

REVISED
MULTI-YEAR RECEIVING WATERS
MONITORING PLAN

Original Plan Submitted on March 1, 2002 in Compliance
with Permit Provisions C7a & b

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PREFACE

On March 1, 2002, the SCVURPPP submitted a Multi-Year Receiving Waters Monitoring Plan (Multi-Year Plan) that was prepared in compliance with monitoring requirements of the permit. The previously submitted Multi-Year Plan covered the entire spectrum of the SCVURPPP monitoring activities, both programmatic and environmental, and outlined the SCVURPPP's approach to monitoring, presented monitoring priorities and described accomplishments to-date. Furthermore, the Multi-Year Plan described the SCVURPPP's linkage to, and support for the Santa Clara Basin Watershed Management Initiative (WMI).

Since its approval, the SCVURPPP has fully implemented the Multi-Year Plan and conducted a variety of special studies. In particular, screening level/baseline water quality monitoring was conducted in receiving water bodies in FY 02-03 and 03-04, and the *Assessment of Watershed Assessment Methods Technical Memorandum* (Technical Memo), dated July 31, 2003, recommended improvements to the SCVURPPP's monitoring and assessment program. Lessons learned from data collected during the first two years of implementing the Multi-Year Plan and recommendations presented in the Technical Memo provide the impetus for the revisions to the Multi-Year Plan.

The revisions presented in this Revised Multi-Year Receiving Waters Plan (Revised Multi-Year Plan) are minor and intended to: 1) more fully integrate the monitoring activities identified in the Multi-Year Plan with watershed assessments, and 2) allow for additional follow-up monitoring activities in order to better identify sources of pollutants or causes of impairment to Beneficial Uses. Additionally, the Revised Multi-Year Plan attempts to provide the SCVURPPP a framework for conducting watershed characterization, screening-level monitoring, watershed assessment, investigative monitoring and management action implementation.

Summary of Revisions

It is important to point out that a large majority of the information contained within this Revised Multi-Year Plan was originally presented in the Program's previously submitted Multi-Year Plan (dated March 1, 2002). Therefore, for the sake of the reader, we would like point out the sections of this Revised Multi-Year Plan that contain a majority of the revisions. These include:

- **Sections 2.3 & 2.4: SCVURPPP's Monitoring and Assessment Approach and Process Flow Chart** – Describes the tiered monitoring approach, the proposed framework for conducting monitoring and assessment activities, and how watershed assessments are integrated with this approach and activities.
- **Section 6.0: Reporting and Quality Control** – Describes the deliverables the Program will develop and quality control procedures which will continue to be incorporated into the SCVURPPP's Monitoring and Assessment Program.
- **Section 7.0: Environmental Monitoring Measures Summary Matrix** – Illustrates the revised environmental monitoring and assessment Program's sampling design.

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SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM

MULTI-YEAR RECEIVING WATERS MONITORING PLAN (REVISED MARCH 1, 2004)

1.0 INTRODUCTION

The Santa Clara Valley Urban Runoff Pollution Prevention (SCVURPPP) was reissued a National Pollutant Discharge Elimination System (NPDES) permit to discharge storm water on February 21, 2001 by the San Francisco Bay Regional Water Quality Control Board (Regional Board). On March 1, 2002, the SCVURPPP submitted a Multi-Year Receiving Waters Monitoring Plan (Multi-Year Plan) that was prepared in compliance with monitoring requirements of the permit. In particular Provision C.7b, which reads:

Multi-Year Receiving Waters Monitoring Plan. In conjunction with the submissions required by Provision 9 the Dischargers shall submit by July 1, 2001, an interim draft of a Five-Year Receiving Waters Monitoring Plan, and, by March 1, 2002, a final Five-Year Receiving Waters Monitoring Plan acceptable to the Executive Officer, designed to comply with these Monitoring Program requirements. The Receiving Waters Monitoring Plan shall include provisions for monitoring South San Francisco Bay by participating in the San Francisco Estuary Regional Monitoring Program for Trace Substances or an acceptable alternative monitoring program. The Receiving Waters Monitoring Plan activities shall be coordinated with SCBWMI assessment activities.

The previously submitted Multi-Year Plan covered the entire spectrum of the SCVURPPP monitoring activities, both programmatic and environmental, and outlined the SCVURPPP's approach to monitoring, presented monitoring priorities and described accomplishments to-date. Furthermore, the Multi-Year Plan described the SCVURPPP's linkage to, and support for the Santa Clara Basin Watershed Management Initiative (WMI), a collaborative, stakeholder driven effort aimed at protecting and enhancing the watersheds in the Santa Clara Basin.

Since its approval, the SCVURPPP has fully implemented the Multi-Year Plan and conducted a variety of special studies. In particular, screening level/baseline water quality monitoring was conducted in receiving water bodies in FY 02-03 and 03-04, and the *Assessment of Watershed Assessment Methods Technical Memorandum* (Technical Memo), which provides information necessary to improve SCVURPPP's monitoring and assessment program, was completed on July 31, 2003. Lessons learned from data collected during the first two years of implementing the Multi-Year Plan and recommendations presented in the Technical Memo provided the impetus for revising the Multi-Year Plan. The revisions contained within this Revised Multi-Year Receiving Waters Monitoring Plan (Revised Multi-Year Plan) are further described in this section.

1.1 Purpose of the Multi-Year Monitoring Plan and Revisions (2004)

Monitoring activities originally described in the Multi-Year Plan are generally aimed at developing and implementing programs/projects designed to assess programmatic and environmental effectiveness and practical, implementable indicators and protocols for assessing the beneficial uses of receiving water bodies, including local creeks and the San Francisco Bay estuary. The implementation of these indicators and protocols are a

necessary step toward establishing a sound regulatory basis for locally based watershed management.

The Revised Multi-Year Plan continues to embrace this strategy and offers revisions that are intended to: 1) more fully integrate the monitoring activities identified in the Plan with the Program's need to conduct watershed assessments, and 2) allow for additional follow-up monitoring activities that will help better identify sources of pollutants or causes of impacts to Beneficial Uses (Uses). Additionally, the Revised Multi-Year Plan attempts to provide the SCVURPPP a formalized process for conducting future monitoring and assessment activities.

The Revised Multi-Year Plan is intended to provide a broad roadmap for the Program's monitoring activities. The full scopes of many of the activities presented in this Revised Multi-Year Plan have not yet been developed. More detailed descriptions of these planned activities will be provided in the Program's Annual Workplans over the next six years. In addition, it is foreseeable that due to unknown water quality issues in the future, the Program will be directed to focus resources on higher priority monitoring and assessment efforts not presented in this Revised Multi-Year Plan. In this case, new and/or revised monitoring and assessment activities will also be presented in the Program's Annual Monitoring Program Plan, which is submitted with its Annual Report.

1.2 Goals and Objectives

The Revised Multi-Year Plan is intended to be a "living" document, evolving along side other regional and State monitoring and assessment plans and strategies, including: the Regional Monitoring and Assessment Strategy (RMAS), Regional Monitoring Program (RMP) and Surface Water Ambient Monitoring Program (SWAMP). The Revised Multi-Year-Plan helps reach the goals and objectives that were set by the Program's Management Committee in 1996. These goals and objectives were incorporated into the SCVURPPP's 1997 Urban Runoff Management Plan (URMP). In particular, the monitoring program aids in reaching Goals 2 and 3 (see highlighted text in Table 1.0).

To aid the SCVURPPP in reaching its primary goals, the following goals specific to the SCVURPPP's monitoring program were developed:

- Develop a better understanding of the chemical, biological, and physical characteristics of water bodies and watersheds relevant to the Program, which will help inform decisions about future management actions and help clarify and resolve storm water related issues within watersheds;
- Assess baseline water quality conditions in representative watersheds within Program boundaries to evaluate storm water impacts and help solve creek drainage basin-specific water quality problems;
- Assess whether specific pollutants of concern are found in storm water discharges and impact water quality in local water bodies and the San Francisco Bay;
- Evaluate the effectiveness of existing storm water pollution prevention and control Best Management Practices (BMPs) and recommend improvements; and,

- Evaluate overall Program effectiveness over time.

**Table 1.0. 1997 Urban Runoff Management Plan
Goals and Objectives**

GOAL 1: Comply with Permit

- Effectively prohibit non-stormwater discharges (unless exempt or managed according to approved conditions)
- Reduce, to the maximum extent practicable, pollutants in stormwater runoff
- Comply with permit submittal requirements

GOAL 2: Determine Success

- Periodically evaluate the attainment of beneficial uses in selected waterways
- Evaluate changes in public awareness and behavior
- Evaluate effectiveness of specific control measures at pollution reduction.

GOAL 3: Adjust Activities to Meet Changes

- Define what constitutes success (how much is enough?) as it relates to programmatic and technical MEP
- Utilize what we learn to plan the next steps

GOAL 4: Achieve Acceptance of Urban Runoff Management Activities

- Effectively facilitate public input into Program planning process
- Integrate urban runoff goals at various intra-agency levels
- Develop and maintain a proactive relationship with regulatory authorities
- Publicize the efforts of the Co-permittees (Program)

GOAL 5: Integrate Urban Runoff Program Elements into other Programs

- Promulgate an understanding of the role of the urban runoff program
- Encourage other agencies to become involved in urban runoff issues
- Encourage action by the appropriate agencies

These goals were designed to achieve each of the following objectives, contained in the Program's NPDES Permit:

1. Characterization of representative drainage areas and storm water discharges, including land-use characteristics, pollutant concentrations, and mass loadings;
2. Assessment of existing or potential adverse impacts on beneficial uses caused by pollutants of concern in storm water discharges, including an evaluation of representative receiving waters;
3. Identification of potential sources of pollutants of concern found in storm water discharges; and,
4. Evaluation of effectiveness of representative storm water pollution prevention or control measures

It is important to point out that although the Revised Multi-Year Plan has been developed to meet the objectives of the NPDES permit, it also addresses the guidance contained in several RWQCB letters written to both the Program and members of the BASMAA monitoring committee.¹

This Revised Multi-Year Plan is intended to help the SCVURPPP: 1) plan and prioritize its watershed assessment and monitoring activities over the next six years, and 2) coordinate with other watershed assessment programs in the Bay area, including the WMI. The SCVURPPP's watershed assessment and monitoring approach emphasizes characterizing watersheds and collecting data when and where appropriate, which will enable watershed assessments and focused studies to be conducted that will yield information necessary to implement effective and feasible management actions designed to reduce the impacts of urban runoff on Uses.

1.3 Revised Multi-Year Plan Organization and Structure

The Revised Multi-Year Plan is organized into eight (8) sections and describes both environmental and programmatic monitoring designed to meet previously stated goals and objectives. The Revised Multi-Year Plan includes sections:

1.0 Introduction – provides a brief introduction to the Revised Multi-Year Plan, including goals and objectives.

2.0 Monitoring and Assessment Approach – presents the SCVURPPP's approach to monitoring and assessment, including: a description of monitoring categories, monitoring and assessment process, annual project funding process, priorities for assisting the WMI, SCVURPPP monitoring priorities, and regional and SCVURPPP monitoring activities accomplished to-date.

3.0 Watershed Monitoring and Assessment Activities - description of planned watershed monitoring and assessment activities, including: screening-level monitoring and watershed assessments.

4.0 Pollutant of Concern Monitoring and Characterization Activities – provides a description of planned pollutant of concern monitoring and characterization, including local and regionally-based activities.

5.0 BMP and Performance Standard Monitoring – describes monitoring activities associated with measuring the effectiveness of implementing performance standards and control programs for POCs.

6.0 Reporting and Quality Control Procedures - provides a description of the quality control and assurance (QA/QC) procedures and the reporting process the Program will develop and implement.

7.0 Environmental Monitoring and Assessment Measures Summary Matrix- illustrates Environmental Monitoring and Assessment Measures (EMMs) that are currently being

¹ RWQCB letter from Tom Mumley to BASMAA monitoring committee entitled “Urban Runoff Monitoring Needs/Recommendations” dated February 2, 2001.

RWQCB letter from Loretta Barsamian to Adam Oliveiri entitled “FY2002-2003 Stormwater Municipal NPDES Program Priorities” dated December 7, 2001.

The water quality monitoring comments in the RWQCB from Bruce Wolfe to Beau Goldie entitled “Pesticide-Related Components of 2000/01 Annual Report” postmarked December 28, 2001.

RWQCB letter from Loretta Barsamian to Beau Goldie entitled “Request for revision of the Program's long-term receiving waters monitoring plan” dated June 5, 2002.

implemented or are planned. EMMs are used to gauge the effects of urban runoff on the environment.

8.0 Programmatic Monitoring Indicators Summary Matrix – illustrates Programmatic Monitoring Indicators (PMIs) that are currently being implemented or are planned. PMIs are used to gauge how well Performance Standards are being met and control measures are being implemented.

2.0 MONITORING AND ASSESSMENT APPROACH

The information contained in Section 2.0 is intended to provide context to the SCVURPPP's Monitoring Program, by briefly describing SCVURPPP's approach to monitoring and assessment. Background information is provided, including: a summary of SCVURPPP's monitoring priorities; descriptions of environmental and programmatic monitoring, and SCVURPPP's monitoring and assessment process; the annual project funding process; priorities for assisting the WMI; the integration of SCVURPPP-led monitoring activities with regional monitoring strategies; and a description of a portion of the SCVURPPP monitoring-related accomplishments to-date

2.1 Background

From its inception in 1990 through 1995, the Program's monitoring activities focused on establishing baseline information through sampling and analysis of runoff from various land uses and ambient waters. A summary of the products produced as part of the SCVURPPP's previous monitoring efforts is contained in the 1997 URMP. In addition to gathering baseline information, the Program's annual monitoring plans have also included assessments intended to enhance understanding of the sources and extent of urban runoff pollution, its effects, and methods for its control.

In August 1996² the Regional Water Quality Control Board (RWQCB) requested that the SCVURPPP redirect its monitoring resources and develop a new approach:

Specific monitoring activities that should be considered within the strategy include characterization of drainage areas (watershed monitoring) including land use characteristics (general, such as open, residential, commercial, or industrial areas, or specific sources) and consideration of physical and biological, as well as chemical indicators to assess the drainage areas. We strongly encourage you to use community-based (volunteer) monitoring as an inexpensive and effective means to conduct this type of monitoring. The strategy should also establish a mechanism or process for effective use of special or pilot studies by your program or those conducted by other programs.

Since 1997, the Program's emphasis has been on integrating urban runoff and watershed management. This emphasis continues to be a major condition of the urban runoff permit. The results of this integration effort include the Program's and individual Co-permittee assistance on: managing various subgroups of the WMI, preparing the abridged and unabridged Watershed Characteristics Report, conducting various projects related to the review of development policies, and the completion of the national Stormwater Environmental Indicators Demonstration Project. A more detailed discussion of these efforts is contained the Program's Annual Reports (i.e., see FY 97-98, 98-99, 99-00, 00-01, 01-02 and 02-03).

2.2 Summary of Program Monitoring Priorities

The SCVURPPP's Monitoring AHTG uses the following monitoring priorities to determine which projects are funded for a given year:

² Loretta K. Barsamian, Executive Officer. August 30, 1996 letter to Frank Maitski.

