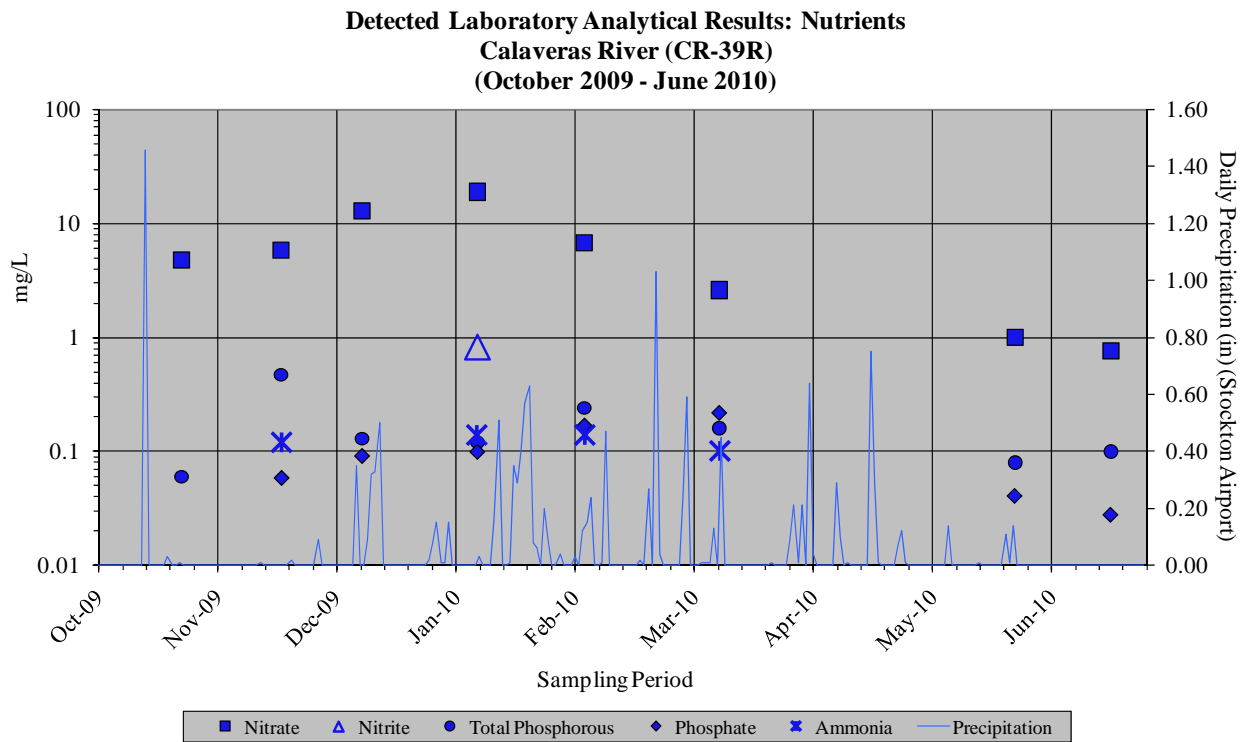


Figure 9-27. Calaveras River (CR-39R)

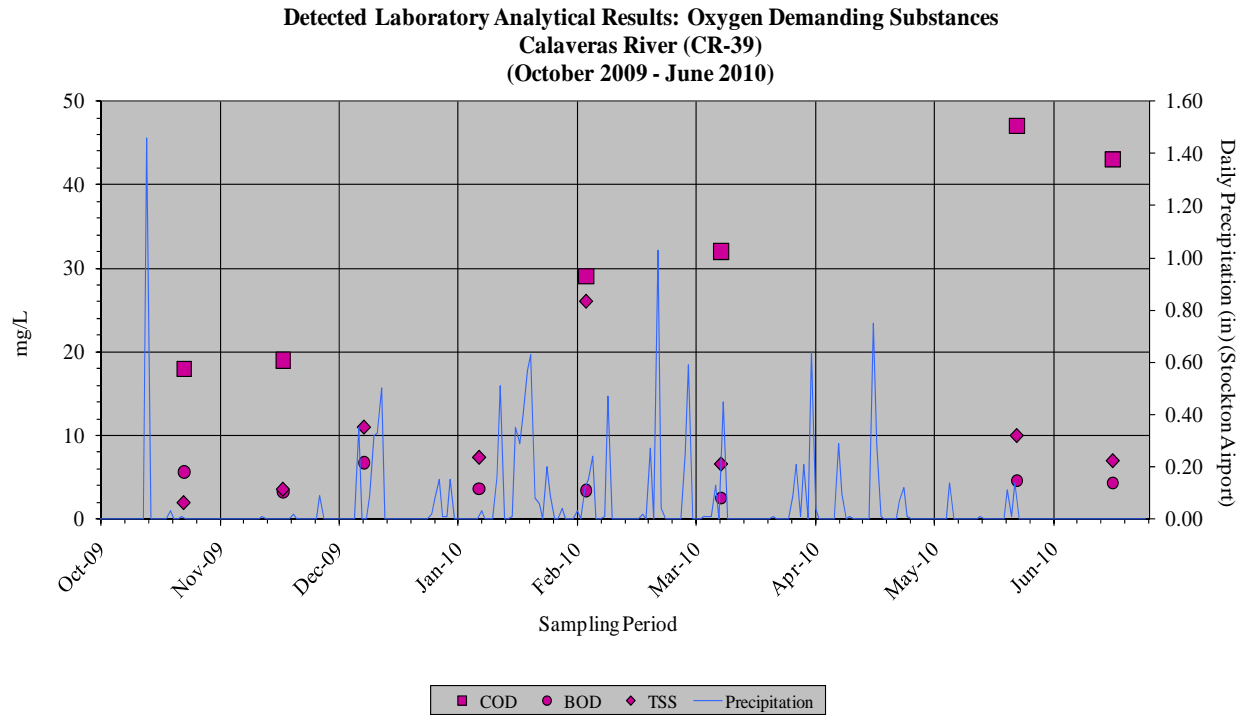


Figure 9-28. Calaveras River (CR-39)

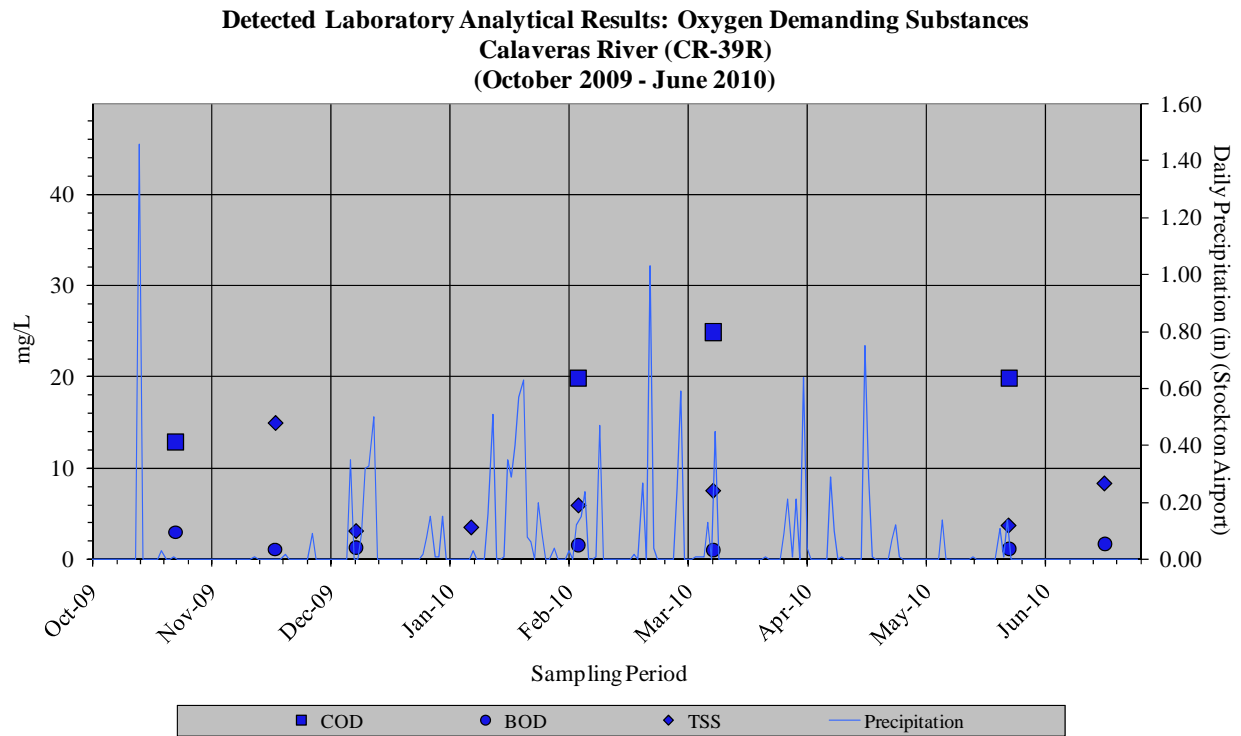


Figure 9-29. Calaveras River (CR-39R)

The results of the *in-situ* DO levels and rainfall precipitation are presented graphically in **Figure 9-30** through **Figure 9-34**. Data is presented for all receiving water sites where data has been collected. In addition, the average monthly DO levels are summarized in **Table 9-20**. A review of the DO and rainfall figures indicates periods of marked oxygen depletion following storm events (notably immediately following the 1.46 inch precipitation event on October 13, 2009). However, with the exception of Smith Canal and Mormon Slough during the early wet season, average monthly DO levels remained above Basin Plan numeric objectives for DO. As a point of clarification, the Basin Plan contains a numeric objective which requires that DO levels in San Joaquin River waterbodies be maintained above 6.0 milligrams per liter (mg/L) between September 1 and November 30 and above 5.0 mg/L at all other times.