- 1) New projects needed to implement the results, and achieve the goals, of current projects;
- 2) New projects that implement continuous improvement items identified through the annual review process;
- 3) Projects that support the Santa Clara Basin Watershed Management Initiative in one of the following ways:
 - a) Investigate Beneficial Uses and Causes of Impairment (including field work)
 - b) Review and Compile Environmental Data and Make it Accessible
 - c) Develop Strategies for Controlling Impacts of Land Use on Beneficial Uses
 - d) Facilitate and Support WMI Subgroups (including coordination with other agencies)
4. Projects identified through participation in regional monitoring collaborative efforts, including the Regional Monitoring Program and BASMAA.

Each of these priorities is intended to fulfill specific provisions of the Program's NPDES permit and the 1997 URMP, and to provide a strong basis for both program improvement and the next round of permit requirements.

2.3 SCVURPPP's Monitoring and Assessment Approach

The SCVURPPP continues to embrace the watershed approach to direct its monitoring and assessment activities, and meet its goals and objectives. The watershed approach is a coordinating framework for environmental management that focuses efforts to address the highest priority problems within hydrologically-defined geographic areas. The SCVURPPP will continue to define and address high priority issues through the implementation of activities that fall into two monitoring categories: programmatic monitoring and environmental monitoring and assessment. Each monitoring category and specific subcategories are defined below. Specific activities being conducted under each category are further described in Sections 3.0, 4.0 and 5.0; and implementation timelines are presented in Section 7.0.

2.31 Monitoring Categories

The word monitoring can be applied to a wide range of activities; therefore, it is important that a monitoring program begins by defining the types of monitoring that will be employed to achieve its objectives. Nonpoint source programs, including urban runoff management programs, generally employ several types of monitoring depending on the type of observation that is desired. The types of monitoring employed by the SCVURPPP fall into two general categories: *Environmental Monitoring and Assessment Measures (EMMs)* and *Programmatic Monitoring Indicators (PMIs)*. Although inherently interconnected, each strategy has its own objectives. The objectives, elements, differences and utility of the environmental monitoring and assessment; and programmatic monitoring strategies are further discussed in the following paragraphs.

Programmatic Monitoring – Programmatic Monitoring Indicators (PMIs) are used to gauge how well performance standards are being met. Programmatic monitoring efforts typically include tracking and evaluating continuous improvements and evaluating the effectiveness of implementing control programs for pollutants of concern. Programmatic monitoring provides the best basis for measuring compliance with Permit requirements

and the success of implementing Program components. Programmatic Monitoring Indicators are presented in described in Section 5.0 *BMP and Performance Standard Monitoring Activities*, and in Section 8.0 *Programmatic Monitoring Indicators Summary Matrix*.

Environmental Monitoring and Assessment - Environmental monitoring and assessment measures (EMMs) are activities that entail the collection of environmental data through field studies and analysis of information through assessments. EMMS are coordinated at the local or regional level and typically fall into one of two general areas:

- Watershed Assessment Activities; and,
- Pollutants of Concern (POC) Monitoring.

EMMs are intended to: 1) assist the RWQCB characterize receiving water quality in urban watersheds consistent with the priorities of the Watershed Management Initiative and the Program; 2) identify where and what type of screening-level monitoring is appropriate; and, 3) recognize the need for site-specific water quality investigations to address questions that might arise while conducting screening-level monitoring efforts. Based on the Program's experience, we believe EMMs provide the best context for considering the effects of stormwater runoff on the environment.^{3,4} EMMs are further described in Sections 3.0 *Watershed Monitoring and Assessment* and 4.0 *Pollutants of Concern Monitoring*. Implementation timelines for EMMs are presented in Section 7.0.

Tiered Monitoring and Assessment Approach

Because there are a variety of types of environmental monitoring that are available, it is useful to classify parameters that may be measured into two tiers; screening-level monitoring and assessments (i.e. Tier I) and investigative monitoring (i.e., Tier II). Screening level monitoring and assessments include more general measurements made at various sampling locations, providing an initial characterization of the physical, chemical, and biological integrity of a particular watershed/waterbody.

Investigative monitoring or studies include more detailed measurements typically taken in a more defined area (e.g., stream reach). Investigative monitoring is intended to address specific questions of impairment, such as: 1) what is the cause of the potential impairment, and 2) what is the potential source of the pollutant identified? Table 2.0 provides a few examples of screening-level indicators and investigative monitoring parameters.

³ *Stormwater Environmental Indicators Demonstration Project – Final Report*, prepared for the Water Environment Research Foundation, 2001.

⁴ *Watersheds 2000 – A Vision of the SCVURPPP's Role in Watershed Management and the SCBWMI*, December 9, 1999.

Table 2.0. Examples of screening-level indicators and investigative monitoring parameters, with associated beneficial uses.

Indicator/Parameter	Beneficial Uses
Screening-level Indicators	
General Water Quality	Aquatic Life Uses
Rapid Bioassessment	
Fisheries Assemblage Characterization	
Qualitative Physical Habitat Assessments	
Bacterial Indicators	Recreation Uses
Investigative Parameters	
Nutrients (NO ₃ , NO ₂ , NH ₄ , PO ₄)	Aquatic Life Uses
Sediment (TSS, SSC, Geomorphic Analyses)	
Toxicity (3 species bioassays, TIEs)	
Metals (Cu, Ni, Cd, Hg, Cr, Pb, Se)	Aquatic Life and Recreation Uses
Pesticides (Organophosphates)	Aquatic Life Uses
Quantitative Physical Habitat Assessments	
Organics (PCBs, PAHs, Dioxins)	Aquatic Life and Recreation Uses

2.32 Integrating Monitoring into Watershed Assessment

In the absence of a robust data set that can be used to characterize water quality and the physical, chemical and biological integrity of most water bodies in the Santa Clara Valley basin, initial characterization (i.e., screening-level monitoring/assessments) is needed. To provide this necessary information, the SCUVRPPP intends to conduct screening level monitoring in watersheds within the Santa Clara Valley basin using screening-level indicators. Data collected from these efforts is intended to provide information that will aid the Program in conducting watershed assessments. To the extent possible, these assessments will be conducted in coordination and collaboration with other efforts current underway in the basin (e.g., SCVWD Stream Stewardship Plans).

As an outcome of conducting watershed assessments, data gaps, testable hypotheses and preliminary management actions will be presented. Where feasible, investigative studies will be conducted to help test hypotheses and fill data gaps identified during watershed assessments. These investigative studies will aid the Program in determining the extent of impairment, and the causes and sources of impairment (if necessary), leading to potential recommendations for management actions in these watersheds. This approach is similar to regional (i.e., RMAS) and other Bay area urban runoff management program monitoring and assessment approaches. The approach is illustrated in Figure 1.0 *SCVURPPP's Monitoring and Assessment Process Flow Chart* and further described in Section 2.4. Additionally, a generalized timetable for conducting screening-level monitoring and assessments, watershed assessments, investigative monitoring, and status and trends monitoring is presented in Section 7.0.

2.4 SCVURPPP's Monitoring and Assessment Process Flow Chart

A *Monitoring and Assessment Process Flow Chart* (Figure 1.0) was developed to illustrate the Program's "tiered" monitoring approach to environmental monitoring and the nexus between environmental monitoring and watershed assessment. This process is intended to provide the Program with a formalized structure for conducting monitoring and assessments under the Revised Multi-Year Receiving Waters Monitoring Plan. This process utilizes the best available water quality and watershed-related information throughout each step, with the goal of collecting additional data needed to characterize, assess and protect/restore beneficial uses in receiving water bodies. The following sections describe each step in the process.

Step #1: Watershed Characterization

Watershed characterization is an import foundation-setting activity needed to develop a better understanding of the location and extent of impacts to watersheds, water quality and beneficial uses. Building on recent watershed assessment activities conducted by the WMI and the SCVURPPP, the Program plans to conduct activities entailing the collection and analysis of information needed to further characterize watersheds. To facilitate this process, the SCVURPPP will annually develop a *Watershed Characterization and Sampling Design Technical Memorandum* (Characterization Memo).

The purpose of the Characterization Memo is to describe existing readily available information (e.g. watershed attributes, beneficial use information, water quality data) that will aid in the development of a sampling design for a specific watershed(s) that are scheduled for screening-level monitoring to begin during the next fiscal year. Beginning with the Program's FY 05-06 Annual Workplan, a Characterization Memo that will, (1) describe relevant watershed attributes and (2) provide justification for the selection of sampling parameters and sites within a watershed(s) scheduled for screening-level sampling in that fiscal year ,will be submitted to the Regional Board.

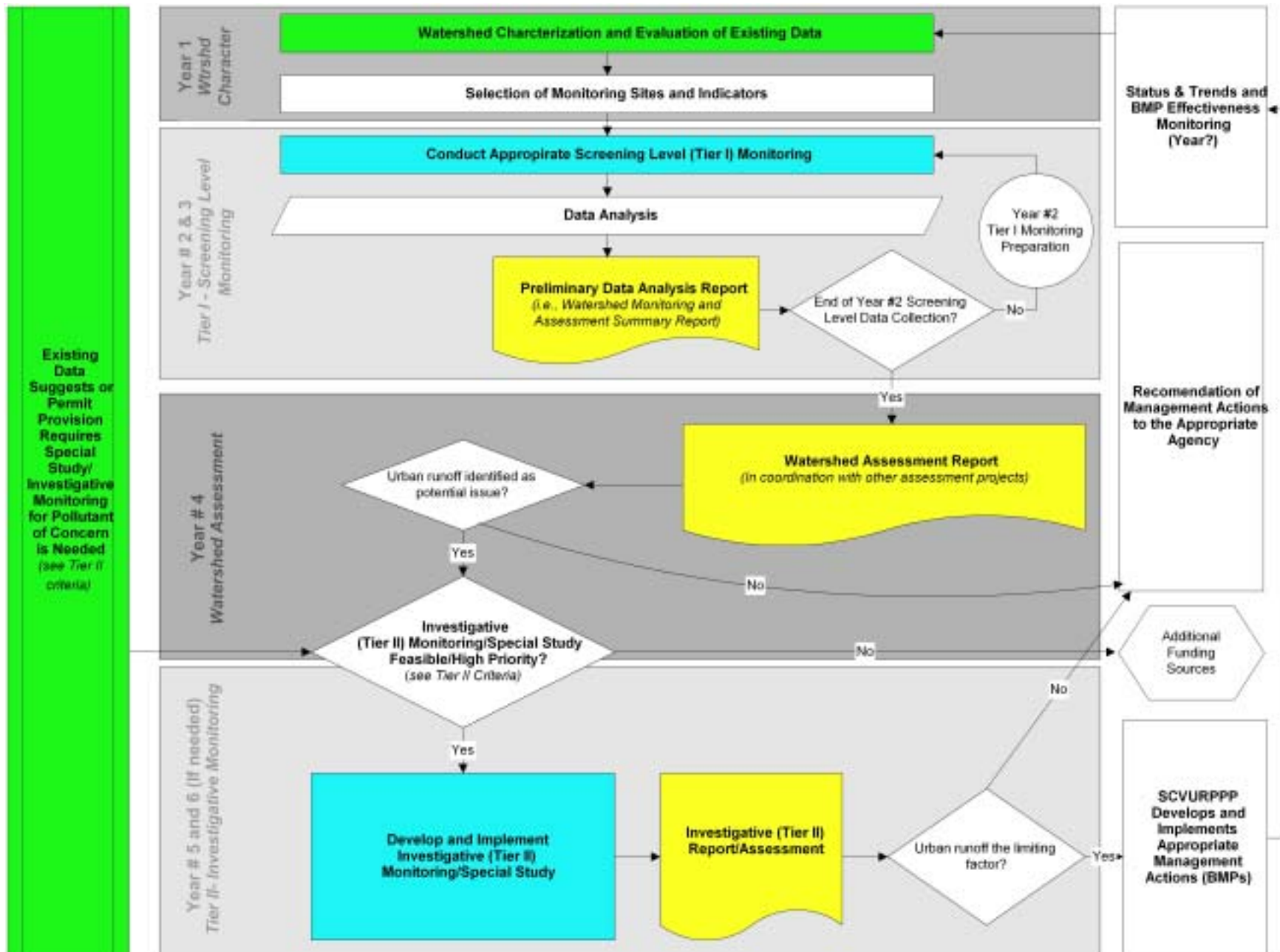
It is important to point out that this task is very similar to activities previously conducted by Program staff when developing the Program's Annual Monitoring Program Plan. The only difference being the deliverable (i.e., Characterization Memo), which will aid the Program in, documenting the extent of readily available information for the given watershed, and developing the rationale behind selection of monitoring indicators and sampling site locations.

Step #2: Screening Level Monitoring

An ecological indicator is a measure, an index of measures, or a model that characterizes an ecosystem or one of its critical components. An indicator may reflect biological, chemical and/or physical attributes of ecological condition, and may also be used to identify major ecosystem stress. The Program intends to collect two types of screening level indicators during the implementation of the Revised Multi-Year Plan: (1) aquatic life use indicators (e.g., benthic macroinvertebrates and fish assemblages) and (2) water recreation use indicators (e.g., fecal and total coliforms, enterococcus and E. coli). Each type of indicator is further described below.

Aquatic Life Use Indicators - As a first step in conducting environmental monitoring, the Program intends to use screening level indicators that will aid in determining ecological

Figure 1.0 SCVURPPP *Monitoring and Assessment Process Flow Chart*, illustrates the Program’s “tiered” monitoring approach to environmental monitoring and the nexus between environmental monitoring and watershed assessment.



condition and status of aquatic life uses in Santa Clara basin water bodies. In particular, the Program has selected Benthic macroinvertebrates (BMIs) and fish community assemblages as screening level indicators of aquatic life uses. Extensive guidance on development and use of BMIs and fish as indicators has been supported at the national and state levels, and a number of agencies and volunteer groups have begun to sample BMIs in Bay Area creeks using the California Stream Bioassessment Procedure developed by the California Department of Fish and Game. Additionally, screening level assessments of physical habitat will be conducted to aid in determining the physical/habitat condition or quality of a watershed and water body. Qualitative screening-level physical habitat assessments will be conducted synoptically with BMI and fish data collection efforts. Qualitative physical habitat assessments also include, general water quality measurements and substrate composition estimates taken during biological sampling.

Recreation Use Indicators - Microbiological water analysis is typically carried out to safeguard the health of a community by testing for possible fecal pollution, the source of microorganisms causing waterborne disease. Indicators of recreational use are microbiological organisms that coexist with pathogens in the fecal environment and are easier and less expensive to test for than pathogens. For these reasons, indicator organisms are often the focus of water analyses rather than pathogens. The most commonly employed indicator organisms are total coliform, fecal coliform, enterococcus, and E. coli. The Program intends to use these organisms as screening level indicators of beneficial uses related to recreation (i.e., REC-1 and REC-2). To ensure locations that have a high potential for recreational uses are sampled, Program staff will identify sampling sites within a given watershed during the watershed characterization stage of the watershed monitoring and assessment process (see Step #1). The selection of sampling site locations will be based upon where the highest potential for exposure and access to the creek appears to exist (e.g., parks adjacent to creeks and local swimming sites).

Step #3: Watershed Assessment

Watershed assessment is the systematic review of specific resources such as benthic macroinvertebrates or fish and their habitat and riparian areas in a watershed-scale context. The results of watershed assessment can be used to establish the context for subsequent evaluations and analysis of cumulative watershed effects. It is the Program's intent to conduct watershed assessments in specific watersheds within the Santa Clara basin. Assessments will integrate information collected during watershed characterizations and screening-level assessments to support Program objectives of continuously improving Program components and developing additional ones to support attainment of beneficial uses in selected water bodies. As an outcome of the assessment, the Program will develop a *Watershed Assessment Report* that will describe the assessment process, identify data gaps and potential follow-up studies, and recommend management actions, where feasible. Watershed assessments will be coordinated with other assessment-related activities occurring in the basin, to the extent possible, and will only occur in watersheds identified as high priority by the Program.

Step #4: Investigative Monitoring/Studies

Investigative monitoring/studies include more detailed measurements typically taken in a more defined area (e.g., stream reach). Investigative monitoring is intended to address

specific questions related to potential impairment, such as: 1) what is the cause of the potential impairment, and 2) what is the potential source of the pollutant identified? Table 2.0 provides a few examples of investigative monitoring parameters.

As illustrated in the Monitoring and Assessment Process Flow Chart (Figure 1.0), investigative monitoring/studies can arise through multiple pathways. First, additional data collection (e.g., investigative monitoring or special studies) may be recommended in a *Watershed Assessment Report* to aid in determining beneficial uses impacts. Alternatively, existing data may suggest that additional data collection is needed to determine impacts, or a NPDES Permit Provision may require that investigative monitoring or a special study be conducted. Regardless of which pathway is taken, prior to conducting investigative monitoring or a special study the Program will determine if additional monitoring or a study is feasible and/or a high priority by reflecting on monitoring priorities established in 1997 to determine which projects should occur in a given year (see Section 2.2).

Step #5: Development/Implementation/Recommendation of Management Actions

Once investigative monitoring or a special study has adequately determined the cause(s) and source(s) of adverse impacts in a watershed or sub-watershed, a logical next step is to implement feasible management actions designed to reduce/eliminate the impacts on beneficial uses (e.g., best management practices). Depending on the location of the source, jurisdiction of the agency and feasibility of implementation, management actions could be implemented by a variety of agencies. For example, if a source of a water quality impact is determined to be outside of the jurisdiction of the SCVURPPP, recommendations may be provided to the appropriate agency or individual. Alternatively, a particular municipality within the SCVURPPP may be the most appropriate agency to implement a best management practice (BMP) designed to help protect or restore a beneficial use.

Step #6: Status & Trends Monitoring and BMP Effectiveness Monitoring

Best Management Practices (BMPs) are measures, activities, or other practices that prevent or minimize pollutant discharges to water bodies. Some are routine activities such as recycling materials that contain pollutants, good housekeeping practices and spill prevention procedures. Others are structural treatment measures that are integrated into the storm water conveyance system to remove pollutants from runoff before it enters water bodies. During its second NPDES permit cycle the Program established initial Performance Standards incorporating a variety of BMPs into several components including, Public Information and Participation; New Development and Redevelopment Activities; Illicit Discharge Controls; Industrial and Commercial Business Controls, and; Municipal Government Maintenance Activities. Performance standards under each component are updated on an as needed basis through the Program's continuous improvement process.

To monitor the effectiveness of an implemented BMP or performance standard, the Program will conduct programmatic monitoring by developing and implementing Programmatic Monitoring Indicators (PMIs). As described in Section 2.31, PMIs typically include tracking and evaluating continuous improvements and the effectiveness of implementing BMPs. Programmatic monitoring provides the best basis for measuring compliance with Permit requirements and the success of implementing Program

components. Additionally, once a BMP has been implemented, status and trends monitoring will occur (in parallel with PMIs) over time to determine if a net environmental benefit is apparent. Although particular situations may require the use of more specific monitoring parameters, screening level indicators will likely be used to determine the status and trends of water bodies.

2.5 Priorities for Assisting the Watershed Management Initiative

The Program's Monitoring Ad-hoc Task Group (AHTG), composed of Co-permittee representatives, works with Program staff to review proposed projects and allocate available funds. Regional Board staff and interested parties attend the AHTG meetings. As presented in the Program's monitoring priorities (see section 2.2), there are four general areas in which the SCVURPPP provides support to the SCBWMI. These include:

1. Investigate Beneficial Uses and Causes of Impairment (including field work)
2. Review and Compile Environmental Data and Make it Accessible
3. Develop Strategies for Controlling Impacts of Land Use on Beneficial Uses
4. Facilitate and Support WMI Subgroups (including coordination with other agencies).

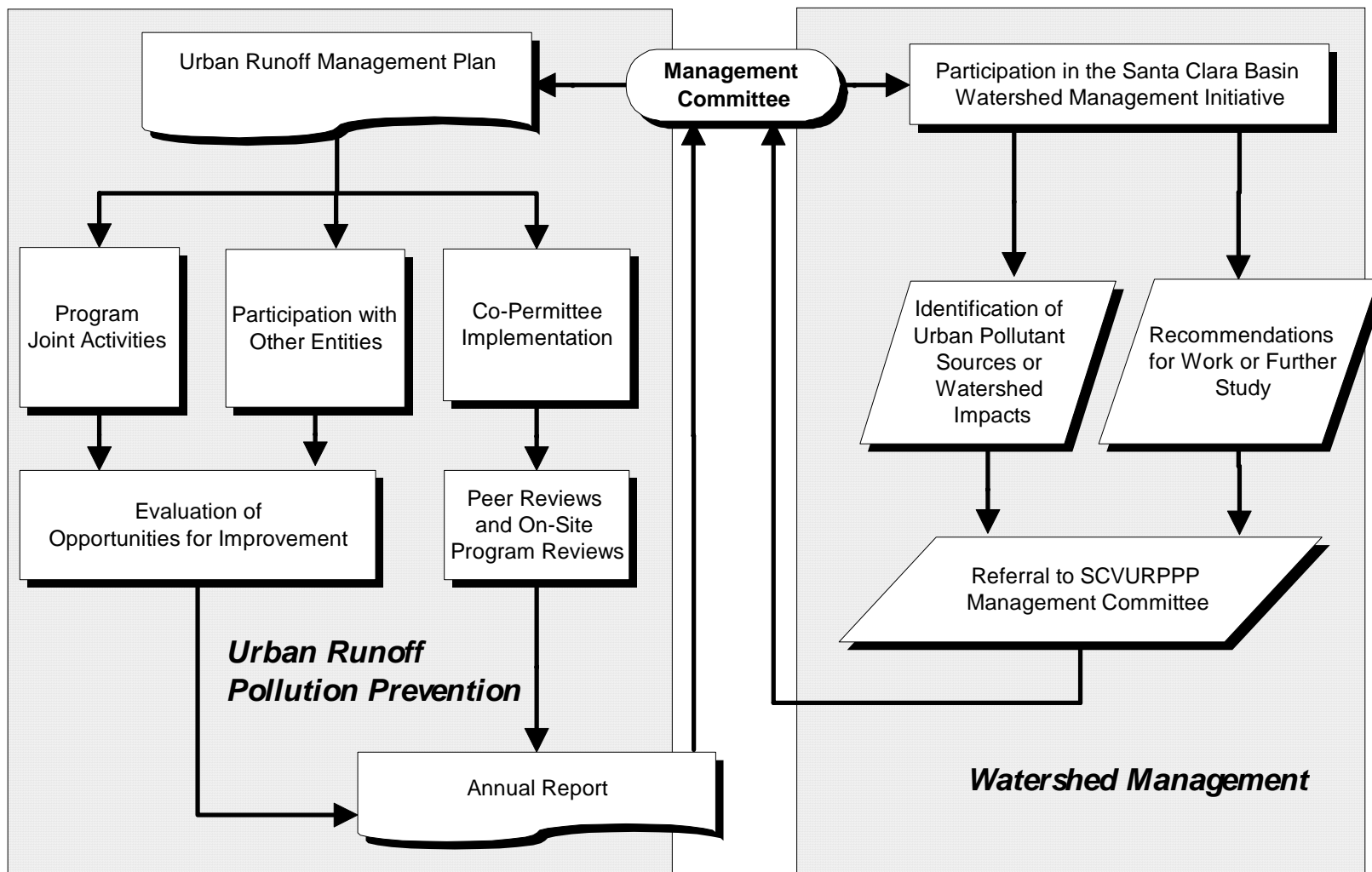
2.6 Continuous Improvement Process

An important feature of a mature Phase I municipal stormwater management program like the Santa Clara Valley Program is a process for continuous improvement. As shown in the Program's 1997 URMP and illustrated in Figure 2.0, continuous improvement is implemented through two feedback "loops." The loop on the left emphasizes programmatic measures to gage the performance of the Co-permittees and the overall Program (and includes participation in regional efforts such as the San Francisco Bay Regional Monitoring Program for Trace Substances). The loop on the right emphasizes watershed assessment and management conducted jointly with other stakeholders in the SCBWMI⁵.

This two-pronged approach facilitates the Regional Board's responsibility for fairly measuring regulatory compliance while encouraging a watershed management approach. The continuous improvement process has been utilized by the Program over the past seven years to successfully integrate programmatic monitoring indicators, which provide the best basis for measuring permit compliance, with watershed management measures (including environmental monitoring), which provides the best context for considering the effects of urban runoff on the environment and measures to improve the health of the watershed.

⁵ The continuous improvement process concept was developed as part of the Program's 1997 Urban Runoff Management Plan to more effectively integrate urban runoff and watershed management.

Figure 2.0. SCVURPPP’s continuous improvement process illustrating two feedback “loops” which emphasize the nexus between the Program and the Santa Clara Basin Watershed Management Initiative (SCBWMI). The continuous improvement process was originally presented in the Program’s 1997 Urban Runoff Management Plan (URMP).



2.7 Stakeholder Involvement & Input

A significant factor in the success of the continuous improvement program is the active involvement and input from the various watershed stakeholders. Over the past seven years, this involvement and input has principally come through the Program's and Co-permittees significant involvement in the Santa Clara Basin Watershed Management Initiative (WMI). For example, the Program's involvement involved a major role preparing both the abridged and unabridged versions of the Watershed Characteristics Report, the lead role in conducting the assessment of Coyote Watershed, a continuing leadership role in the Landuse Subgroup as well as the Bay Monitoring and Modeling and Regulatory Subgroups, and it's continued support of the Core Group efforts.

As the SCVURPPP and WMI move forward towards completing ongoing assessments, initiating new assessments, identifying impediments to maintaining and improving water quality and identifying actions to improve water quality, the "continuous improvement" process and input from stakeholders will become even more important to shape the actions and priorities for the future. As illustrated in Figure 2.0 the most advantageous time to provide effective input to the Program and Co-permittees is through the review of the Annual Report. The Annual Report is submitted to the RWQCB on September 15 each year. To be useful, the review and comment needs to occur during the latter half of September and October of each year with comments available by the first of November.

While review of the Annual Report is the most effective means to influence future efforts, the Program and Co-permittees continued involvement in the WMI will also generate new ideas and avenues to improve the management of urban runoff and the effective and efficient integration⁶ of urban runoff management into the overall management of the Santa Clara basin watersheds.

2.8 Effectively Integrating Urban Runoff and Watershed Management

The requirement to investigate, consider, and implement watershed management measures first appeared in the Program's 1995 NPDES permit and is also a requirement of the Program's current NPDES permit. As part of its application for the current permit, the Program developed a "Watersheds 2000 Vision" (December 1999) that outlines the principles and approaches that the Program and its Co-permittees will use to support better management of the Santa Clara Basin through the implementation of urban runoff control measures. The vision statement also defines the relationship between and the roles of the Program and the SCBWMI in this context.

The Program's approach for supporting watershed management and the SCBWMI is based on the following principles:

- The goal of the Program and its Co-permittees is to maintain water quality and protect the beneficial uses of the waterbodies in the Santa Clara Basin through the implementation of control measures to the maximum extent practicable.
- Successful watershed management must be a community-wide, stakeholder-driven effort that includes regulatory agencies, the business community, environmental advocates, and local government.

⁶ See the Program's report entitled "Watershed Management and Urban Runoff Management Integration Report-Permit Provision C.10, June 29, 2001" for a further discussion.

- The Co-permittees recognize it can be difficult to separate many urban runoff “issues” from the general impacts of urbanization resulting from the cumulative effects of land development.
- The Co-permittees understand that municipal agency activities have the potential to impact water quality and beneficial uses; conversely such activities can create opportunities to improve water quality and enhance aquatic resources.

Given those principles, the Co-permittees envision the roles of the Program and that of the SCBWMI as follows:

- The Program’s activities pursuant to the NPDES permit assist Co-permittees and other local agencies to incorporate appropriate watershed management recommendations into their decision-making and specific watershed protection approaches into their day-to-day operations.
- The SCBWMI, as a stakeholder process, provides the tools to identify community goals and issues, and facilitates the development of common ground between stakeholders to recommend to policy-makers the actions needed to better manage watershed resources.

The Program seeks to create an avenue by which the SCBWMI's broad stakeholder goals and objectives can be incorporated into the daily operations of the Co-permittees. The Co-permittees will strive to apply their resources and powers to preserve and enhance the watershed. To do this most effectively, the Program and Co-permittees need to translate SCBWMI stakeholder recommendations into specific actions that are reasonable, practical, and that can be incorporated into their missions and services (see Figure 2.0). In addition, the Program will work with Regional Board staff to apply a regulatory strategy that allows Co-permittees to find ways to coordinate with other agencies within a specific watershed to protect and enhance beneficial uses.

2.9 Integration with Regional Monitoring Activities

The Program has contributed to the Regional Monitoring Program for Trace Substances (RMP) since 1993 and has contributed approximately \$150,000 a year to the RMP over the past four years. In addition, the three South Bay municipal wastewater treatment plants (i.e., City of Palo Alto, City of Sunnyvale, and the San Jose-Santa Clara facility) annually contribute between \$200,000 and \$250,000 a year to the RMP. Thus, local communities (which are urban runoff Co-permittees) contribute approximately \$350,000 to \$400,000 a year to a regional monitoring program (consistent with Permit Provision C.7b). The results of the RMP's research and investigations have been published by the San Francisco Estuary Institute (SFEI).

The Regional Board has requested that the Program and other members of the Bay Area Storm water Management Agencies Association (BASMAA) conduct “monitoring” in a broad sense that includes watershed assessment, and pollutants of concern (POCs) and BMP monitoring. The scope and objectives of monitoring and assessment activities have been refined through a number of initiatives including the BASMAA Regional Monitoring Strategy (BRMS) and the Regional Monitoring and Assessment Strategy (RMAS). The Regional Board’s most recent conceptual strategy is based on the design

of its Surface Water Ambient Monitoring Program (SWAMP) efforts and uses several categories of monitoring depending on the spatial extent, type of pollutant or stressor and level of detail and data quality required. These activities are described in more detail in Sections 3.0, 4.0 and 5.0.