Table 9-20. 2009-2010 Monthly Average Dissolved Oxygen Concentrations (mg/L)

Site code	Date											
	7/2009	8/2009	9/2009	10/2009	11/2009	12/2009	1/2010	2/2010	3/2010	4/2010	5/2010	6/2010
SC-5R	2.81	4.88	4.65	7.31	10.52	7.38	4.52	7.41	8.80	6.87	8.23	6.97
DW-2R	6.99	7.26	7.96	8.91	9.03	10.14	9.11	7.68	8.25	8.04	8.69	6.93
DW-1R	7.17	5.85	6.01	6.68	7.56	9.63	9.24	7.72	8.39	9.13	8.55	7.00
MM-4R	-	-	6.88	5.40	7.21	8.24	7.91	7.39	8.10	7.25	8.30	6.53
5M-25R	-	-	-	-	-	-	-	-	-	10.64	10.64	7.72
5M-28R	-	-	-	-	-	-	-	-	-	-	-	-
CR-39R	-	-	5.45	5.63	7.04	8.86	9.45	7.63	8.67	8.44	7.44	7.46
CR-42R	-	-	-	-	-	-	-	-	9.38	9.00	8.31	8.23

Notes:

mg/L = milligrams per liter = parts per million (ppm)

- = Data not recorded

Bold indicates average monthly concentrations below the Basin Plan WQO for DO

Figure 9-30 through **Figure 9-34** show results of in situ monitoring results from the time at which the in situ monitoring device was installed until June 30, 2010.

In-Situ Dissolved Oxygen and Precipitation (July 2009 - June 2010)

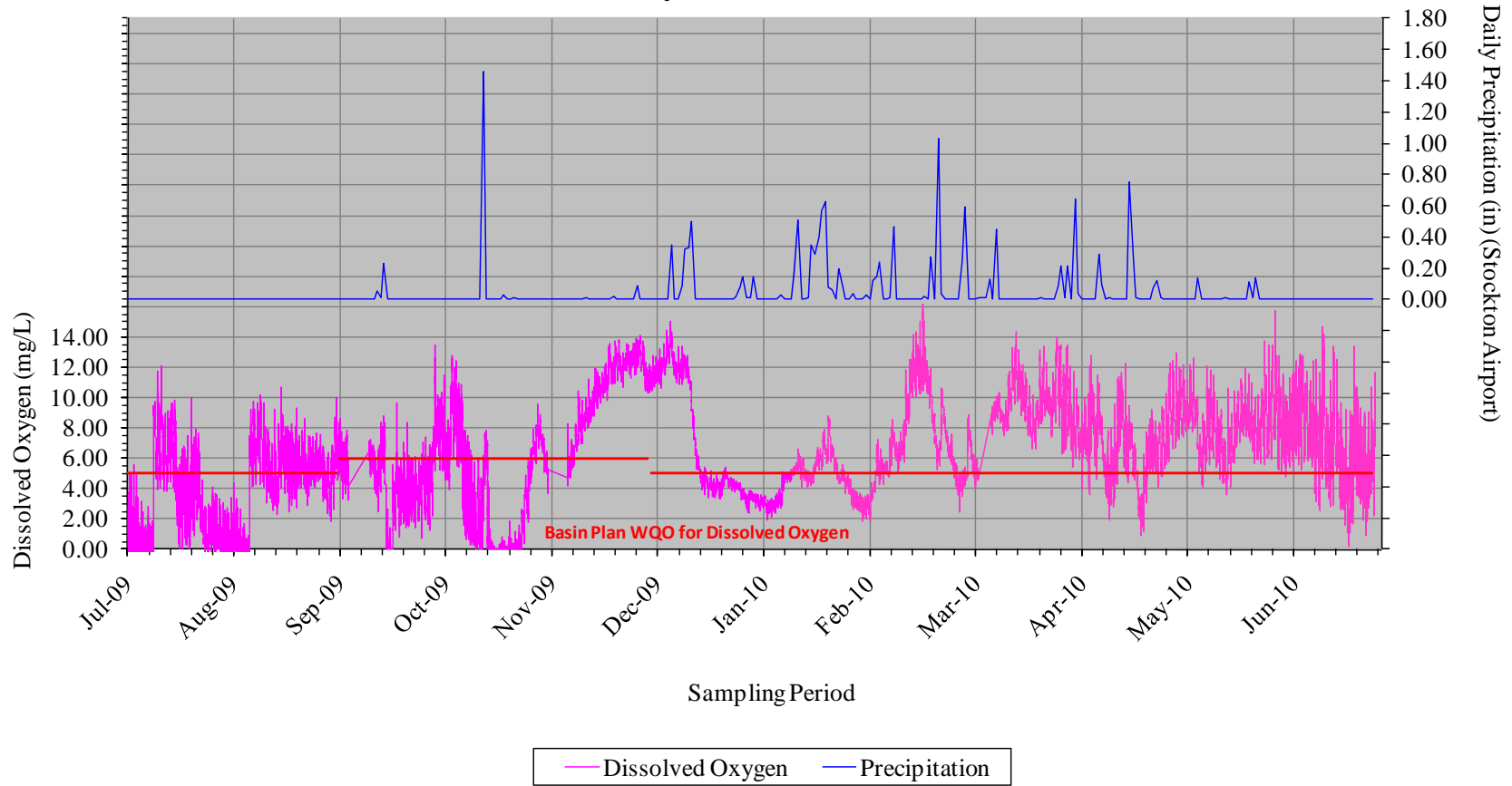


Figure 9-30. Yosemite Lake (SC-5R)

In-Situ Dissolved Oxygen and Precipitation (September 2009 - June 2010)