2.10 Accomplishments to-date

Complying with the Regional Board directive to redirect monitoring resources from a baseline monitoring approach, the Program has, since 1997, moved toward assessment of specific pollutants and conditions of designated beneficial uses. To improve the effectiveness of our special studies and those conducted by other programs, in 1996 and 1997, the SCVURPPP co-sponsored, and participated in, the Bay Area Stormwater Management Agencies Association's (BASMAA's) development of a BASMAA Regional Monitoring Strategy (BRMS). The SCVURPPP continues to coordinate its monitoring activities with other BASMAA member agencies.

In recent years, the Program has conducted substantial original research and investigations into the sources, fate, transport, and effects of urban runoff pollutants, the characteristics of Santa Clara Basin watersheds, the effects of urbanization on watersheds, and the effectiveness of various control measures. Beginning in 1993-1994, the SCVURPPP has funded efforts to assess the condition of beneficial uses of creeks within the Santa Clara Basin. The Program, as part of the Annual Reports, updates a summary of memoranda and reports published as a result of their research and investigative efforts. The most recent update is contained in Table 4-2 of the 2002-2003 Program Annual Report. The following subsections briefly describe a portion of the projects the Program has conducted.

Stormwater Environmental Indicators Demonstration Project (SEIDP)

The SCVURPPP recently completed a two year research project entitled "The Stormwater Environmental Indicators Demonstration Project (SEIDP). The SEIDP is part of USEPA's Environmental Indicators/Measures of Success Project (third phase), which focuses on local demonstration projects and testing of the indicators. The Water Environment Research Foundation sponsored the SEIDP jointly with the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP).

The project objectives were to:

- Evaluate the usefulness of the Center for Watershed Protection's (CWP) Stormwater Indicator Methodology under semi-arid conditions;
- Evaluate the applicability of environmental indicators under semi-arid conditions in two different situations: at a watershed level that includes a variety of chemical, physical and biological indicators and in an industrial watershed that emphasizes programmatic indicators;
- Select, test, and refine protocols for monitoring environmental indicators in semi-arid conditions; and,
- Develop guidance on selection and use of environmental indicators, and disseminate guidance to other stormwater programs in California, Oregon and the west to assist in validation of environmental indicators throughout the west.

Consistent with these objectives, the CWP's stormwater indicator methodology was applied at two distinct geographic scales: the 310-square-mile watershed of Coyote Creek (which includes the eastern portion of the City of San Jose) and a 28-acre industrial catchment along Walsh Avenue in the City of Santa Clara. The semi-arid climate is typical of California's coast from the San Francisco Bay area southward.

In Coyote Creek, the baseline was a 1979-1981 EPA-sponsored study that sought to identify the effects of urban runoff on water quality, sediment, fish, macroinvertebrates, attached algae, and rooted aquatic vegetation. In addition, the SCVURPPP monitored stormwater constituents and toxicity in the creek 1987-1996. In 1999, the SEIDP sampled fish and the physical habitat at 18 locations in Coyote Creek, sampled surficial sediment at six locations, and sampled benthic macroinvertebrates at nine locations. The SEIDP analyzed flooding, changes to stream morphology, and sources of imperviousness in the surrounding watershed. Georeferenced reports of illegal dumping and known industrial and construction sites were also generated.

Regional Board staff has been thoroughly involved in these projects through participation in the Program's Monitoring Ad-hoc Task Group, through WMI subgroups, and through special review groups such as the Stormwater Environmental Indicators Demonstration Project Review Committee and other technical advisory groups facilitated by Program staff.

Joint Stormwater Agency Project

The recent emphasis on developing Total Maximum Daily Loads (TMDLs) for water quality impairing pollutants has led the Regional Board to require new assistance from Bay area municipal storm water programs. Requirements include characterizing pollutant distributions in representative watersheds, identifying pollutant sources, estimating pollutant loads and identifying and implementing additional pollutant control measures. To meet these requirements, the Program coordinated a recently completed two-year regional study to characterize distributions of these pollutants found in storm drain and creek embedded sediment. The study found statistically higher concentrations of mercury, PCBs, chlordanes and DDTs in urbanized areas compared to undeveloped, open land uses. Median concentrations of total PCBs, chlordanes and DDTs measured in urban storm drain sediments were roughly two orders of magnitude greater than median concentrations measured in Bay sediments by the Regional Monitoring Program. The median concentration of mercury in urban storm drains was generally comparable to Bay sediments. Several sites with elevated levels of one or more of the study pollutants were identified. The study also developed planning-level estimates of urban runoff pollutant loads to San Francisco Bay from its surrounding watersheds.

Regional Monitoring and Assessment Strategy

Regional Board staff has developed a Regional Monitoring and Assessment Strategy (RMAS) for watershed monitoring and assessment in the Bay area. The purpose of the RMAS is to improve the technical content of the Regional Board's policies and regulatory actions. The specific regulatory focus of the RMAS is to help the Regional Board complete biennial water quality assessments under the Clean Water Act's 305(b) and 303(d) requirements. The RMAS endorses a multi-faceted monitoring approach, including incorporation of bioassessment data and physical measurements into Regional Board decision making, as supported by the 1997 USEPA 305(b) guidelines. The RMAS is being carried out in a phased approach, beginning with "pilot-scale implementation in

selected watersheds,” and establishing a rotating basin approach that will eventually result in “comprehensive assessment of surface and ground waters in the San Francisco Bay Region.”

The Regional Board has begun implementing the RMAS by assessing selected pilot watersheds in the Bay area. These assessments of “Board-lead” watersheds are currently funded by the NPDES permittees, including SCVRUPPP, through permit surcharges for the State Surface Waters Ambient Monitoring Program (SWAMP). The Regional Board is also relying on partnerships with local agencies to implement the RMAS in “Partner-lead” pilot watersheds.

To-date, the Program has participated in the RMAS through its pilot watershed assessment work in the Coyote Creek, Adobe and San Tomas Aquino watersheds. It is the Program’s intent to continue to conduct bioassessments in Program relevant watersheds during the implementation of the Revised Multi-Year Plan. A timetable for completion of bioassessments is presented in Section 6.0.

Coyote Creek Watershed Integrated Pilot Assessment

Past Program efforts (reported in the Program’s FY 99-00 and FY 01-02 Annual Reports) have been to assist Regional Board staff with the development of a functional and pragmatic assessment approach. To test this functional assessment approach and to contribute to the SCBWMI’s assessment of Santa Clara Basin watersheds, the Program conducted an Integrated Pilot Assessment in the Coyote Creek Watershed. The intent of the pilot assessment was to: (1) help facilitate continuous improvement of the SCBWMI’s watershed assessment framework; (2) integrate that methodology with that being used by the Regional Board’s Regional Monitoring and Assessment Strategy (RMAS) and other Regional Board initiatives; (3) develop a list of appropriate initial management actions to preserve and enhance the Coyote watershed; and (4) identify appropriate monitoring locations and provide baseline information as part of the Multi-year Monitoring Program to assist with continued watershed assessment.

The method used in the Coyote Creek Watershed Integrated Pilot Assessment to assess physical stream ecosystem is based on the Hydrogeomorphic Approach (HGM) that was developed to assess riverine (water and wetland) functions. It has been applied locally and in Central and Northern California. Biological stream ecosystem functions were assessed using a multimetric approach to calculate an Index of Biological Integrity. A multimetric approach is useful to assess biotic integrity in streams in which a broad range of human impacts occur.

The study area for this project was limited to data-rich portions of the two largest creeks in the watershed: Upper Penitencia Creek below Cherry Flat Dam and Coyote Creek below Anderson Dam. Stream reaches were classified using factors related to geomorphology and urbanization. The existing capacities of study area reaches to support the following four physical ecosystem functions were assessed using hydrogeomorphic models: hydrologic processes and channel dynamics, aquatic habitat, riparian habitat and landscape-level connectivity. The existing capacities of study area reaches to support aquatic fauna (macroinvertebrates and fishes) were assessed using indices of biological integrity. Selected water quality parameters were examined to assist interpreting model results. Future capacities of stream ecosystem functions were assessed by estimating the relative positive and negative impacts of existing and near-

term factors that may continue or soon influence the distribution and viability of fish and macroinvertebrate assemblages, their habitats and the functional capacities of supporting stream processes. Potential capacities of stream ecosystem functions were assessed by identifying where existing and future stream ecosystem functional capacities could be maintained or improved by practical, strategic management actions that have not been planned. Potential management actions were prioritized based on which would have the greatest positive impact on cold and warmwater fish and macroinvertebrate communities. Monitoring activities to address data gaps identified through the assessment are also described and prioritized.

Assessment of Watershed Assessment Methods

In keeping with the Program's commitment to continuous improvement of program elements, selected regional and national watershed assessment methods were evaluated to identify and recommend future direction for SCVURPPP's environmental monitoring and assessment program. As part of this evaluation, a memorandum was prepared which identifies the Program's monitoring and assessment needs in the context of prior efforts and pilot studies. In addition, the memorandum provides a framework for linking different types of assessment methodologies to address such needs using an adaptive management approach; summarizes types of and trends in watershed assessments; and focuses on methods using bioassessment and analysis of stream ecosystem functions.

The framework integrates the tiered assessment and rotating basin approaches currently implemented by the Regional Board, Program and many other agencies involved in water quality and watershed monitoring and assessment. Watershed assessment methods were characterized as either Tier I (screening level methods intended to detect beneficial use impairment) or Tier II (more detailed investigations of causes of degradation and use impairment). The framework also embraced the practice of integrating biological, chemical and physical indicators using a regional reference framework to establish water body condition relative to benchmarks. The ultimate goal of implementing this framework is to develop a monitoring and assessment program that provides an information base to support Program objectives of continuously improving program components and to develop additional ones to support attainment of beneficial uses in selected water bodies.

The Tier I assessment methods evaluated included Rapid Bioassessment Protocols, Rapid Stream Assessment Technique, Proper Functioning Condition, Stream Ecosystem Function Assessment, Oregon Watershed Assessment Manual and the Framework for Conducting Watershed Assessments. The Tier II assessment methods evaluated included the North Coast Watershed Assessment Program Limiting Factors Analysis, the Napa River Basin Limiting Factors Analysis, the San Francisquito Creek Sediment Reduction Plan and Aquatic Habitat Assessment and Limiting Factors Analysis, the Program's *Workplan for Watershed Analysis and Management Practice Assessment in Other Creeks Potentially Impaired by Sediment from Anthropogenic Activities*, the Hydromodification Plan, and the Biological Water Quality Target Approach.

Recommendations for the Program's monitoring and assessment program resulting from this evaluation of watershed assessment methods include the following:

Tier I (Screening-level) Assessment Methods

- Use the Stream Ecosystem Function Assessment (SEFA) approach (as recommended by the Program in 2003), augmented by certain aspects of the Rapid Stream Assessment Technique (RSAT), to analyze data generated from an ambient monitoring program based largely on Rapid Bioassessment Protocols (RBPs);
- Coordinate regionally to develop reference conditions and bioassessment tools to support analysis of macroinvertebrate data;
- Work towards developing robust numeric biocriteria; and
- Consider pursuing bioassessment of fish assemblages in larger order streams and in streams supporting steelhead trout.

Tier II (Investigative-level) Assessment Methods

- Continue to implement Limiting Factors Analysis (LFA) as primary approach to investigating factors potentially limiting attainment of aquatic life uses. Incorporate lessons from other projects implementing LFA;
- Consider using the HMP as tool to address potential use impairment caused by hydromodification associated with future development;
- Consider incorporating aspects of the HMP method of geomorphic assessment into a method for classifying Santa Clara Basin streams. Identify and prioritize where restoration efforts could occur; and
- Incorporate biocriteria into assessments as feasible.

The Program's document entitled *Assessment of Watershed Assessment Methods* was provided as Appendix D-2 to the Program's FY 02-03 Annual Report. The results and recommendations included in the report were presented to the SCBWMI Watershed Assessment Subgroup (WAS) and the Ad Hoc Monitoring Workgroup in July 2003, and were generally well received by the participants.

3.0 WATERSHED MONITORING AND ASSESSMENT ACTIVITIES

A watershed is hydrologically-defined geographic area that includes all land and water areas within its boundaries. Creeks, lakes and wetlands are the receiving water bodies that make up the complex system that ultimately receives runoff and drainage from the surrounding upland area within the watershed boundaries. The entire municipal storm drainage system that feeds into the receiving water bodies consists of storm drain inlets, culverts, road-side ditches, and outfalls. Changes to either upland areas or storm drainage systems may cause changes in the physical, chemical or biological characteristics of receiving water bodies. These effects may be most visible in a part of the stream far removed from the area where changes occurred. The response of the system may also take many years after the change has occurred.

3.1 APPROACH AND OBJECTIVES

The goal of the watershed assessment activities element of the SCVURPPP's Revised Multi-Year Plan is to develop a better understanding of the physical, biological, and physical characteristics of watersheds relevant to the Program. The collection and analysis of watershed information will help make informed decisions about future management actions and help clarify and resolve potential issues within the watersheds.

The Program's watershed assessment activities are designed to meet the following three main objectives:

- Collect, analyze and present appropriate watershed data, using a Geographical Information System (GIS) and other mapping tools;
- Develop and refine indicators for evaluating the physical, chemical and biological functioning of watersheds, and identify effective ways to apply them in urban creeks; and,
- Provide guidance and support to better understand watershed processes with the goal of protecting and restoring beneficial uses to the maximum extent practicable.

3.2 WATERSHED MONITORING AND ASSESSMENT ELEMENTS

The SCVURPPP watershed monitoring and assessment activities are described within this section. By implementing these activities, the SCVURPPP seeks to extend and continue implementation of the Program's monitoring priorities.

To reach the Program's watershed assessment objectives presented above, the Program anticipates that activities will be conducted within two (2) watershed assessment elements during implementation of the Revised Multi-Year Plan.

Watershed Characterization Activities – element entails watershed characterization of watershed attributes, leading to the development of watershed scale features for all watersheds within the co-permittees' jurisdictions.

Screening-level Monitoring and Assessment Activities – element entails the development and implementation of screening-level indicators of creek health,

and aids determining the ability of the water body to support beneficial uses (e.g., aquatic life and recreational uses).

Watershed Assessment Activities – entails a process that characterizes current watershed conditions at a coarse scale. The main goal in conducting watershed assessments is to characterize current watershed conditions by using existing data. Although coarse in resolution, watershed assessments can provide the basis for watershed-level planning, management and policy decisions and can lead to more detailed hypothesis testing through the implementation of monitoring studies at the finer scale.

Brief descriptions of each watershed assessment element and relevant activities are provided. A timeline for implementing these activities is presented in Section 6.0 *Comprehensive Monitoring Plan Timeline*.

3.21 Watershed Characterization Activities

Watershed characterization is an important foundation-setting activity needed to develop a better understanding of the location and extent of impacts to watersheds, water quality and beneficial uses. The analysis of similarities and differences in watersheds or sub-watersheds can help interpret indicator data and make useful distinctions among these watersheds. Additionally, watershed characterization can aid in the identification of priority areas where management actions may be taken, with the goal of protecting or restoring watershed functions.

Building on recent watershed monitoring and assessment activities conducted by the WMI and the SCVURPPP, the Program plans to conduct activities entailing the collection and analysis of information needed to further characterize watersheds. To facilitate this process, the SCVURPPP will annually develop a *Watershed Characterization and Sampling Design Technical Memorandum* (Characterization Memo). The purpose of the Characterization Memo is to describe existing readily available information (e.g. watershed attributes, beneficial use information, water quality data) that will aid in the development of a sampling design for a specific watershed(s) that are scheduled for screening-level monitoring to begin during the next fiscal year. Beginning in FY 05-06, the Program will submit within its Annual Work Plan. The memo will describe and provide the rationale for the selection of sampling parameters and sites within the watershed scheduled for screening-level sampling in that fiscal year.

3.22 Screening-level Monitoring and Assessment Activities

An ecological indicator is a measure, an index of measures, or a model that characterizes an ecosystem or one of its critical components. An indicator may reflect biological, chemical and/or physical attributes of ecological condition. The primary uses of an indicator are to characterize current status and to track or predict significant change. With a foundation of analytical research, an ecological indicator may also be used to identify major ecosystem stress. The Program intends to collect two types of screening level indicators during the implementation of the Revised Multi-Year Plan: (1) aquatic life use indicators (e.g., benthic macroinvertebrates and fish assemblages) and (2) water recreation use indicators (e.g., microbiological indicators). The following paragraphs briefly describe these indicators and related activities the Program will conduct during the implementation of the Revised Multi-Year Plan.

Biological and Physical Habitat Assessments

Benthic macroinvertebrates (BMIs) are organisms that inhabit the bottom of freshwater habitats for at least part of their life cycles and are at least a half a millimeter in size. BMIs are important indicators of biological and ecological condition of fresh water bodies because they are ubiquitous, affected by a variety of environmental perturbations (e.g. hydromodification, sedimentation, and chemical pollutants), can be easily identified and enumerated, and contain a diversity of taxonomic groups that are well known. Extensive guidance on development and use of BMI indicators has been supported at the national and state levels, and a number of agencies and volunteer groups have begun to sample BMIs in Bay Area creeks using the California Stream Bioassessment Procedure developed by the California Department of Fish and Game.

Fish assemblages have also been used as indicators of biological integrity for many years throughout the world. In fact, many water quality management programs consider fish assemblage monitoring an integral component, and its importance is reflected in the aquatic life use-support designations of many states. Assessments of the fish assemblage must measure the overall structure and function of the community to adequately evaluate biological integrity and protect surface water resource quality. Fish bioassessment data quality and comparability are assured through the utilization of qualified fisheries professionals and consistent methods, such as the USEPA's Rapid Bioassessment Procedures for Fish.

Together with biological indicators, assessments of physical habitat can aid in determining the physical/habitat condition or quality of a watershed and water body. Physical habitat assessments can be conducted at multiple spatial and temporal scales and can be quantitative or qualitative in nature. Depending on the methodology used to collect physical habitat data, one may use the information to help interpret results from biological indicator studies, or for separate analyses of ecological condition. Strategies may involve the collection of instream, riparian, and/or landscape scale measurements.

To-date, the Program has conducted biological and physical habitat assessments in the Coyote Creek, Adobe Creek and San Tomas Aquino Creek watersheds. Additionally, a number of physical habitat assessment-related activities have been, and will likely continue to be conducted by Co-permittees. It is the Program's intent to continue conducting screening level monitoring by utilizing aquatic life use indicators in Program relevant watersheds during the implementation of the Revised Multi-Year Plan. Additional measurements which will be collected synoptically with aquatic life use indicators include qualitative substrate characterizations and general water quality parameters. A timetable for the completion of screening level monitoring is presented in Section 7.0.

Regional Biological Assessment Network

In February 2002, the SCVURPPP participated in a workshop for information sharing and discussion of recent and ongoing bioassessment (benthic macroinvertebrates) studies in the Bay Area. The network of individuals participating in the workshop was named the Bay Area Macroinvertebrate Bioassessment Information Network (BAMBI). BAMBI's purpose is to coordinate and share bioassessment information throughout the Bay Area.

Building on the success of the BAMBI workshop in 2002, the Program participated in the second annual BAMBI workshop on January 29, 2003. In preparation for the workshop,

the Program supported the development of issue papers intended to stimulate discussion on issues related to the following five topic areas: (1) the standardization of rapid bioassessment protocols in the Bay Area; (2) the establishment of reference conditions for Bay Area creeks; (3) quality assurance and control in field sampling and laboratory analyses; (4) data management and sharing; and (5) physical habitat assessments and protocols. As a follow up, the third annual BAMBI workshop was held on January 29, 2004.

In fiscal year 2004/05 and beyond, the Program anticipates providing support and actively participating in BAMBI activities with the goal of developing regional bioassessment tools necessary to provide context to bioassessment data collected in creeks relevant to the Program.

Pathogen Indicator Organisms

Microbiological water analysis is typically carried out to safeguard the health of a community by testing for possible fecal pollution, the source of microorganisms causing waterborne disease. Indicators of recreational use are microbiological organisms that coexist with pathogens in the fecal environment and are easier and less expensive to test for than pathogens. For these reasons, indicator organisms are often the focus of water analyses rather than pathogens. The most commonly employed indicator organisms are total coliform, fecal coliform, enterococcus, and *E. coli*.

To provide data necessary to determine impacts to recreational uses in Santa Clara basin water bodies, the Program intends to conduct screening level monitoring using microbiological indicators. Sampling will likely occur at areas where recreational uses are the most prevalent and during times when recreational uses may occur. A timetable for the completion of screening level monitoring is presented in Section 7.0.

3.23 Watershed Assessment Activities

Watershed assessment is the systematic review of specific resources such as benthic macroinvertebrates or fish and their habitat and riparian areas in a watershed-scale context. Watershed assessment is a stage-setting process intended to be based primarily on existing information. The results of watershed assessment can be used to establish the context for subsequent evaluations and analysis of cumulative watershed effects. Watershed assessments typically: 1) address cumulative effects within a watershed; 2) provide for more ecologically sound resource planning; and, 3) identify and help protect environmentally sensitive areas.

From its inception in 1990 through 1995, the Program's monitoring activities focused on establishing baseline information through sampling and analysis of runoff from various land uses and ambient waters. Most recently, SCVURPPP implemented the monitoring approach endorsed by the State Water Resources Control Board (SWRCB) (Surface Waters Ambient Monitoring Program (SWAMP)) and by the RWQCB (Regional Monitoring and Assessment Strategy (RMAS)). However, the SWAMP/RMAS approach focuses on strategies for monitoring but does not describe methods to assess monitoring data. To address this need, SCVURPPP recently developed and tested a method to assess stream ecosystem functions in the Coyote Creek watershed that integrated hydrogeomorphic models and indices of biotic integrity. This method was found useful for evaluating stream ecosystem functions and associated aquatic life Beneficial Uses and for identifying and prioritizing additional management actions that could improve

conditions and beneficial use attainment as well as monitoring activities that could fill existing data gaps.

Following the testing of the stream ecosystem function (SEF) method in Coyote Creek, the Program conducted an *Assessment of the Watershed Assessment Methods* project, which was undertaken to build upon recent pilot studies and evaluate findings in the context of the Program's current monitoring and assessment program as well as those implemented by other selected local, regional, and state agencies. Recommendations from the project included, using the SEF assessment approach to analyze data generated from an ambient monitoring program based largely on rapid bioassessments. The Program has embraced this recommendation by integrating watershed assessments into this Multi-Year Plan.

It is the Program's intent to conduct watershed assessments in specific watersheds within the Santa Clara Valley basin beginning in FY 05-06. Assessments will integrate information collected during watershed characterizations and screening-level assessments to support Program objectives of continuously improving Program components and developing additional ones to support attainment of beneficial uses in selected water bodies. Watershed assessment will be coordinated with other assessment-related activities occurring in the basin, to the extent possible, and will only occur in watersheds identified as high priority by the Program.

4.0 POLLUTANTS OF CONCERN (POC) MONITORING ACTIVITIES

4.1 Approach and Objectives

Several Multi-Year Plan elements address local and regional needs for technical information to address POCs in water bodies in or adjacent to the Santa Clara Valley basin. The goal of POCs monitoring is to collect scientifically valid information on the sources, status, trends, fate, and transport of POCs and their effects, so that feasible, cost effective management actions can occur to the maximum extent practicable to reduce the impacts on the beneficial uses. POCs monitoring typically include studies that involve field sampling or environmental monitoring, which should not be confused with monitoring the effectiveness of BMPs implemented to control POCs in urban runoff. BMP monitoring is described in Section 5.0 of this Revised Multi-Year Plan.

To assist in reaching the goal of POCs monitoring, the Program has developed the following two POCs monitoring objectives:

- Continue to participate in regional efforts to gain a better understanding of the impacts of POCs on beneficial uses and to work to mitigate these impacts through implementation of water quality attainment strategies (e.g., TMDLs); and,
- Continue to characterize the concentrations and extent of POCs in Program-relevant water bodies, and investigate and identify potential sources and information to support strategies for controlling POCs.

4.2 Pollutants of Concern Monitoring Elements

To reach the Program's monitoring objectives for POCs, the Program will conduct and participate in monitoring-related activities under the following three POC monitoring elements during implementation of the Multi-Year Plan:

Impacts of POCs on the San Francisco Bay Estuary – element entails participation in, and support regional efforts such as the Regional Monitoring Program for Trace Substances (RMP);

Impacts of POCs on Local Water Bodies and Source Characterization– element entails investigating the impacts to, and sources of POCs present in Program-relevant local creeks and water bodies; and,

Additional Regional POC Activities – element entails participation in, and support for regional programs (e.g., Clean Estuary Partnership) designed to develop studies supporting the development of scientifically based total maximum daily loads (TMDLs) and/or site specific water quality objectives for specific POCs;

Brief descriptions of each POCs monitoring element and relevant activities that either, were recently completed; are currently being implemented; or are planned, are provided below. To the extent possible, results from POCs monitoring activities presented in this Revised Multi-Year Plan have been integrated into the Program's POCs Control Programs as they are revised or developed.

4.21 Impacts of POCs on the San Francisco Bay Estuary

In recent years, the Regional Board has determined that the San Francisco Estuary and associated water bodies are impaired by a variety of POCs, under Section 303(d) of the federal Clean Water Act. There are several regional efforts that are currently helping to address the sources, pathways, loadings of POCs and their impacts on the Bay. The Program is an active participant in these efforts and continues to provide funding to regional programs designed to monitor the Bay for POCs. The following paragraphs provide brief descriptions of these programs and the Program's involvement.

Regional Monitoring Program for Trace Substances (RMP)

The RMP was developed in 1993 to provide information to State and local agencies on the status, trends, sources and pathways of pollutants, and the potential effects on organisms that live in or use the Estuary. The RMP's goal is to collect scientifically valid information that allows movement towards understanding contaminant impacts on beneficial uses of the Bay. The RMP focuses on determining spatial patterns and long term trends through sampling of water, sediment, bivalves, and fish; effects on sensitive organisms; and chemical loading to the Bay. To provide the most complete assessment possible of chemical contamination in the Bay, the RMP seeks to synthesize RMP data with data from other sources. Ultimately, the RMP will provide information on how contaminant concentrations in the Estuary are responding to pollution prevention and reduction measures, and if the financial resources devoted to these efforts are improving water quality.

All Bay Area dischargers with NPDES permits (including the Program) contribute funding to the RMP annually. Currently, Program staff represents BASMAA on the RMP Technical Review Committee (TRC). The Program will continue to contribute and actively participate in the RMP (or its equivalent) during the implementation of the Revised Multi-Year Plan. Additionally, the Program will seek to utilize information collected through the RMP to assess potential impacts from discharges under the Program's jurisdiction and develop appropriate management actions through the implementation of POCs Control Programs.

Brake Pad Partnership

After studies in the South Bay indicated that automobile brake pads may be the most significant source of copper in urban runoff, the Brake Pad Partnership (BPP) was initiated in 1996 as a collaboration among regulators, storm water programs, brake material manufacturers, scientists and environmentalists to address environmental problems from brake wear debris. The BPP's work includes research and monitoring, and is an integral part of the Program's Copper Action Plan. Contingent upon available funding, the Program plans to continue participating in the BPP during the implementation of the Revised Multi-Year Plan.

4.22 Impacts of POCs on Local Water Bodies and Source Characterization

Very few local water bodies (i.e., creeks and lakes) throughout the Bay area are currently listed as impaired by specific POCs under Section 303(d) of the federal Clean Water Act. Rather, local water bodies have been thought of as potential transport pathways of POCs that the Regional Board has determined impair segments of the Bay. This section discusses specific investigative monitoring that will be conducted in local water bodies during the implementation of the Revised Multi-Year Plan. As watershed

characterization, screening level monitoring and watershed assessments progress additional investigative monitoring may be needed.

Urban Creeks Toxicity Testing and Chemical Analyses

The SCVURPPP is currently conducting investigative monitoring to determine if diazinon-related toxicity exists in urban creeks. Sampling is conducted twice a year (wet and dry seasons) and water samples are analyzed for the organophosphate pesticide concentrations and three species bioassays are conducted. The goal of the diazinon monitoring program is to detect changes in diazinon concentrations and related toxicity in urban creeks, as management actions are further implemented. Monitoring will occur in a representative number of creeks that provide adequate information for detecting changes in water quality and associated toxicity. Additionally, the Program will continue to conduct water chemistry analyses in sampling locations where toxicity testing has occurred and/or where elevated levels of POCs are evident. These efforts will be coordinated with other stormwater management programs and regional collaborative efforts (e.g, CEP) to the extent possible.

Guadalupe River Monitoring

The Santa Clara Basin Watershed Management Initiative (SCBWMI) is serving as the stakeholder forum for the development of the Guadalupe River TMDL Report for Mercury. The Guadalupe River Watershed encompasses parts of San Jose, Los Gatos, Campbell, Monte Sereno and Santa Clara. The Program is a stakeholder in the Guadalupe River TMDL. The Santa Clara Valley Water District (SCVWD) and is playing a lead role in the TMDL development process. Program staff is also participating in the TMDL process. Through the Guadalupe River TMDL efforts, a substantial amount of water quality monitoring and bioaccumulation studies are planned to occur during the implementation of the Multi-Year Plan.

San Francisquito Creek Sediment Analysis

In response to a listing of impairment by sediment under section 303(d) of the Clean Water Act and a need to provide information for a TMDL assessment, two separate (but coordinated) projects have been developed. These projects are the San Francisquito Creek Sediment Reduction Plan, administered by the San Francisquito Creek Joint Powers Authority (JPA); and the Aquatic Habitat Assessment and Limiting Factors Analysis, managed by the Santa Clara Valley Water District (SCVWD).