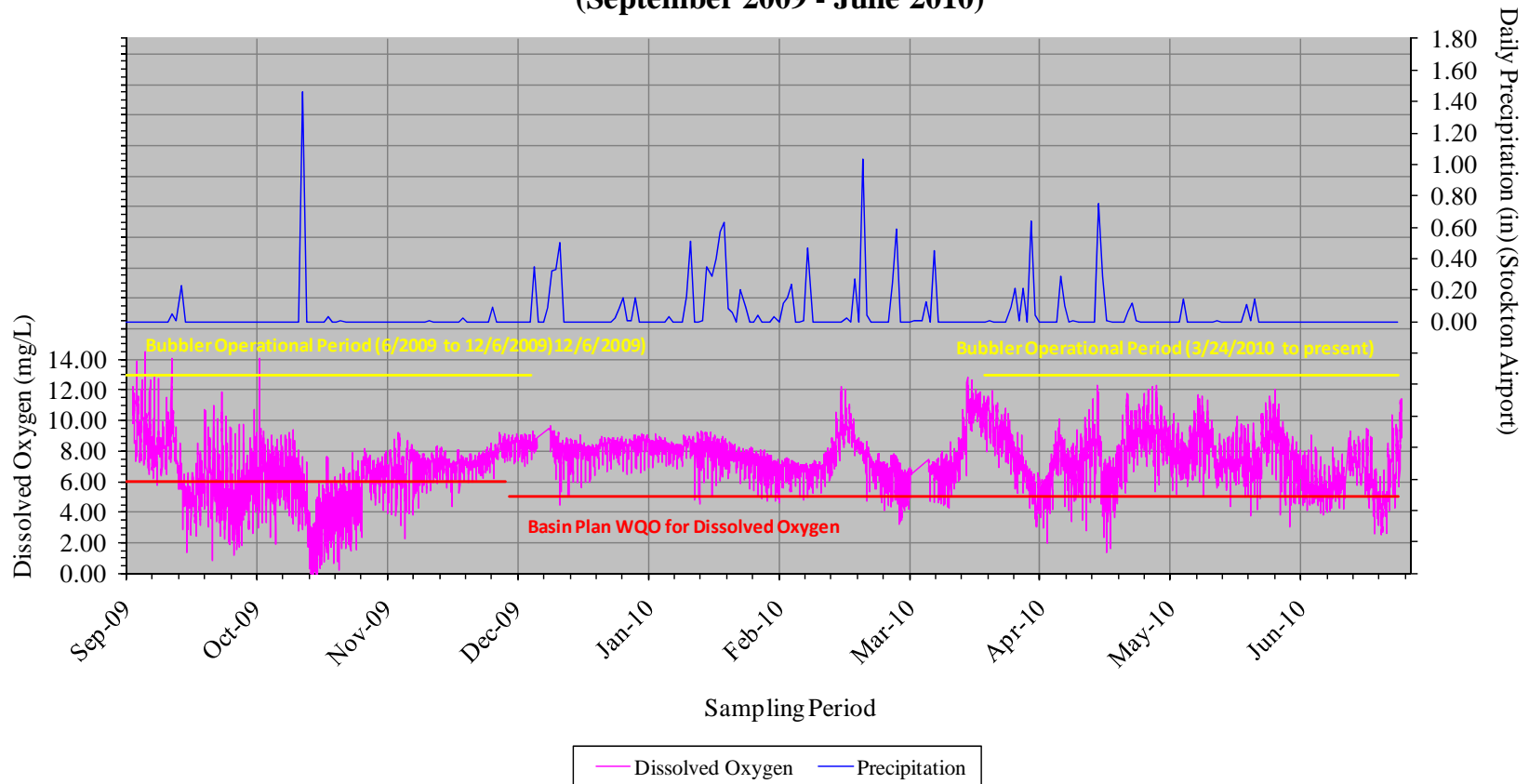


Figure 9-31. Mormon Slough (MM-4R)

***In-Situ* Dissolved Oxygen and Precipitation (April 2010 - June 2010)**

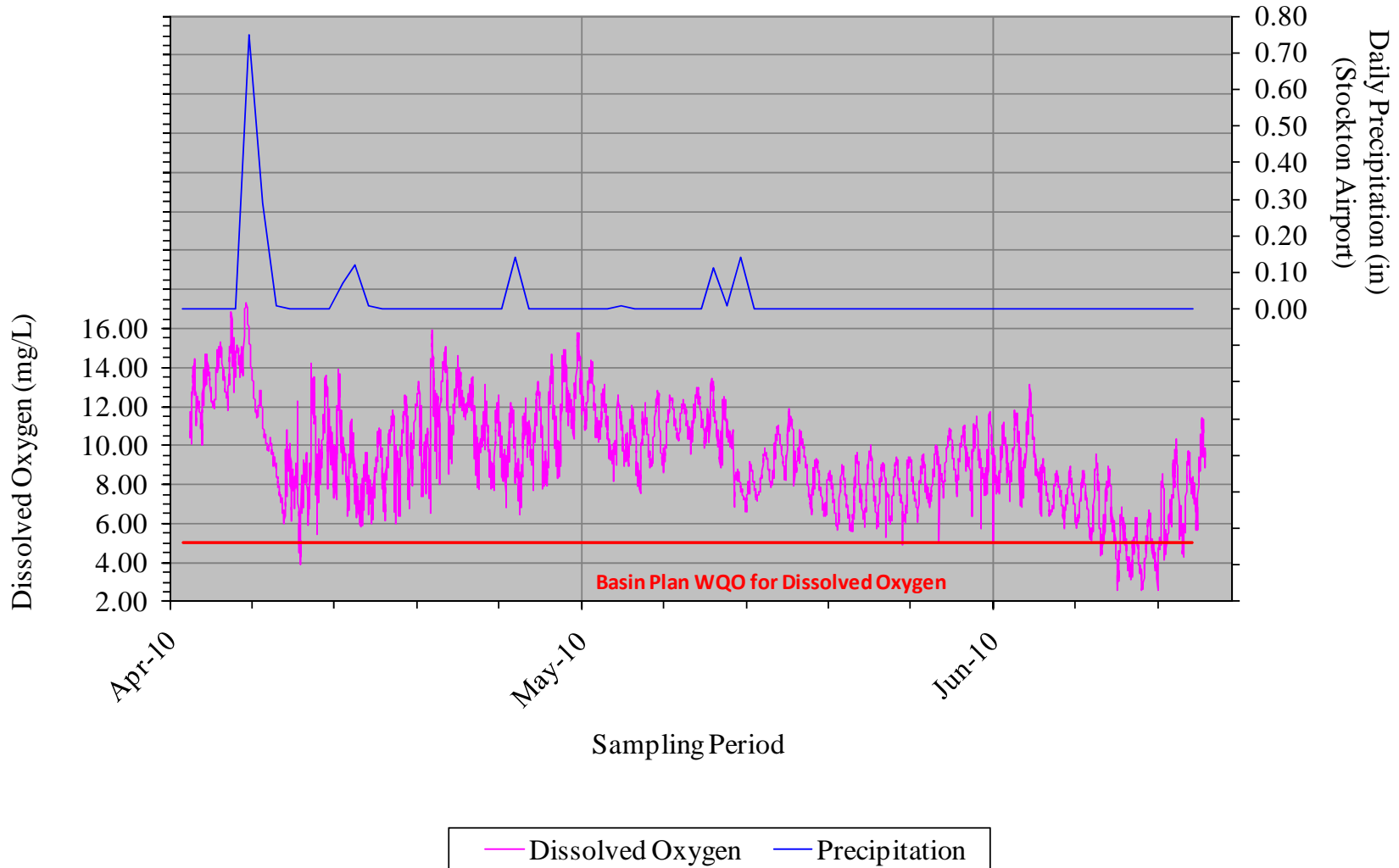


Figure 9-32. Five Mile Slough (5M-25R)

In-Situ Dissolved Oxygen and Precipitation (October 2009 - June 2010)

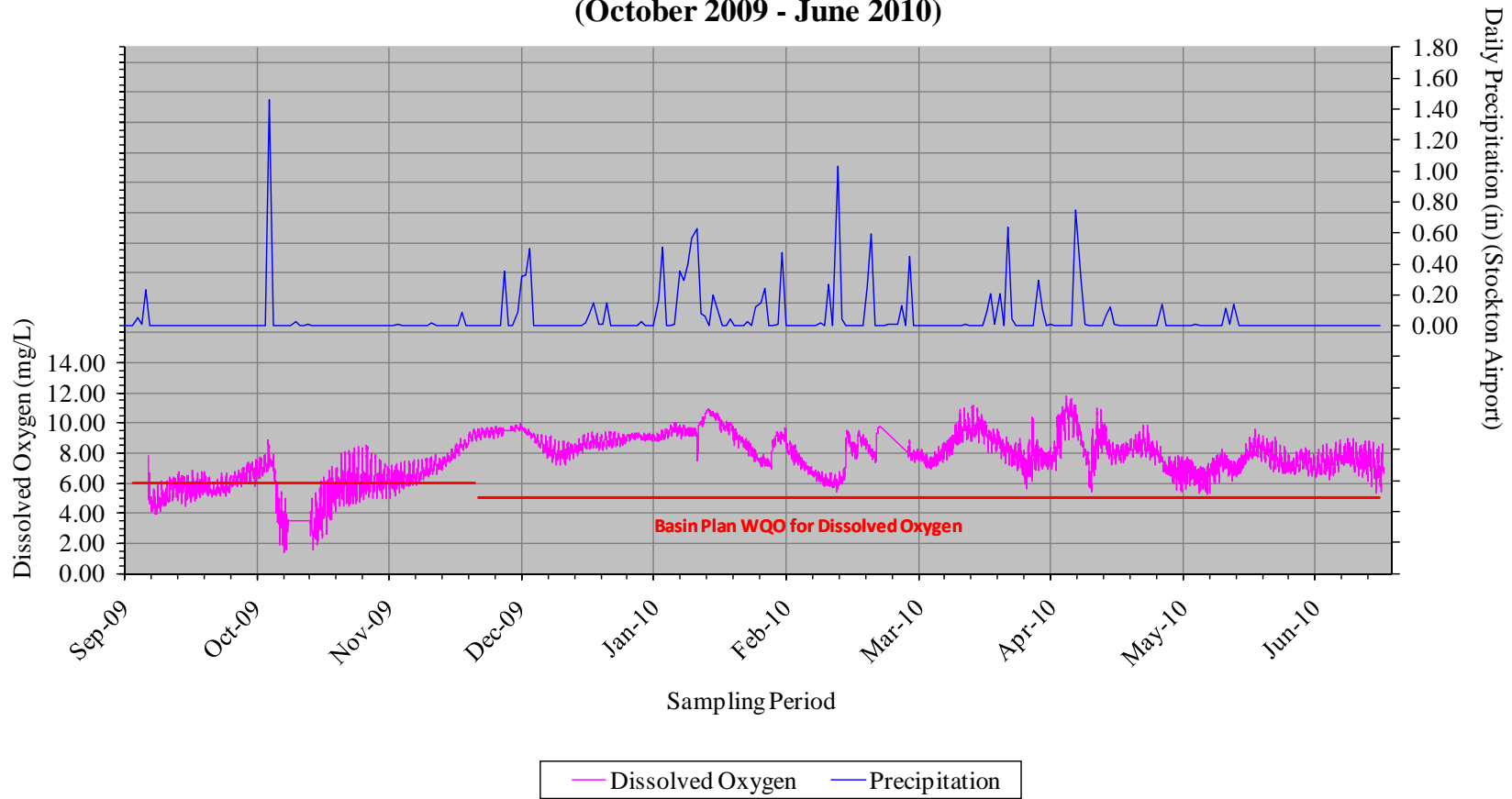


Figure 9-33. Calaveras River (CR-39R)