The primary issues driving the TMDL are flooding and degradation of steelhead trout, other threatened aquatic species and their habitats. The approach adopted by the JPA and SCVWD in these projects is to assess factors limiting the threatened aquatic species, including but not confined to those related to excessive sedimentation caused by human land use activities. Project products are intended to produce information that will assist the Regional Board to confirm or reject the validity of the sediment impairment listing and help identify other causes of impairment to aquatic species and their habitats in San Francisquito Creek.

Additional Watershed Analyses and Sediment Practice Assessments

In accordance with permit provision C.9.f.iii, the Program submitted the Sediment Impairment Report (Other Creeks) to the Regional Board on March 1, 2002. The Program received a request from Regional Board staff on July 8, 2002 to revise the

report to include certain issues regarding the development of a work plan and schedule relating to Stevens, Coyote and Saratoga creeks. On August 30, 2002, the Program developed a work plan entitled *Workplan for Conducting Watershed Analysis and Management Practice Assessment in Other Creeks Potentially Impaired by Sediment from Anthropogenic Activities* (Watershed Analysis Work Plan) to fulfill the request. The Watershed Analysis Work Plan tasks and timeline was designed to evaluate and potential implement new watershed assessment approaches in the future using lessons learned from the San Francisquito Creek TMDL project.

Additional Investigative Monitoring

As watershed characterization, screening level monitoring and watershed assessments progress, areas where beneficial uses appear to be impacted by urban runoff may become apparent. In these cases, additional investigative monitoring may be needed. The goal of investigative monitoring is to collect scientifically valid information on the sources, status, trends, fate, and transport of pollutants and their effects, so that feasible, cost effective management actions can occur to the maximum extent practicable to reduce the impacts on the beneficial uses. As previously described,

4.23 Additional Regional POC Activities

Total Maximum Daily Loads (TMDLs) are actions to restore water bodies that have been determined to be impaired under section 303(d) of the federal Clean Water Act. Through the TMDL process, these water quality problems are examined, sources of pollutants are identified, and specify actions that may create solutions are developed. The Regional Board is currently developing more than 30 TMDL projects to address more than 160 listings of Bay area water bodies impaired by specific pollutants.

Clean Estuary Partnership (CEP)

On August 6, 2001, a Memorandum of Understanding (MOU) regarding development of: 1) a Water Quality Attainment Strategy for San Francisco Bay-Delta and Tributaries; and 2) TMDLs for 303(d) pollutants (including mercury) was entered into by the Regional Board, Bay Area Clean Water Agencies (BACWA) and Bay Area Stormwater Management Agencies Association (BASMAA). This group is referred to as the Clean Estuary Partnership (CEP).

The mission of the Clean Estuary Partnership (CEP) is to use sound science, adaptive management, and public collaboration to develop and implement technically valid and cost-effective strategies (including TMDLs) that result in identifiable, sustainable water quality improvements for San Francisco Bay. As a member agency of BASMAA, the Program has contributed funding annually to the CEP. In addition, Program staff currently participates on the CEP Technical Committee (TC) and pollutant-specific workgroups.

In recent years, CEP accomplishments included the development of technical draft reports and projects, including: *Draft Conceptual Model for Mercury in the Bay*; *Mercury Source Assessment Report*; implementation alternatives for reducing mercury from various sources (seven reports); and the *Guadalupe River Contaminant/Sediment Loading Study*. Contingent upon available funding, the Program will to continue to actively participate in the CEP during the implementation of the Revised Multi-Year Plan.

5.0 BMP AND PERFORMANCE STANDARD MONITORING ACTIVITIES

5.1 Approach and Objectives

Best Management Practices (BMPs) are measures, activities, or other practices that prevent or minimize pollutant discharges to water bodies. Some are routine activities such as recycling materials that contain pollutants, good housekeeping practices and spill prevention procedures. Others are structural treatment measures that are integrated into the storm water conveyance system to remove pollutants from runoff before it enters water bodies. During its second NPDES permit cycle the Program established initial Performance Standards incorporating a variety of BMPs into several components including, Public Information and Participation; New Development and Redevelopment Activities; Illicit Discharge Controls; Industrial and Commercial Business Controls, and; Municipal Government Maintenance Activities. Performance standards in under each component are updated annually on an as needed basis.

The SCVURPPP has developed the following two BMP effectiveness monitoring objectives to aid the Program in determining the most effective and feasible measures that can be implemented to control potential impacts of urban runoff:

- Evaluate the effectiveness of activities and measures implemented by the Program through POCs control programs designed to alleviate potential adverse effects of POCs on water bodies; and,
- Evaluate the effectiveness of activities implemented by the Program that may effectively reduce pollutants from entering water bodies and causing or contributing to exceedances in water quality objectives and/or adverse impacts to beneficial uses.

5.2 BMP and Performance Standard Monitoring Elements

To reach the Program's objectives for BMP implementation monitoring, the Program will conduct and participate in BMP monitoring related activities under following two elements during implementation of the Revised Multi-Year Plan:

Control Programs for POCs – entails monitoring the effectiveness of measures developed and implemented by co-permittees to control POCs;

Performance Standard Monitoring Activities– entails tracking, evaluating and reporting on the effectiveness of urban runoff BMPs, performance standards through the implementation of continuous improvement activities.

Brief descriptions of ongoing or planned activities related to the BMP and performance standard monitoring elements are provided below.

5.21 Control Programs for POCs

The recent emphasis on the enforcement of long-standing Federal requirements relating to TMDL development and implementation has led the Regional Board to request (and require) assistance with identifying control measures for pollutants of concern. The Program's current Performance Standards provide for the control of urban runoff

pollutants to the maximum extent practicable. In addition, the Program's continuous improvement process provides for timely and orderly updates of the Performance Standards as new technology and information becomes available.

The Program's current NPDES permit has greatly expanded the requirements for developing and implementing copper, mercury, pesticides, PCBs, dioxins and sediment control tasks/measures/plans/programs. Since the permit was reissued, the Program has focused on the creation, revision and implementation of numerous activities associated with developing control programs for POCs. The following paragraphs provide brief summaries of these activities. A detailed timeline for implementation of these activities is provided in Section 7.0, *Programmatic Monitoring Indicators (PMIs) Summary Matrix*.

Copper and Nickel Action Plans

The Metals Control Measures Plan, was first created in FY00-01 to assist implementation of baseline activities contained in the Lower South San Francisco Bay Copper and Nickel Action Plans, to track and report activities, and to continue to work with the SCBWMI Bay Monitoring and Modeling (BMM) and Regulatory Subgroups regarding BMM Work Plan Updates. Descriptions of copper control program activities and nickel control program activities are included in the Copper and Nickel Action Plans approved by the SCBWMI and transmitted to the RWQCB as part of the Copper and Nickel TMDL Project for the South Bay. In addition, those baseline activities that are specifically related to the stormwater program are listed in Appendix B of the recently adopted NPDES permit.

To date, most of the CAP/NAP baseline activities have been implemented at the Program level (except for those assigned to specific Co-permittees). During FY 02-03 SCVURPPP, in response to Regional Board staff comments, formalized the process in which Co-permittees clearly identify specific baseline actions within their individual work plans in addition to Program-wide actions. The SCVURPPP, working with Regional Board staff, met in FY 02-03 and FY 03-04 to discuss proposed changes to the CAP/NAP reporting approach and format and agreed upon a revised approach. Relative to developing the annual Work Plan, the revised reporting format includes the following basic information for each baseline action: description of baseline action, regional applicability, linkage to copper reduction, and identification of the performance measure. For each baseline activity the following information is included in the reporting table: an identification of the lead party (if the lead party is the Co-permittee then the Co-permittee includes the action within their individual work plans), a description of the proposed Work Plan actions, a description of how effectiveness will be evaluated, and a summary of the possible future actions.

In addition, the Work Plans tables also provide a summary of actions accomplished in the prior (i.e., FY 02-03) for each CAP/NAP activity assigned to the Program and certain Co-permittees (San Jose, Sunnyvale and Palo Alto). The CAP/NAP contains 21 copper baseline actions and 7 nickel actions. Overall, Regional Board staff has indicated that they are satisfied with the improvements made in the Program's revised Cu/Ni Work Plan and the strategy implemented regarding the tracking/completion of tasks. Some minor remaining issues were acknowledged to be difficult to resolve since they are in large part due to the vagueness of the language (in certain places) found in the original CAP baseline activity tables.

These tasks will be tracked and reported by the Program in Annual Reports. To the extent possible, the Program will evaluate the effectiveness of implementing the tasks during its annual reporting process.

Mercury Pollution Prevention Activities

The Program's reissued NPDES permit states that municipal stormwater discharges may be causing or contributing to exceedances of water quality standards for mercury. Mercury has been found in sediments in South San Francisco Bay and the Guadalupe River Watershed. Some types of fish caught in the Bay contain mercury and other pollutants at concentrations that may threaten the health of humans consuming those fish. In response, the California Office of Environmental Health and Hazard Assessment issued an interim fish consumption advisory. The U.S. Environmental Protection Agency (EPA) has listed the Bay and the Guadalupe River Watershed (including the Guadalupe River, Alamos Creek, Guadalupe Creek, Calero Reservoir, and Guadalupe Reservoir) as impaired by mercury under Section 303(d) of the Clean Water Act. In accordance with Section 303(d), the Regional Board is required to establish a Total Maximum Daily Load (TMDL) for mercury in the South San Francisco Bay and the Guadalupe River Watershed.

Permit Provision C.9.c. requires the Program to address the impairment by developing and implementing a mercury pollution prevention plan. The Program developed a Mercury Pollution Prevention Plan (Mercury Plan) consistent with this Provision. The Mercury Plan was submitted to the Regional Board on March 1, 2002 as part of the Program's FY 02-03 Work Plan. To the extent possible, mercury pollution prevention measures described in the workplan will be consistent with the required implementation actions for urban runoff described in the approved and adopted Basin Plan Amendment associated with the Mercury TMDL for the San Francisco Bay. Through its annual reporting process, the Program will provide an assessment of the effectiveness of mercury reduction measures following their implementation.

Pesticide Control Program

Diazinon has been identified in recent studies as causing toxicity in local creeks. In May 1999, the U.S. Environmental Protection Agency (USEPA) listed San Francisco Bay and 35 Bay Area urban creeks as impaired by diazinon under Section 303(d) of the Clean Water Act (CWA). The 303(d) listing triggered the need for USEPA and the State to develop Total Maximum Daily Loads (TMDLs) for the impaired waterbodies.

The SCVURPPP's NPDES Permit Provision C.9.d. includes specific requirements for a pesticide control program. The Program and Co-permittees must develop and implement a pesticide control plan that addresses municipal uses of pesticides, including diazinon and other lower priority banned pesticides such as chlordane, dieldrin, and DDT, and the use of these pesticide by others within municipal jurisdictions. The permit provision also requests that the Program continue to work with the Urban Pesticide Committee, BASMAA, and the California Stormwater Quality Association Pesticide Committee to assess impacts of pesticide use and encourage actions by other state and federal agencies. Through its annual reporting process, the Program will provide an assessment of the effectiveness of mercury reduction measures following their implementation.

Polychlorinated Biphenyls (PCBs) and Dioxin Compounds Control Program

PCBs - To develop data needed for the Bay PCBs TMDL, the Program has provided leadership to Bay Area storm water agencies in their efforts during the past three years. This has included coordinating a regional study that characterized the distribution of PCBs concentrations in storm water conveyance sediments in Bay Area watersheds. The Program has also performed PCBs case studies in selected areas where elevated concentrations of PCBs were found during the regional study and coordinated similar case studies by other Bay Area storm water agencies. The case studies were aimed at identifying PCBs sources and assist in developing controls. To facilitate regional coordination, the Program has led a work group of representatives from BASMAA and Regional Board staff. The Program has also prepared PCBs work plans for the above regional and local field studies. The work plans included a preliminary list of known sites where PCBs were used, stored and/or released in Santa Clara County and preliminary tables summarizing PCBs control options. Through its annual reporting process, the Program will provide an assessment of the effectiveness of PCDD/Fs control measures following their implementation.

Dioxin-like Compounds – All segments of San Francisco Bay were initially listed as impaired by certain PCDD/F compounds in the 1998 303(d) list and repeated in the 2002 303(d) list. The impetus for the listing was an interim advisory on the consumption of fish from the Bay issued by the California Office of Environmental Health Hazard Assessment. The advisory was issued after PCDD/F compounds (i.e., Dioxin-like compounds) and other pollutants (e.g., mercury and PCBs) were found in Bay fish tissue at levels thought to potentially pose a health risk to people consuming fish caught in the Bay.

There is considerable controversy regarding the Bay 303(d) listing and the associated potential threats to human health by PCDD/Fs. The SWRCB and the Regional Board opposed the 1998 listing of PCDD/Fs in the Bay for three reasons: 1) water column concentrations did not exceed PCDD/F water quality criteria; 2) fish tissue concentrations of PCDD/F were consistent with national background levels; and, 3) the fish consumption advisory was an interim action that only included PCDD/Fs because of exceedances of informal screening levels. The State of California was overruled by the USEPA, which cited two primary reasons for the Bay listing: 1) failure to attain a designated beneficial use of the Bay, Commercial and Sport fishing (COMM), based on the interim fish consumption advisory; and, 2) violation of a narrative objective found in the San Francisco Bay Water Quality Control Plan (Basin Plan) pertaining to bioaccumulation of pollutants.

SCVURPPP has conducted a variety of characterization activities for PCDD/Fs in the recent past. These efforts are summarized in the *Control Program for Dioxin Compounds*, which was submitted in the Program's FY 04-05 Annual Work Plan, per NPDES Permit Provision C.9.e. Additionally, in the SCVURPPP has continued to work with other Bay area dischargers and Regional Board staff through the Bay Area Stormwater Management Agencies Association (BASMAA), the CEP and the San Francisco Estuary Regional Monitoring Program (RMP) to coordinate PCDD/F-related activities. Through its annual reporting process, the Program will provide an assessment of the effectiveness of PCDD/Fs control measures following their implementation.

Trash Management Activities

On November 14, 2001, the Regional Board released the document entitled *Proposed Revisions to Section 303(d) List of Priorities for Development of Total Maximum Daily Loads for the San Francisco Bay Region Report*. This report states that “between now and the next 303(d) listing cycle, municipalities will be expected to assess trash impairments in their jurisdiction ...”, Regional Board staff will review information concerning trash in the next listing cycle to determine whether specific water bodies warrant 303(d) listing. In addition, the report proposed that all urban creeks of the San Francisco Bay region be placed on the 2002 303(d) “monitoring list” due to the threat of trash impairment to water quality.

On February 4, 2003, the State Water Resources Control Board adopted the 2002 303(d) list of water quality limited segments (which included this recommendation) at its Board meeting. According to the SWRCB’s *Revision of the Clean Water Act Section 303(d) List of Water Quality Limited Segments* (dated February 4, 2003), water bodies placed on the “monitoring list” have:

“ data or information that are not of adequate quality and/or quantity to support a listing and subsequent TMDL regulatory process. In these cases, a finding is warranted that more information must be collected to resolve whether objectives and beneficial uses are attained. The waters on the Monitoring List are high priority for monitoring before the next section 303(d) list is completed.”