***In-Situ* Dissolved Oxygen and Precipitation
(March 2010 - June 2010)**

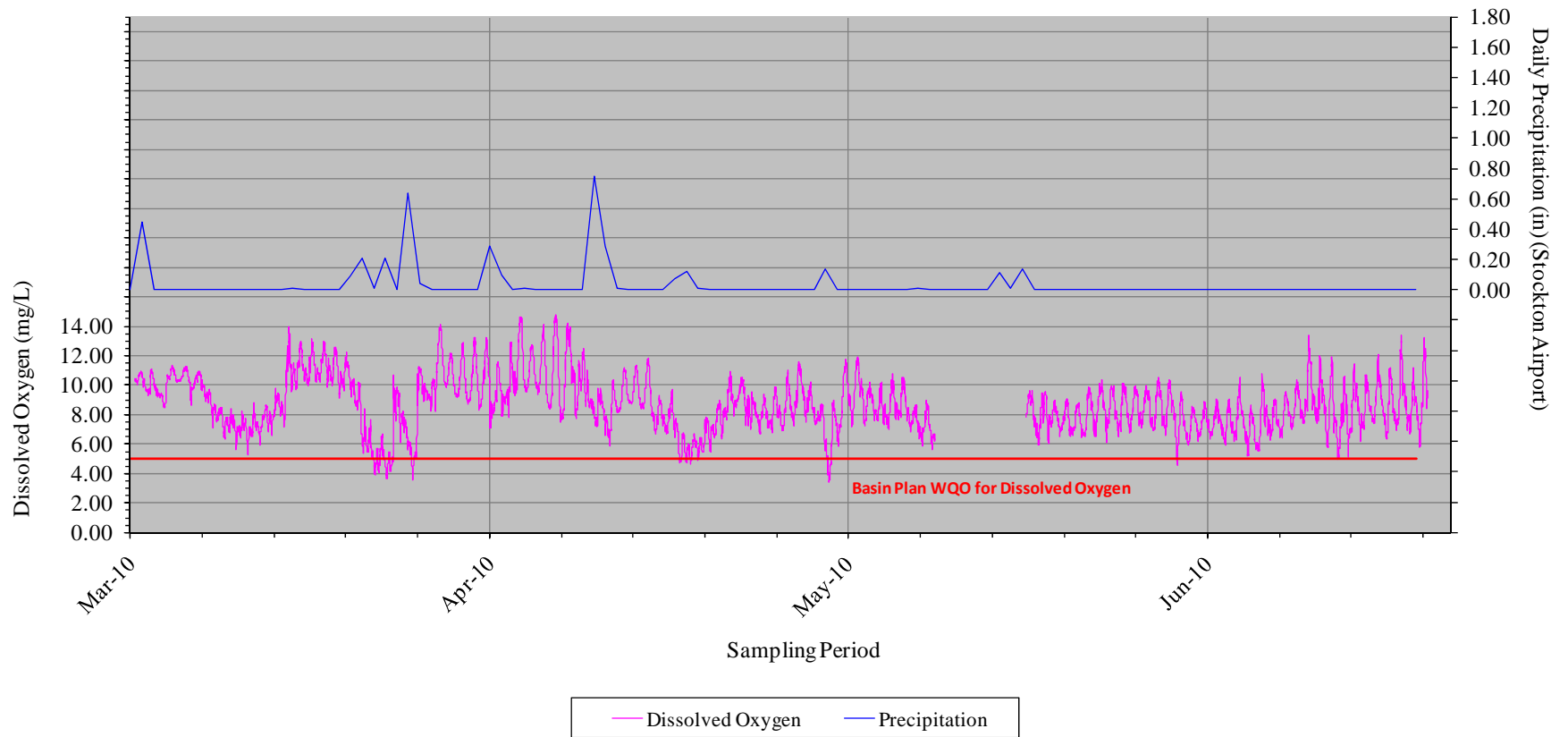


Figure 9-34. Calaveras River (CR-42R)

Note.

There is a gap in data collected at CR-42 from May 19 to 27, 2010 due to battery failure in the *in-situ* data recorder.

9.5.5 Stockton Deep Water Ship Channel

In 2006, the City installed a bubbler system in the Stockton Channel as part of the City's Stockton Channel Water Quality Improvement Project. Interspersed along the reach of the Stockton Deep Water Ship Channel from McLeod Lake to the Interstate (I)-5 overpass are eight (8) laterals covering roughly 75% waterway across. The system was designed to prevent thermal stratification and inhibit blue-green algae growth in the waterway. The bubbler system operated continuously from June 2009 through December 6, 2009 and from March 24, 2010 through June 30, 2010. A graphical presentation of *in-situ* DO data recorded at the Stockton Channel DW-1R and DW-2R monitoring locations relative to precipitation¹³ is provided in **Figure 9-35** and **Figure 9-36**. In general, DO levels recorded in the Stockton Channel at the DW-1R and DW-2R locations remained above the Basin Plan WQOs during the periods when the bubblers were operating. Low DO sags below the WQO were noted at the DW-1R location in August 2009 and immediately following the early seasons storm events on September 12-14 and October 13, 2009.

¹³ Precipitation values as reported at the Stockton Airport

In-Situ Dissolved Oxygen and Precipitation (July 2009 - June 2010)

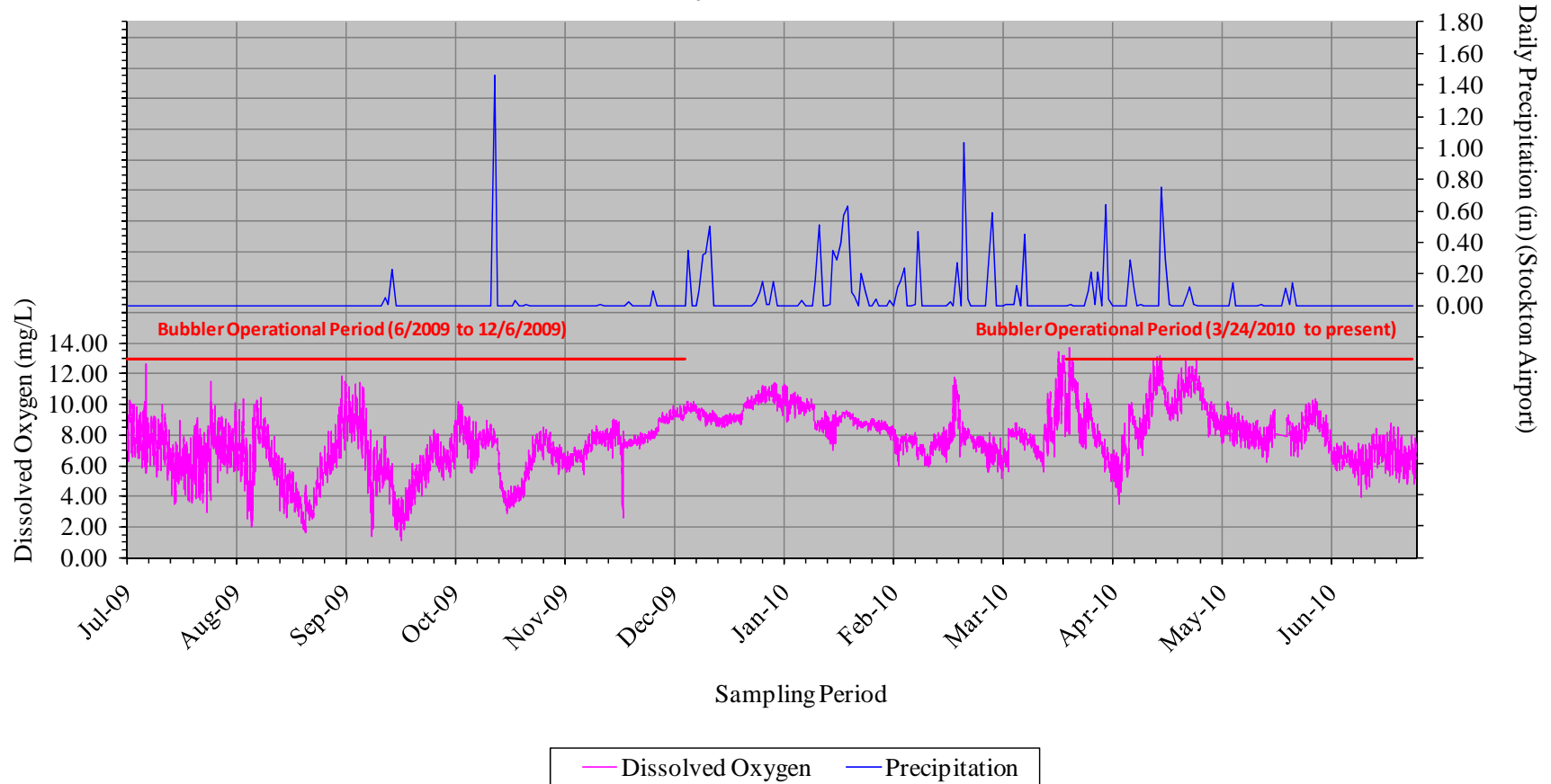


Figure 9-35. Stockton Deep Water Ship Channel (DW-1R)