In order to effectively address trash issues, the Management Committee formed a Trash AHTG on February 21, 2002. The Trash AHTG prepared a Trash Work Plan that identifies a strategy for addressing trash problem areas that occur in urban streams and waterways. The Trash Work Plan was submitted within the Program’s *FY 03-04 Draft Work Plan* on March 1, 2003. During the implementation of the Revised Multi-Year Plan, the Program will provide an assessment of the effectiveness of trash management measures through its annual reporting process.

5.22 Performance Standard Monitoring Activities

In recent years, the Program has implemented, developed and revised performance standards through its continuous improvement process. These efforts are generally focused towards tracking, reporting and evaluating data collected through Program activities and the implementation of BMPs. The following are activities the Program intends to conduct during the implementation of the Revised Multi-Year Plan.

Enhanced Reporting for Industrial-Commercial Discharger (IND) Control Program Illicit Connection and Illegal Dumping (ICID) Elimination Activities

Since October 2001, Program staff has assisted each Co-permittee (on an individual basis) with the implementation of enhanced reporting requirements for IND and IC/ID. To demonstrate consistency and compliance (on a Program-wide basis) with the strategy provided in the Program’s technical memoranda regarding IND and IC/ID reporting (dated September 7, 2001) and the approved MC approach, Co-permittees have been submitting raw IND and IC/ID inspection data to Program staff. This data is used to construct IND and IC/ID summary tables. The summary tables are double checked (with the Co-permittees) to ensure that the results are reasonably consistent with their internal data and their interpretation of the data; provided to the Co-permittees for inclusion in their annual reports; and included in the Program’s Annual Report. The

overall goal of the effort has been to capture the full extent and the results of the Co-permittees efforts in a consistent format and on a Program-wide basis. This effort has been very successful in demonstrating compliance with Permit Provisions C.6.a.i and ii. To ensure effective reporting of IND and IC/ID data, Co-permittees intend to continue this process during the implementation of the Revised Multi-Year Plan.

Development of Strategies for Controlling Impacts of Land Use on Beneficial Uses

To implement this priority, the Program supports the SCBWMI Land Use Subgroup (LUS). The Program's participation in the LUS is intended to fulfill a commitment in the 1997 URMP to "translate SCBWMI goals and objectives into model local-jurisdiction policies and procedures." The LUS includes stakeholders representing business interests, developers, environmental advocates, and Regional Board staff, as well as SCVURPPP Co-permittees. As documented in the LUS "Consensus Points" and in Chapter 4 of the SCBWMI Watershed Characteristics Report ("Land Use in the Basin"), the LUS has reviewed and discussed at length the potential effectiveness of various approaches to controlling urban runoff pollutants and other effects of urbanization on streams. A specific approach to integrating municipal land use planning and watershed management is described in Section 4.1 of the Watershed Characteristics Report (unabridged).

In addition to administrative support and leadership for the LUS, the Program has also created additional projects to support the LUS' development of policies and watershed management measures. These projects include: *Economic and Tax Incentives in Watershed Management* and *Compare and Contrast Development Policies*. The Program encourages the RWQCB staff, as part of developing the revised permit language for new development, to integrate the results of the LUS' work to date, to continue RWQCB staff participation in the LUS, and to work with the Program and LUS to implement consensus recommendations reached within the LUS. The Program intends to monitor the successes of the LUS during the implementation of the Revised Multi-Year Plan. The Program intends to report these efforts through its annual reporting process.

Compile, Maintain and Share Program Watershed Data

The Watershed Assessment Subgroup (WAS) of Santa Clara Basin Watershed Management Initiative (SCBWMI), has a mission to provide the SCBWMI with a solid scientific foundation for watershed planning. One of WAS's tasks is to coordinate the SCBWMI's data collection and data management efforts with stream monitoring studies within the Basin. The Stream Studies Inventory (SSI) is a result of this task and was initially prepared by the Program in November 1998. The purpose of the SSI is to promote inter-agency awareness of environmental investigations within riparian corridors and to facilitate coordination of related data collection and management. It also describes stream-related multi-stakeholder studies and projects that were in-progress in the Santa Clara Basin. The SSI was updated, revised and reissued in February 2000 (version 2.0), July 2001 (version 3.0), August 2002 (version 4.0) and November 2003 (version 5.0). The Program funded the initial development of the SSI and each of the annual updates.

Additionally, to comply with its NPDES permit, the Program compiles, develops and analyzes a variety of data sets and reports. Most of this data is collected and generated as part of the Program's environmental monitoring and assessment activities. A majority

of the information collected and used by the Program originates from different municipalities and agencies that conduct studies within Program jurisdictional boundaries.

The Program developed a relational database as an initial task to systematically describe and document data used for its activities. The intent of the database is to demonstrate its usefulness of how to systematically and efficiently collect and document all of the relevant data used in the Program's activities. In addition, the database was designed to explore the feasibility of eventually expanding and coordinating its maintenance and use with other agencies and organizations in the Program. The database is a metadata database which focuses on the description, documentation, and indexing of the data sets, sources, reports, etc. It does not focus on data. The current metadata database incorporated information on data sources that were documented in the existing SCBWMI's watershed assessment metadata database (MDDDB) and the WMI's Stream Studies Inventory Report data (SSI). The Program developed draft written user documentation for the database in FY 02-03.

In an effort to compile, maintain and share watershed data, the Program intends to continue to update the SSI and the Program's relational database, to the extent possible during the implementation of the Revised Multi-Year Plan. Additionally, the Program will report on these efforts during its annual reporting process.

6.0 REPORTING AND QUALITY CONTROL PROCEDURES

Consistent reporting of monitoring activities not only allows the Program to comply with NPDES Permit requirements, but also provides a format to discuss the results of data collection efforts and evaluation of the effectiveness of control measures. Additionally, in any environmental monitoring program effective quality control procedures are necessary to assess the accuracy and completeness of data, and to ensure its scientific validity. Lastly, data management is an integral part of environmental monitoring, providing a means to access, query and retrieve data in a relatively easy manner. This section briefly discusses the reporting, quality control and data management activities the Program will undertake during the implementation of the Revised Multi-Year Plan.

6.1 Reporting Procedures and Deliverables

There are a variety of reporting mechanisms the Program utilizes to: 1) demonstrate compliance with monitoring requirements in the Permit; 2) describe monitoring activities conducted; 3) provide an evaluation of information collected; and, 4) suggest next steps, including changes in methodologies, potential management actions and additional data collection efforts. Each reporting mechanism has its purpose and scope, as described below. The following is a list of documents the Program intends to submit to the Regional Board during the implementation of the Revised Multi-Year Plan.

Watershed Characterization and Sampling Design Technical Memorandum

Building on recent watershed monitoring and assessment activities conducted by the WMI and the SCVURPPP, the Program plans to conduct activities entailing the collection and analysis of information needed to further characterize watersheds. To facilitate this process, the SCVURPPP will annually develop a *Watershed Characterization and Sampling Design Technical Memorandum* (Characterization Memo). The purpose of the Characterization Memo is to describe existing readily available information (e.g. watershed attributes, beneficial use information, water quality data) that will aid in the development of a sampling design for a specific watershed(s) that are scheduled for screening-level monitoring to begin during the next fiscal year. Beginning in FY 05-06, the Program will submit the Characterization Memo within its Annual Work Plan. The memo will describe and provide the rationale for the selection of sampling parameters and sites within the watershed scheduled for screening-level sampling in that fiscal year. This task is very similar to activities previously conducted by Program staff when developing the Program's Annual Monitoring Program Plan.

Watershed Monitoring and Assessment Summary Report

Following the first and second year of screening-level monitoring in a given watershed, the Program will develop and submit a *Watershed Monitoring and Assessment Summary Report* (Summary Report). The Summary Report is intended to provide a preliminary analysis of data collected during the previous fiscal year. The Summary Report will discuss the results of implementing the Annual Monitoring Plan, pursuant to Provisions C.8 and C.10(b) of the Program's NPDES Permit, by illustrating the SCVURPPP's support for the WMI by: (1) investigating beneficial uses and causes of impairment; (2) reviewing, compiling, and disseminating environmental data; (3) developing and implementing strategies for controlling adverse impacts of land use on beneficial uses; and, (4) facilitating, implementing, and supporting relevant SCBWM subgroups.

Furthermore, this Summary Report may also provide information on current or planned watershed management activities and suggest (to the extent possible) next steps needed for continuous improvement in addressing high priorities in each of the subject watersheds. The report will be submitted annually with the Program Annual Report.

Watershed Assessment Report

As described in Section 3.23 and illustrated in Figure 1.0, it is the Program's intent to conduct watershed assessments in specific watersheds within the Santa Clara basin beginning in FY 05-06. Assessments will integrate information collected during watershed characterizations and screening-level assessments to support Program objectives of continuously improving Program components and developing additional ones to support attainment of beneficial uses in selected water bodies. Watershed assessment will be coordinated with other assessment-related activities occurring in the basin, to the extent possible, and will only occur in watersheds identified as high priority by the Program. The *Watershed Assessment Report* (Assessment Report) will document the assessment process implemented in a given watershed and present data gaps that the Program may choose to fill through additional monitoring activities. Additionally, similar to the Coyote Creek Watershed Integrated Pilot Study, potential management actions that will likely enhance beneficial uses may be recommended in the Assessment Report.

Investigative Monitoring Reports

Investigative monitoring/studies include more detailed measurements typically taken in a more defined area (e.g., stream reach). As described in Section 2.4, investigative monitoring activities will be conducted on an as needed basis, where previous monitoring suggests that more detailed studies are warranted and feasible. To document these activities, *Investigative Monitoring Reports* (Investigative Reports) will be developed by the Program as investigative studies are completed. Investigative Reports will likely include a detailed analysis of the methods utilized, a discussion of results and recommended next steps.

Program Annual Reports

The Program annually submits a comprehensive report (Annual Report) to the Regional Board that describes activities conducted during the previous fiscal year that are intended to demonstrate compliance with Permit requirements. Within the report, monitoring and watershed management activities implemented during the previous year are described and an evaluation of the effectiveness of implementing these activities is presented.

6.2 Quality Control Procedures

A thorough and effective quality control program is an essential aspect of any monitoring program. While the specific quality control methods applied may vary with the type of monitoring (e.g., sediment quality, water quality, habitat evaluation) and data quality objectives, a few key activities should be included in the development of the quality control program. These activities include:

- An evaluation and documentation of data quality objectives, data acceptance criteria, and field and laboratory quality control methods;

- A review and documentation of field and laboratory methods, along with appropriate information regarding equipment, personnel, logistics and safety considerations;
- Coordination of each project with other projects in the watershed, to ensure consistency and compatibility of approach and to foster interdisciplinary transfer of data and resources; and,
- Review of the project data (including QA/QC data) to determine where project-specific objectives are or are not being met and to identify any notable QA/QC problems, and modification or revision of study methods as appropriate to provide corrective action where needed.

Since the implementation of the Program's original Multi-Year Plan (FY 02-03), quality control procedures have been followed to the extent possible with available resources. To further document quality control procedures that will be followed, the Program will develop, adopt and implement a Quality Assurance Project Plan (QAPP) related to its watershed monitoring and assessment and POC monitoring activities during the implementation of Multi-Year Plan. The QAPP is intended to help the Program ensure that data collected under the Revised Multi-Year Plan are of adequate quality given the monitoring objectives. Once complete, the QAPP will be included as an Appendix to the Revised Multi-Year Plan.

7.0 ENVIRONMENTAL MONITORING MEASURES - SUMMARY MATRIX

While continuing the programmatic approach to measuring compliance, the SCVURPPP is committed to monitoring and assessing their creeks and the San Francisco Bay. Table 3.0 is provided to illustrate the SCVURPPP's proposed surface water monitoring program for the next six years. Table 3.0 contains the following information: watershed location (prioritized based on WMI and SCVURPPP assessment priorities), data type (chemical, biological and physical), FYs (8 years starting with FY02-03 through FY09-10), rationale, and lead agency. The information on data type utilizes a tiered monitoring approach discussed in Section 2.0 of this document, and includes the following monitoring categories: screening level, investigative, and status and trends. Table 4.0 provides a description of data parameters and analytical methods SCVURPPP intends to use during implementation of its Revised Multi-Year Waters Monitoring Plan.

Table 3.0 (Revised 3/1/04). SCVURPPP 8-year monitoring plan for Santa Clara Basin Watersheds¹.