In-Situ Dissolved Oxygen and Precipitation (July 2009 - June 2010)

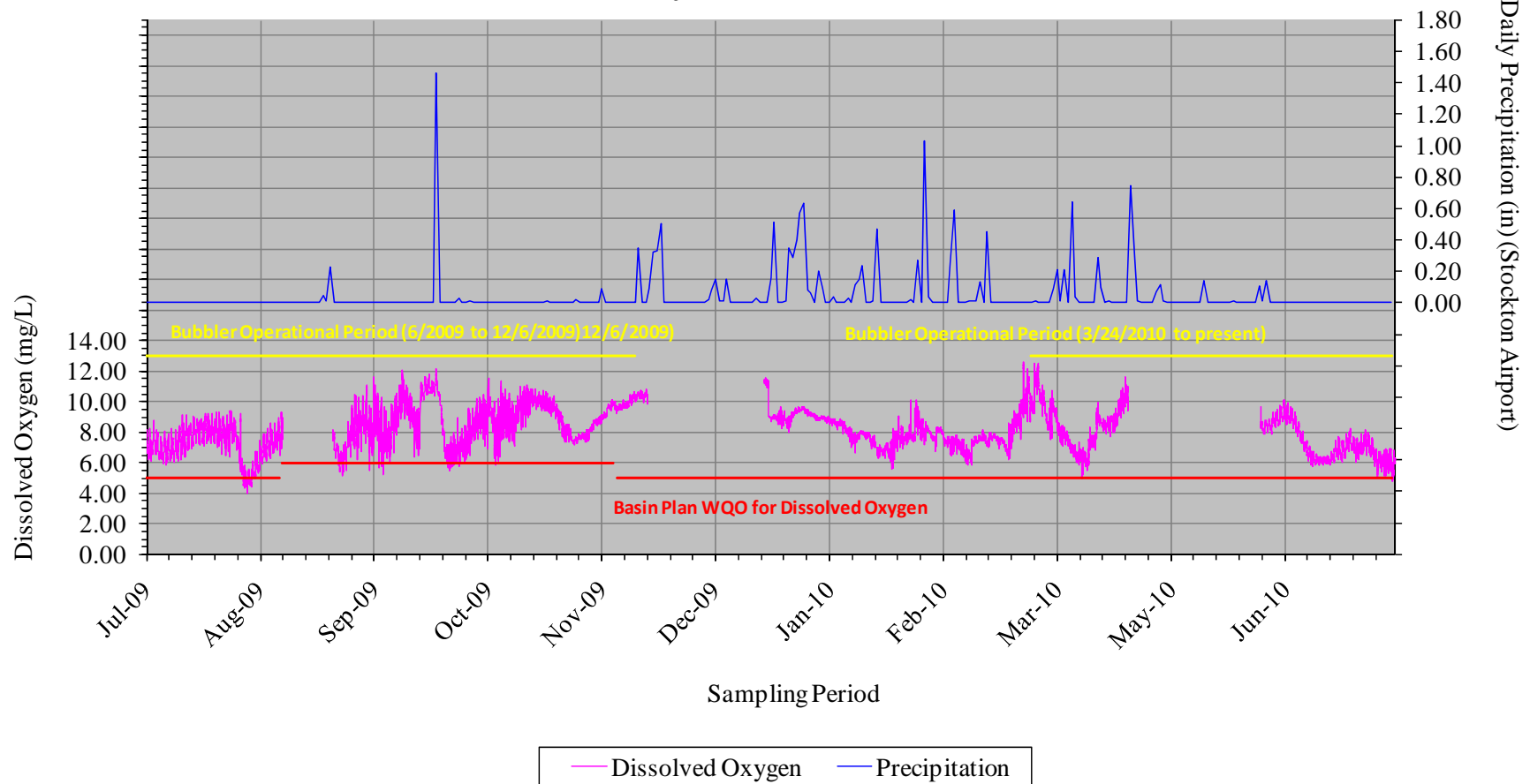


Figure 9-36. Stockton Deep Water Ship Channel (DW-2R)

Note.

The DW-2R September 2 - 15, 2009 data gap was the result of battery failure on the *in-situ* data recorder while December 2009/January 2010 and April/May 2010 data gaps were the result of data loss due to download error from the *in-situ* data recorder. Data downloading procedures have been reviewed to correct this issue.

The monitoring data does not reflect a simple relationship between rainfall amounts and turbidity levels with respect to DO levels. Results of the 2004/2005 *in-situ* monitoring program reported in the *Smith Canal Drainage Area Analysis and Dissolved Oxygen Work Plan Final Report*, dated October 2, 2006, indicated that the primary source of the oxygen sags was likely resuspension of biologically-active (reduced) lake sediments. Although storm events are a likely source of sediment resuspension during the early wet season, high episodes of turbidity are recorded during the dry season as well. Recreational activities, construction, and biological activities likely contribute to increased turbidity during the dry season. Graphical presentations of *in-situ* DO data recorded at the Yosemite Lake (SC-5R), Mormon Slough (MM-4R), Five-Mile Slough (5M-25R), Calaveras River (CR-38R and CR042R), and Stockton Channel (DW-1R) monitoring locations relative to recorded turbidity are provided in **Figure 9-37** through **Figure 9-42**. In these graphs, data is presented for one receiving water site on each waterbody. Figures show results of in situ monitoring results from the time at which the in situ monitoring device was installed until June 30, 2010.

***In-Situ Dissolved Oxygen and Turbidity
(July 2009 - June 2010)***

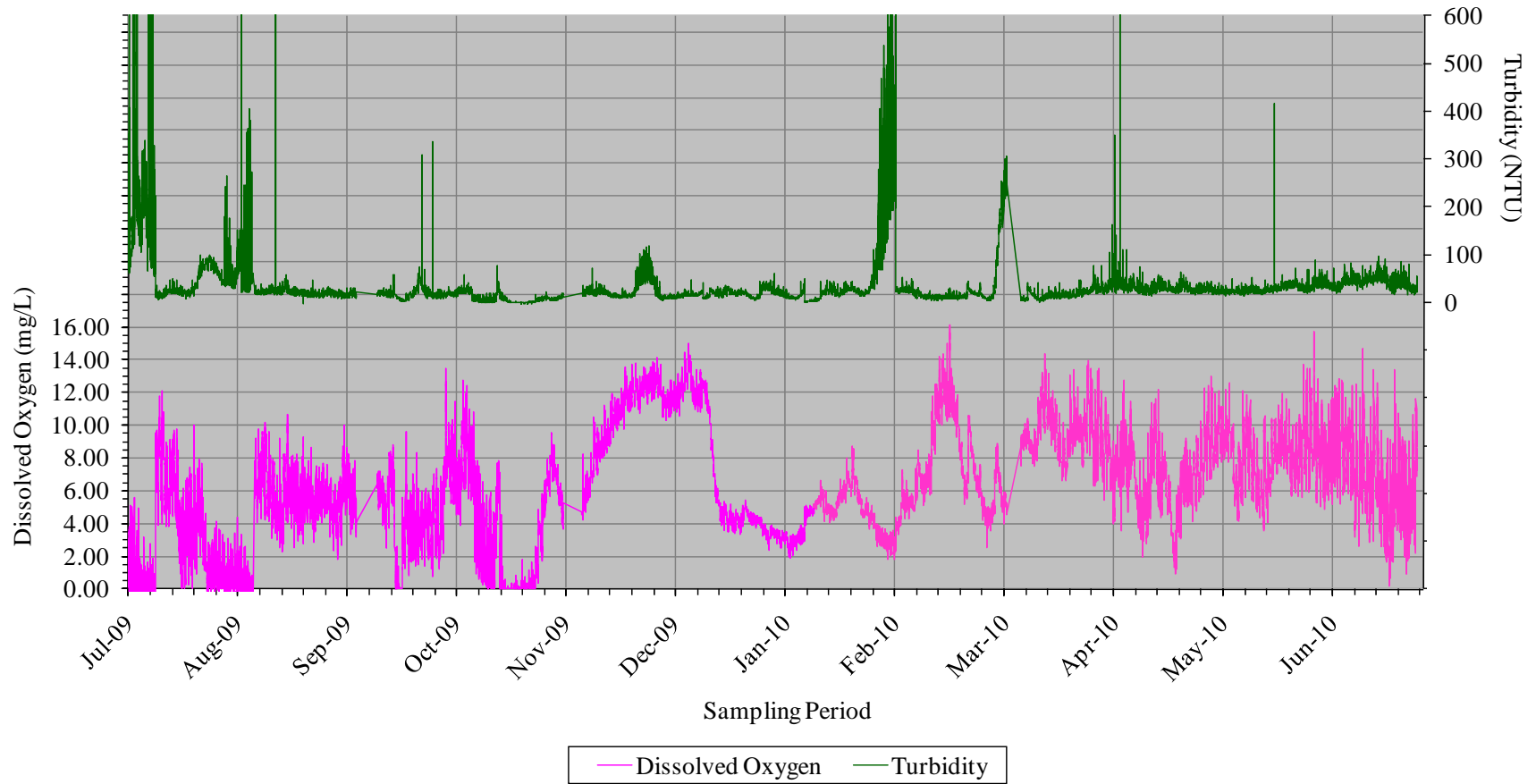


Figure 9-37. Yosemite Lake (SC-5R)

In-Situ Dissolved Oxygen and Turbidity
(September 2009 - June 2010)

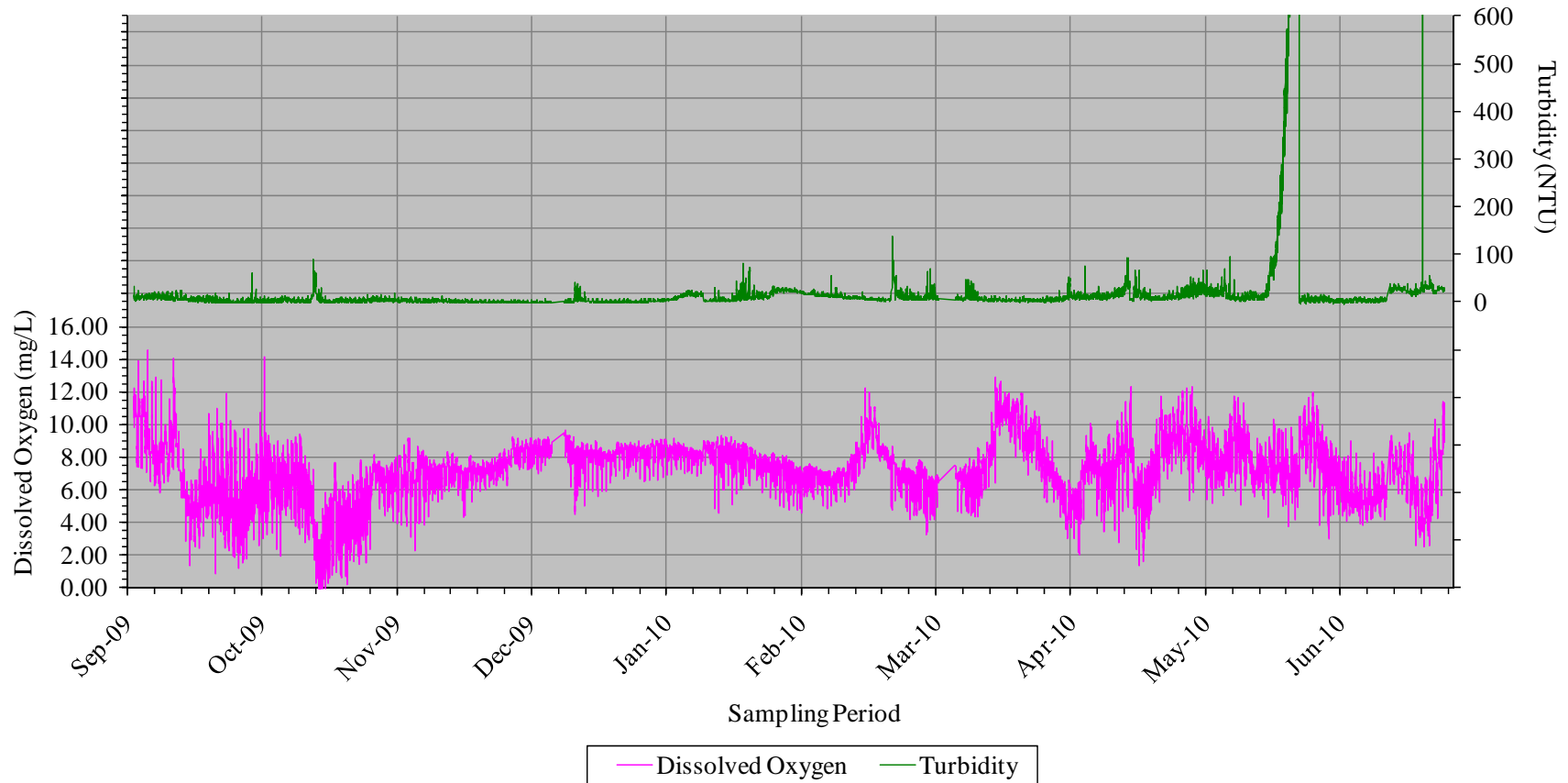


Figure 9-38. Mormon Slough (MM-4R)

In-Situ Dissolved Oxygen and Turbidity (April 2010 - June 2010)

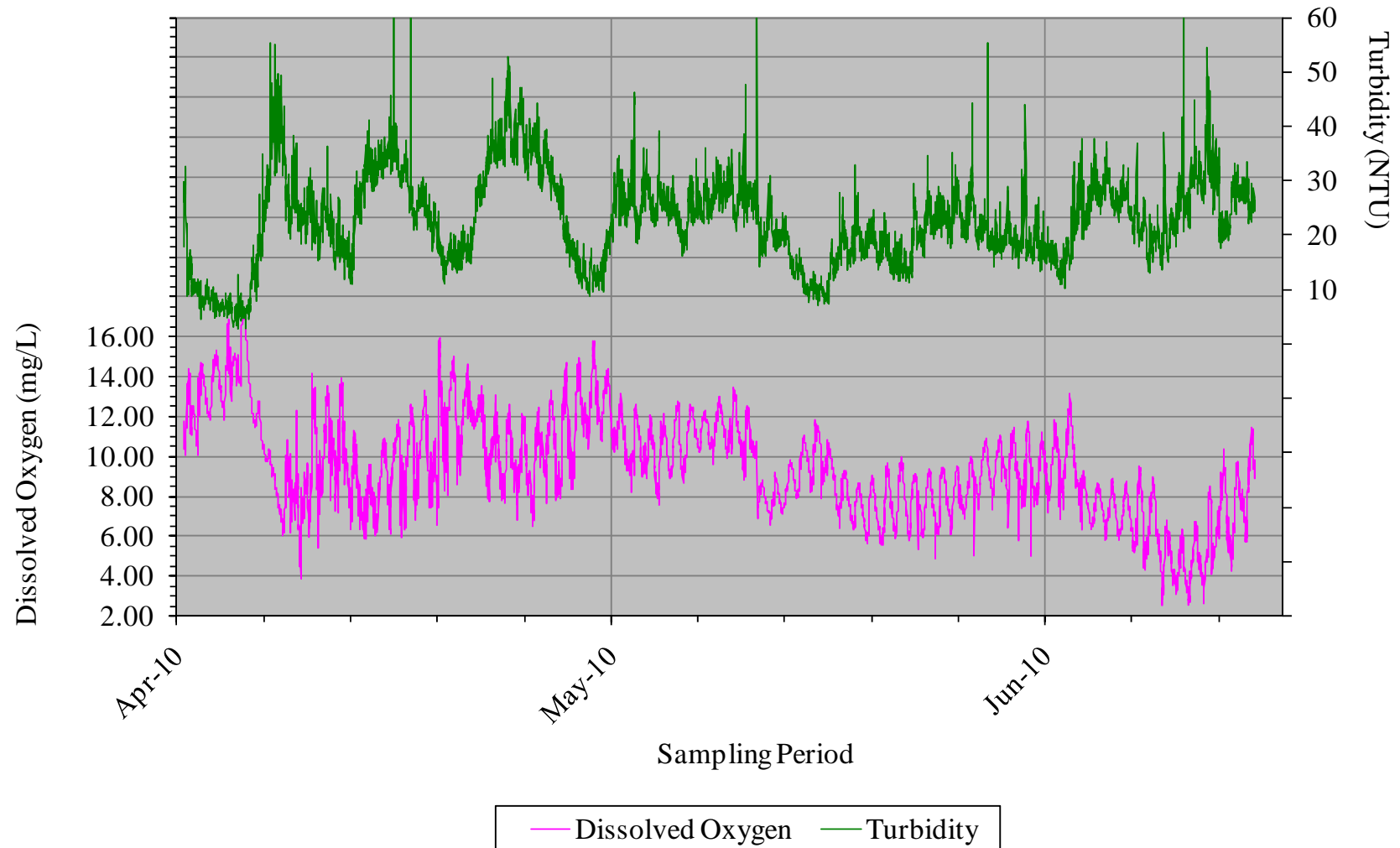


Figure 9-39. Five Mile Slough (5M-25R)