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
Coyote Creek (Only tributaries sampled in FY 02-03)	Chemical										
	Contaminants - Water ³	I (3)			I	I				See FY 02-03 Monitoring Plan	SCVURPPP
	Contaminants - Sediment ⁴	I (1)								See FY 02-03 Monitoring Plan	SCVURPPP
	General Water Quality ⁵	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Biological										
	Toxicity - Water Quality ⁶	I (1)			I	I				See FY 02-03 Monitoring Plan	SCVURPPP
	Conventional Water Chemistry ⁷	S(4)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Pathogens (Indicator Organisms) ⁸	S(4)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Bioassessment – Macroinvertebrates ⁹	S(4)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Bioassessment – Fish ¹⁰									See FY 02-03 Monitoring Plan	SCVURPPP
	Physical										
	Physical Habitat ¹¹	S(4)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Sediment Characterization ¹²	S(4)		I	I	I				Identified as high priority for potential impairment from sediment in SCVURPPP sediment report. Conduct studies using methods developed in work associated with sediment workplan.	SCVURPPP
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
Riparian Vegetation									See FY 02-03 Monitoring Plan	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
Lower Penitencia Creek	Chemical										
	Contaminants - Water Quality	I (2)			I	I				See FY 02-03 Monitoring Plan	SCVURPPP
	Contaminants - Sediment	I (1)			I	I				See FY 02-03 Monitoring Plan	SCVURPPP
	General Water Quality	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Biological										
	Toxicity - Water Quality	I (2)			I	I				See FY 02-03 Monitoring Plan	SCVURPPP
	Conventional Water Chemistry	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Pathogens (Indicator Organisms)	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Bioassessment - Macroinvertebrates	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Bioassessment - Fish									See FY 02-03 Monitoring Plan	SCVURPPP
	Physical										
	Physical Habitat	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Sediment Characterization	S(5)			S	S				See FY 02-03 Monitoring Plan	SCVURPPP
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
Riparian Vegetation									No data collection is currently planned	SCVURPPP	
San Thomas Aquino	Chemical										
	Contaminants - Water Quality		I (6)	I (1)		I	I	T	T	Investigative Monitoring	SCVURPPP
	Contaminants - Sediment		I (1)							Investigative Monitoring	SCVURPPP
	General Water Quality		S(7)	S(11)		I	I	T	T	Screening Level Monitoring	SCVURPPP
	Conventional Water Chemistry		S(7)	S(4)		I	I	T	T	Screening Level Monitoring	SCVURPPP
	Biological										
Toxicity - Water Quality		I (3)	I (1)		I	I	T	T	Investigative Monitoring	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency	
	Pathogen Indicator Organisms		S(7)	S(3)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Bioassessment - Macroinvertebrates		S(7)	S(7)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Bioassessment - Fish			S(2)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Physical											
	Physical Habitat		S(7)	S(7)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Sediment Characterization		S(7)	S(7)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP	
	Riparian Vegetation									No data collection currently planned	SCVURPPP	
Adobe Creek	Chemical											
	Contaminants - Water Quality		I (2)	I (1)		I	I	T	T	Investigative Monitoring	SCVURPPP	
	Contaminants - Sediment		I (1)							Investigative Monitoring	SCVURPPP	
	General Water Quality		S(3)	S(5)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Conventional Water Chemistry		S(3)	S(2)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Biological											
	Toxicity - Water Quality		I (1)	I (1)		I	I	T	T	Investigative Monitoring	SCVURPPP	
	Pathogen Indicator Organisms		S(3)	S(2)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Bioassessment - Macroinvertebrates		S(4)	S(4)		I	I	T	T	Screening Level Monitoring	SCVURPPP	
	Bioassessment - Fish			S(2)		I	I	T	T	Screening Level Monitoring	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
	Physical										
	Physical Habitat		S(4)	S(4)		I	I	T	T	Screening Level Monitoring	SCVURPPP
	Sediment Characterization		S(4)	S(4)		I	I	T	T	Screening Level Monitoring	SCVURPPP
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
	Riparian Vegetation									No data collection is currently planned	SCVURPPP
Matadero/ Barron Creeks	Chemical										
	Contaminants - Water Quality			I (3)	I		T	T	T	Screening level monitoring	SCVURPPP
	General Water Quality			S(6)	S		I	I	T	Screening level monitoring	SCVURPPP
	Conventional Water Chemistry			S(4)	S		I	I		Screening level monitoring	SCVURPPP
	Biological										
	Toxicity - Water Quality			I (2)	I		T	T	T	Screening level monitoring	SCVURPPP
	Pathogen Indicator Organisms			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	Bioassessment - Macroinvertebrates			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
	Bioassessment - Fish			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	Physical										
	Physical Habitat			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
	Sediment Characterization			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
	Riparian Vegetation									No data collection is currently planned	SCVURPPP
Calabazas Creek	Chemical										
	Contaminants – Water Quality			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	General Water Quality			S(6)	S		I	I	T	Screening level monitoring	SCVURPPP
	Conventional Water Chemistry			S(3)	S		I	I	T	Screening level monitoring	SCVURPPP
	Biological										
	Toxicity - Water Quality			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	Pathogen Indicator Organisms			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	Bioassessment - Macroinvertebrates			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
	Bioassessment - Fish			S(2)	S		I	I	T	Screening level monitoring	SCVURPPP
	Physical										
	Physical Habitat			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
	Sediment Characterization			S(4)	S		I	I	T	Screening level monitoring	SCVURPPP
Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP	
Riparian Vegetation									No data collection is currently planned	SCVURPPP	
Sunnyvale Channel (East/West)	Chemical										
	Contaminants - Water Quality			S(3)	S		I	I	T	Screening level monitoring	SCVURPPP
	General Water Quality			S(3)	S		I	I	T	Screening level monitoring	SCVURPPP
	Conventional Water Chemistry			S(3)	S		I	I	T	Screening level monitoring	SCVURPPP
	Biological										
Toxicity - Water Quality									No data collection is currently	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency	
										planned		
	Pathogen Indicator Organisms									No data collection is currently planned	SCVURPPP	
	Bioassessment - Macroinvertebrates									No data collection is currently planned	SCVURPPP	
	Bioassessment - Fish									No data collection is currently planned	SCVURPPP	
	Physical											
	Physical Habitat										No data collection is currently planned	SCVURPPP
	Sediment Characterization										No data collection is currently planned	SCVURPPP
	Channel Dynamics and Hydrology										Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
	Riparian Vegetation										No data collection is currently planned	SCVURPPP
Stevens Creek	Chemical											
	Contaminants - Water Quality				I	I		T	T	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	
	Conventional Water Chemistry				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	
	General Water Quality				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	
	Biological											
	Toxicity - Water Quality				I	I		T	T	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	
	Pathogens (Indicator Organisms)				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency	
	Bioassessment - Macroinvertebrates				S	S		I	I	Baseline data collected by USGS in 1997 and RWQCB in 2002	SCVURPPP	
	Bioassessment - Fish				S	S		I	I	Coordinate with SCVWD to obtain permits and/or develop approach to monitor status and trends of steelhead populations.	SCVWD/ SCVURPPP	
	Physical											
	Physical Habitat				S	S			I	I	Salmonid habitat survey in 1999 by FAHCE; Visual habitat assessment by RWQCB in 2002	SCVURPPP
	Sediment Characterization		I	I	S	S					Identified as high priority for potential impairment from sediment in SCVURPPP sediment report. Conduct studies using methods developed in work associated with sediment workplan.	SCVURPPP
	Channel Dynamics and Hydrology										Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
	Riparian Vegetation										No data collection is currently planned	SCVURPPP
Permanente Creek	Chemical											
	Contaminants - Water Quality				I	I		T	T	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	
	Conventional Water Chemistry				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP	

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
	General Water Quality				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP
Biological											
	Toxicity - Water Quality				I	I		T	T	Baseline screening level data collected by RWQCB in 2002	SCVURPPP
	Pathogens (Indicator Organisms)				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP
	Bioassessment - Macroinvertebrates				S	S		I	I	Baseline data collected by RWQCB in 2002	SCVURPPP
	Bioassessment - Fish				S	S		I	I	Coordinate with SCVWD to monitor status and trends of resident rainbow trout populations.	SCVWD/ SCVURPPP
Physical											
	Physical Habitat				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	SCVURPPP
	Sediment Characterization				S	S		I	I	Baseline screening level data collected by RWQCB in 2002	RWQCB/ SCVURPPP
	Channel Dynamics and Hydrology									Potential Data Collection through the Hydromodification Management Plan (HMP)	SCVURPPP
	Riparian Vegetation									No data collection is currently planned	SCVURPPP

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
Monitoring Activities in watersheds not currently considered in plan.											
San Francisquito Creek		I	I	I						Detailed watershed assessment being conducted by stakeholder workgroup administered by the San Francisquito Creek Joint Powers Authority (JPA)	
Guadalupe River	Contaminants - Water Quality	S 16	S 16	S 16	S 16	S 16	S 16	S 16	S 16	Four reaches. Monitoring is shown as quarterly; actual frequency will be in accordance with RWQCB requirements. Total Hg, Methylmercury, TSS.	SCVWD
	Contaminants - Sediment	S(4)	S(4)	S(4)	S(4)	S(4)	S(4)	S(4)	S(4)	Methylmercury concentrations in riverbed and suspended sediments.	SCVWD
	General Water Quality	S(9)	S(9)	S(9)	S(9)	S(9)	S(9)	S(9)	S(9)	Monitoring used to calibrate model to simulate stream temperature. Key variable for fish survival.	SCVWD
	Bioassessment - Fish	S 17	S 17	S 17	S 17	S 17	S 17	S 17	S 17	Adult migration & spawning; juvenile rearing and/or migration in 17 or more locations.	SCVWD
	Physical										
	Channel Dynamics and Hydrology	S 14	S 14	S 14	S 14	S 14	S 14	S 14	S 14	S 14	Channel bottom stability in 14 transects
Riparian Vegetation	S 23	S 23	S 23	S 23	S 23	S 23	S 23	S 23	S 23	Survival, health & vigor, non-native species cover, and/or tree basal area (18 plots)	SCVWD
<p>¹ Parameter types are listed with category of monitoring design, which include: (S) screening level, (I) investigative, and (T) status and trends. The number in parentheses represents the number of sampling locations for that sampling period. For FY's 05-06 to 09-10, Parameters types (I and T) only serve as place holders. Future annual monitoring plan submittals will indicate the number of sites where screening-level (S) , investigative (I), and status and trends (T) monitoring will occur in a given watershed.</p>											

Watershed Area	Data Type ²	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Rationale	Lead Agency
<p>2 Description of analyses conducted for each data type is described in the footnotes below. In some cases, partial analyses may be implemented for data types when existing data satisfies screening level target. Standard analytical methods are indicated in separate table attached to Plan; methods are intended to be congruent with SWAMP/RMAS methodology. Adjustments will be made, if necessary, when SWAMP QAPP becomes available in September 2002.</p> <p>3 Water Chemistry: Total and dissolved metals (Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se) and organophosphate pesticides; sampling conducted for two times per year.</p> <p>4 Sediment chemistry: Metals (Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As), PCB, mercury, PAHs and organochlorine pesticides; sampling conducted in the dry season only.</p> <p>5 General water quality: Temperature, dissolved oxygen, pH and specific conductance (multiparameter probe readings and/or continuous measurements); sampling conducted two times per year.</p> <p>6 Toxicity testing of water on three species: (1) Ceriodaphnia: 7 day survival and reproduction; (2) pimephales 7-day; and (3) selenastrum test; toxicity conducted at wet and dry season.</p> <p>7 Conventional water chemistry: Major anions: ortho-phosphate, nitrate, nitrite, chloride, sulfate; total phosphate, boron, TKN, TDS, SSC, ammonia, chlorophyll-a, alkalinity, hardness, TOC and DOC; sampling conducted two times per year.</p> <p>8 Indicator organisms: total and fecal coliform and <i>enterococcus</i>; sampling conducted two times per year.</p> <p>9 Bioassessment: following CSBP methodology and conducted in the spring season.</p> <p>10 Rapid bioassessment of fish communities will be done using methods established in the SEIDP or by other standardized methods utilized by the SCVWD or other Co-permittee agencies.</p> <p>11 Habitat survey physical habitat assessment using CSBP methodology.</p> <p>12 Sediment characterization includes collecting sediment grain size (full analysis) at sites where sediment samples are collected. Suspended sediment concentrations (SSC) are collected with conventional water chemistry samples. Stream substrate composition is estimated qualitatively during Macroinvertebrate bioassessments and physical habitat surveys.</p>											

Table 4.0 Analytical methods used in SCVURPPP Multi-Year Monitoring Plan.

Description of data parameters	Analytical Methods
Pesticides (water) - Organophosphate suite	EPA 8141A
Pesticides (sediment) - Organochlorine suite	EPA 8081A
PCB congeners	EPA 8082
PAH congeners	EPA 8270
ICPMS metals suite (sediment) (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As--all costs)	EPA 6020
ICPMS metals suite (water)--unfiltered "total" (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--all costs)	EPA 200.8
ICPMS metals suite (water)--filtered "dissolved" (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--al costs)	EPA 200.8
Total mercury (sediment)	EPA 245.7/1631M
Major anions nutrient scan: ortho-phosphate, nitrate, nitrite, chloride, sulfate	EPA 365.2, EPA 300
Total Phosphate	EPA 365.2
Boron	EPA 200.8
TKN	EPA 351.3
TDS	EPA 160.1
Suspended Sediment Concentration (SSC)	ASTM D3977-97
Ammonia	EPA 350.3
Chlorophyll-a	SM 10200H/EPA 445.0
Alkalinity	EPA 310.1
Hardness	EPA 130.2
TOC	EPA 415.1
DOC	EPA 415.1
Sediment grain size - full analysis (phi scale)	Plumb/PSEP
Total coliform	SM 9221B
Fecal coliform	SM 9221B
enterococcus	SM 9230B
<i>Ceriodaphnia 7-day Survival & Reproduction</i>	EPA 1002.0 (WET)
<i>Pimephales (fathead minnow) 7 - day</i>	EPA 1000.0 (WET)
<i>Selenastrum (algae) test</i>	EPA 1003.0 (WET)

(WET) Whole Effluent Toxicity: Guidelines Establishing Test Procedures for the Analysis of Pollutants (October 16, 1995)

8.0 PROGRAMMATIC MONITORING INDICATORS - SUMMARY MATRIX

Based on the SCVURPPP's experience in implementing Performance Standards, monitoring projects and the continuous improvement process, the Program believes that a key element of its strategy should focus on developing better programmatic indicators and on collecting and analyzing programmatic data. A summary matrix of the various ongoing and planned projects relative to how they address the four major components of the RWQCB's long-term monitoring goals is shown in Table 5.0. The purpose of this table is to give the reader a perspective on the various projects that the SCVURPPP has underway or planned.

In general, specific details on the project scope, expected or completed products and overall due dates can be found in several other reports produced by the Program and are not reproduced in this report. Please refer to the Program's website (www.scvurppp.org) or see the following areas noted below for additional information:

- Project Scopes & Schedules: see the annual monitoring plan contained in the Annual Program Workplans.
- Completed Products: see Table 4-2 contained in the monitoring section of the Program's Annual Reports.
- Status Reports: distributed to AdHoc Monitoring Group and Management Committee at least on a quarterly basis. In addition, the Program discusses the status of various projects on an as needed basis at the BASMAA monitoring subcommittee meetings, special workshops, and various WMI subgroup meetings, in particular the Land Use Subgroup. The results of those presentations and discussions are contained in meeting notes that are distributed to the Management Committee and members of the specific workgroup.

**TABLE 5.0
SUMMARY OF ONGOING AND PLANNED SCVURPPP PROGRAMMATIC MONITORING ACTIVITIES**

SCVURPPP Programmatic Monitoring Elements	Screening Level¹	Investigative (targeted – source ID)²	Status and Trends Monitoring³	Evaluate Management Effectiveness⁴	Status (Expected FY)
Control Programs for POCs					
Copper/Nickel Baseline Actions	Yes	Yes	Yes	Yes	Ongoing
Mercury Pollution Prevention	Yes	Yes	Yes	Yes	Ongoing
Pesticide Control Program	Yes	Yes	Yes	Yes	Ongoing
PCBs Control Program	Yes	Yes	Yes	Yes	Ongoing
Dioxin-like Compounds Control Program	Yes	Yes	Yes	Yes	Ongoing
Trash Management Activities	Yes	Yes	Yes	Yes	Ongoing

SCVURPPP Programmatic Monitoring Elements	Screening Level ¹	Investigative (targeted – source ID) ²	Status and Trends Monitoring ³	Evaluate Management Effectiveness ⁴	Status (Expected FY)
Performance Standard Monitoring Activities					
Program Data Management & ICID/IND enhanced reporting	No	Yes	Yes	Yes	Ongoing
<u>Land Use Subgroup</u> <ul style="list-style-type: none"> Economic and Tax Incentives Compare and Contrast develop. policies Stormwater's role in congestion management 	No	No	No	Yes	Ongoing

¹ Screening-level monitoring involves the collection and analysis of existing and/or new data (chemical, physical, biological) to characterize baseline conditions.

² Investigative monitoring typically includes the collection of more detailed measurements in a defined area (e.g., stream reach), to answer specific questions of impairment our source/causes of adverse impacts to beneficial uses and water quality.

³ Status and trends monitoring typically involves the periodic collection of new data for comparison against baseline conditions and analysis of trends.

⁴ Management Effectiveness monitoring involves designing specific receiving water and/or programmatic monitoring programs to evaluate BMPs and/or the implementation and effectiveness of overall stormwater program activities.