***In-Situ Dissolved Oxygen and Turbidity
(October 2009 - June 2010)***

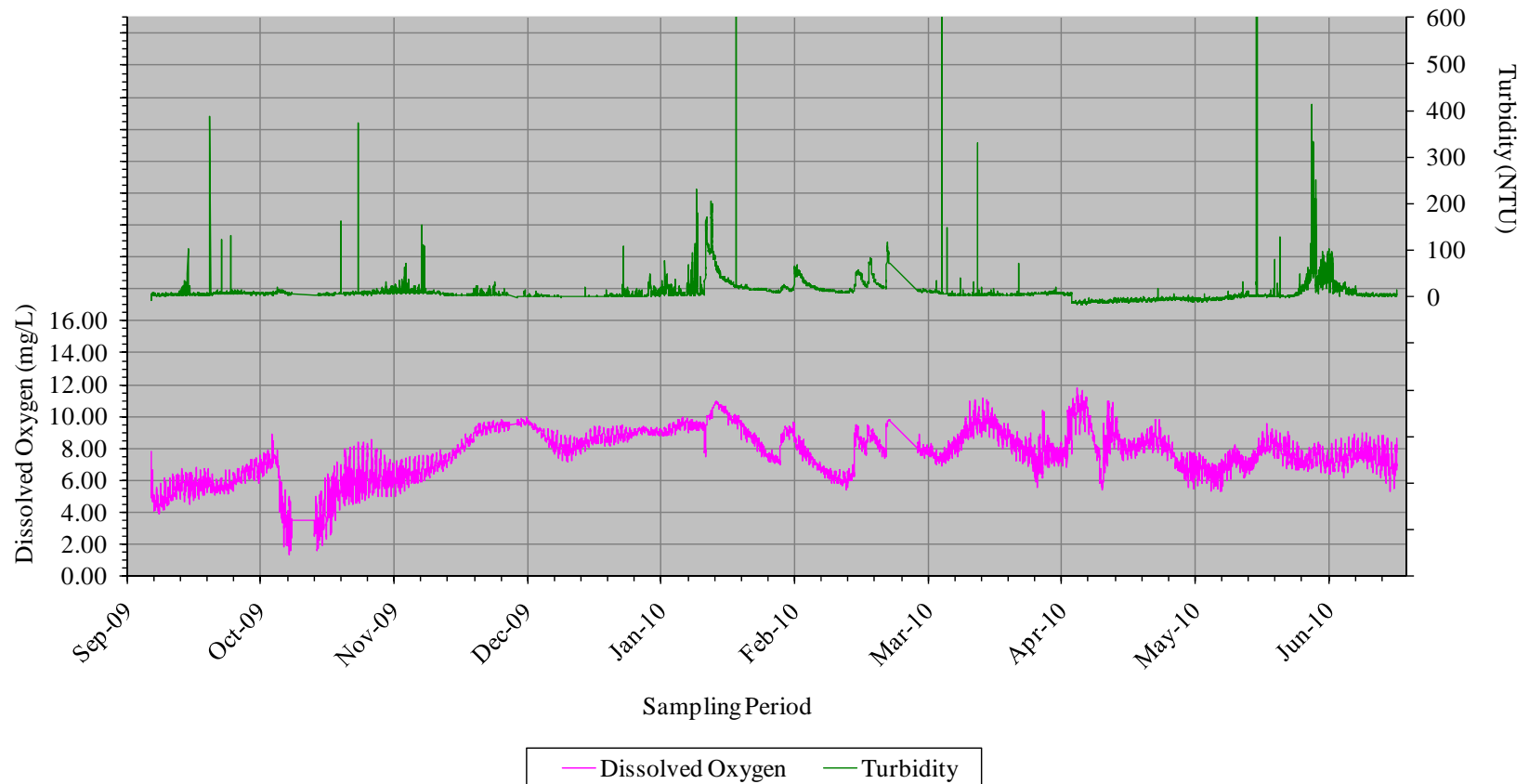


Figure 9-40. Calaveras River (CR-39R)

In-Situ Dissolved Oxygen and Turbidity
(March 2010 - June 2010)

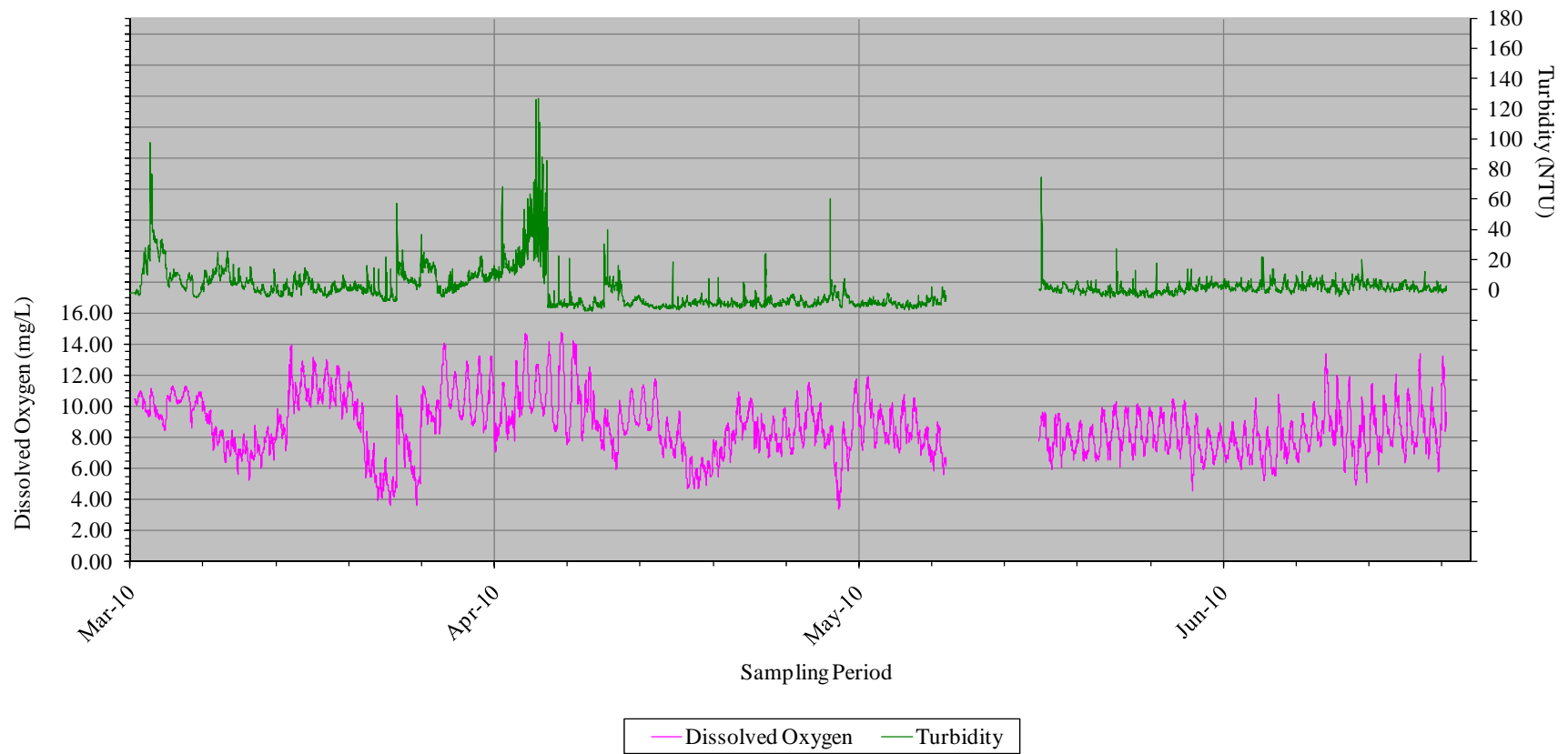


Figure 9-41. Calaveras River (CR-42R)

Note.

The Calaveras River CR-42 from May 19, 2010 to May 27, 2010 data gap was the result of battery failure in the *in-situ* data recorder.

In-Situ Dissolved Oxygen and Turbidity
(July 2009 - June 2010)

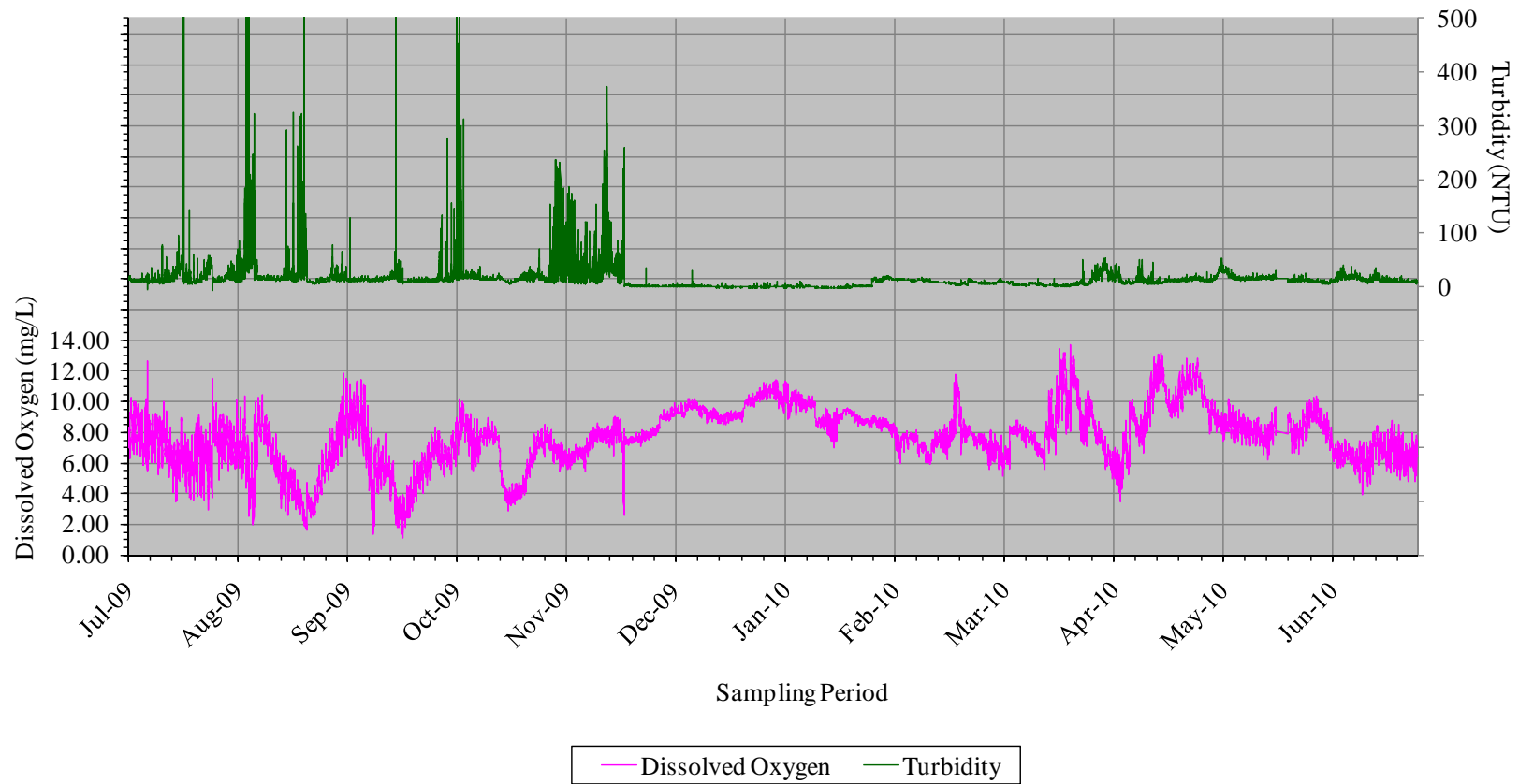


Figure 9-42. Stockton Deep Water Ship Channel (DW-1R)

Section 10

Program Implementation, Assessment, and Reporting

10.1 OVERVIEW

The City is actively and adaptively managing the SWMP through the implementation, assessment, and reporting of the Program Elements and the related Control Measures and Performance Standards.

10.2 CONTROL MEASURES

The City has developed several Control Measures and accompanying performance standards to ensure that program implementation, assessment, and reporting related permit requirements are effectively developed and implemented. For each Control Measure there are accompanying performance standards which, once accomplished, constitute compliance with the Permit requirements.

The Control Measures consist of the following:

Control Measure
Program Implementation
Evaluation/Assessment
Reporting

This section of the Annual Report provides information on the specific tasks that have been initiated and/or completed during the reporting period pursuant to the Performance Standards and implementation schedules.

10.3 PROGRAM IMPLEMENTATION

The SWMP has been structured to identify the specific activities that must be implemented, as well as the responsible party for implementing the activities. This has been accomplished through the establishment of Control Measures and Performance Standards. However, some Control Measures and Performance Standards require a series of tasks to be undertaken in order to complete them. Therefore, progressive implementation of the Performance Standards throughout the Permit term will be necessary in order to completely implement the Program Elements.

Successful implementation of the SWMP also requires an extensive training effort by the City to ensure that its employees understand the Stormwater Program and conduct their activities in a manner to minimize pollutants from stormwater discharges. The City's proposed training effort is described within each of the SWMP Program Elements.

10.3.1 Annual Work Plan

An Annual Work Plan is submitted to the Regional Water Board by **April 1** of each year. The Annual Work Plan summarizes the proposed activities that the City will undertake during the next fiscal year (July 1 – June 30). While the Annual Work Plan generally follows the Control Measures and Performance Standards outlined within the SWMP, it may also include additional activities that the City has identified as being necessary during the previous reporting period.

The City submitted the annual work plan for 2010-2011 to the Regional Water Board on April 1, 2010. The work plan identified the various performance standards that would be initiated and/or completed during the next fiscal year. The 2010-2011 annual work plan may be modified based on the outcome of the City's Proposition 218 Clean Water Fee vote in the fall of 2010.

10.4 EVALUATION/ASSESSMENT

Paramount to the success of the stormwater program is the need for the City to evaluate the effectiveness of its program by compiling and reviewing program data. As a part of this process and overall effectiveness assessment strategy, the City is currently assessing effectiveness as a part of the annual reporting process (see each of the Program elements). The strategy for assessing effectiveness will continue to build upon the results of the annual reports and initial assessments and will address the stormwater program in terms of achieving both programmatic goals and environmental goals.

By utilizing the iterative process and conducting effectiveness assessments, the City can use the information gained to adapt its programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The results of these assessments and proposed modifications to the SWMP will be provided to the Regional Water Board on an annual basis as a part of the reporting process.

10.5 REPORTING

The City will continue to coordinate with the County in developing standardized formats for all reports that are required pursuant to the stormwater Permit. This will include annual reports, fiscal analysis reports, and program effectiveness assessments. Pursuant to the federal regulations, all work plans and reports will be signed and certified.

For this annual report, the reporting templates for both the City and the County were updated to ensure that the report would address the performance standards that needed to be initiated and/or completed during the 2009-2010 reporting year. The templates will continue to be updated as needed.

10.5.1 Annual Report

An annual report is submitted in both electronic and hard copy form to the Regional Water Board by **September 1** of every year. The purpose of the Annual Report is to document the status of the SWMP implementation, present results from activities implemented, provide a compilation of deliverables and milestones reached during the previous fiscal year (July 1 – June 30), and report on the overall status and effectiveness of the SWMP. Updates, improvements, or revisions to the SWMP are also identified in the Annual Report.

This report covers the period from July 1, 2009 through June 30, 2010.

10.5.2 Report of Waste Discharge

The municipal stormwater Permit expires on December 6, 2012. As a result, the City is required to submit a Report of Waste Discharge (ROWD) to the Board 180 days prior to its expiration (June 6, 2012). The ROWD serves as the application for the re-issuance of the Permit. The ROWD will be submitted as required.

10.6 PROGRAM MODIFICATIONS

Every April, the City submits an annual work plan for the upcoming fiscal year. The 2010-2011 work plan identified several key tasks for Program Implementation, Assessment, and Reporting. In addition to the anticipated tasks that are identified within the annual work plan, the City evaluates the results of the annual progress report as well as the experience that staff has had in implementing the program and determines if any additional program modifications are necessary in order to comply with Clean Water Act requirements to reduce the discharge of pollutants to the maximum extent practicable.

There were no program modifications identified for Program Implementation, Assessment, and Reporting for 2010-2011.