

4. MONITORING ACTIVITIES

The Program's *Watershed Monitoring and Assessment Program* continued to provide valuable information on the condition of beneficial uses in Santa Clara Valley creeks and rivers in Fiscal Year 2008-09 (FY 08-09). The Program also continued to actively participate in, and provide financial support towards developing a better understanding of the water quality condition of the San Francisco Estuary through the continued implementation of the *Regional Monitoring Program for Water Quality in the San Francisco Estuary* (RMP). Activities conducted by each of these monitoring programs during FY 08-09 are discussed in this section¹. In addition, summaries of management activities conducted through the implementation of the Program's Pollutant of Concern (POC) Control Plans are also summarized for those POCs that do not have separate Annual Report sections (e.g., PCBs, Copper/Nickel and Dioxins).

Summaries of the status, results and next steps of monitoring and assessment activities conducted or completed during FY 08-09 are presented within this section in the following order:

- 1) Monitoring activities, studies and on-going programs focused on developing a better understanding of the conditions and impacts to beneficial uses in Santa Clara Valley creeks and rivers (Page 4-2);
- 2) Studies and programs designed to better understand the status, effects, sources, pathways and trends of pollutants in the San Francisco Estuary (Page 4-6); and
- 3) Pollutant of Concern Control Programs that are not discussed within other sections of the Annual Report (Page 4-8).

The activities described in this section are consistent with Provisions C.7 and C.9 of the Program's NPDES Permit. To the extent possible, each summary included in this section contains the following information:

- 1) Descriptions of the relationship to NPDES Permit requirement(s) and management question(s) the or study was designed to address;
- 2) Brief description of subtasks and status of project/activity;
- 3) Brief description of the results to date;
- 4) Summary of findings to-date and recommendations (where feasible); and
- 5) Description of lessons learned and planned/recommended follow-up activities.

To ensure public access to the entire contents of completed reports, work products and environmental data, the Program has placed major reports and work products on its website (www.scvurppp.org). The website is continually updated to include the latest reports and work products, data inventory sets and other pertinent Program information. When viewing the website, a large majority of the reports and work products are linked to downloadable documents. Reports and work products not available through the website may be obtained by submitting a web-based request form to Program staff.

A summary of FY 08-09 monitoring and assessment activities directly conducted by the Program are provided in Appendix C-1 and Table 4-1. Summaries of RMP studies conducted or

¹ Prior to the next Annual Report (i.e., FY 09-10), the Program intends to reorganize this section to better summarize the results and lessons learned from the numerous monitoring and POC control program activities recently completed and planned with the adoption of the Municipal Regional Permit (MRP).

completed this fiscal year are included in Appendix C-4. Monitoring activities specific to pesticide-related toxicity and mercury are summarized in sections 6 and 7, respectively.

1. SANTA CLARA BASIN CREEK AND RIVER MONITORING

SCVURPPP Watershed Monitoring and Assessment Program

Through the implementation of the *Watershed Monitoring and Assessment Program*, information is collected by the Program on the conditions of water quality and beneficial uses in Santa Clara Basin creeks and rivers. More specifically, the Program monitoring in creeks/rivers focuses on answering the following core management questions:

1. *Are conditions in Santa Clara Basin creeks/rivers protective, or likely to be protective, of beneficial uses?*
2. *What is the extent and magnitude of the current or potential problems in Santa Clara Basin creeks/rivers?*
3. *What is the relative urban runoff contribution to the problem(s) in Santa Clara Basin creeks/rivers?*
4. *What are the sources to urban runoff that contribute to creek/river problem(s)?*
5. *Are conditions in Santa Clara Basin creeks/rivers getting better or worse?*

The Program's existing monitoring program was developed as an outgrowth of the Program's current NPDES Permit Provisions C.7.b and C.9. In March of 2002, the Program submitted a Multi-Year Receiving Waters Monitoring Plan (Multi-Year Plan) to the Water Board that identifies Program monitoring activities in Santa Clara Basin watersheds over an eight-year period (FY 02-03 through FY 09-10). As new monitoring priorities were established, the Multi-Year Plan was revised in FY 03-04 (Revised Multi-Year Plan). This Revised Multi-Year Plan can be found under the Environmental Monitoring and Assessment Measures link on the Program's website (www.scvurppp.org).

The Revised Multi-Year Plan contains information on the watersheds selected for monitoring (prioritized based on SCBWMI and Program assessment priorities), parameters to be monitored (chemical, biological and physical), the number and frequency of sampling events, rationale and lead agency. The information on data type uses a tiered monitoring approach discussed by the Water Board staff in its Regional Monitoring and Assessment Strategy (RMAS) memo (Draft Monitoring Design in Water Board-lead Pilot Watersheds, spring 2001) dated February 8, 2001. The Revised Multi-Year Plan also incorporates specific data needs that have been identified in Program activities relevant to watershed assessment and monitoring (e.g., sediment-related studies in Stevens and Upper Penitencia Creek watersheds). Field and analytical methods used in the Revised Multi-Year Plan are described in the Program's Draft Quality Assurance Project Plan (QAPP), which is consistent with the Water Board's Surface Waters Ambient Monitoring Program (SWAMP) QAPP.

Summary of Fiscal Year 2008-09 Results

During FY 07-08, the Program developed the *FY 08-09 Annual Monitoring and Watershed Management Measures Work Plan* (FY 08-09 Monitoring Plan), which was included in the Program's *FY 08-09 Draft Work Plan* (submitted March 1, 2008). Monitoring activities described in the FY 08-09 Monitoring Plan were generally aimed at developing and implementing programs/projects designed to assess the condition of water bodies using practical, implementable indicators and protocols. The implementation of these indicators and protocols

are a necessary step toward establishing a sound regulatory basis for locally based watershed management. Therefore, monitoring and assessment activities described within this section are not entirely independent from activities described in Section 5 – Watershed Management Measures. Information gained from conducting studies and implementing activities/measures described in both sections have been used (and will continue to be used) in concert to meet objectives outlined in Permit Provisions C.7, C.9, and C.10, which include; (1) characterizing watersheds and stormwater discharges; (2) assessing existing or potential adverse impacts to beneficial uses; (3) identifying potential sources of pollutants of concern; (4) aiding in developing and implementing strategies for controlling adverse impacts on beneficial uses; and (5) assessing the effectiveness of pollutant prevention/control measures.

The following sections briefly summarize monitoring conducted by the Program's *Watershed Monitoring and Assessment Program* and described in the FY 08-09 Monitoring Plan.

Bioassessments in the Guadalupe River and Tributaries

Benthic macroinvertebrate (BMI) communities are used by the Program as a leading indicator of the condition of aquatic life uses in Santa Clara Valley creek/rivers. In FY 08-09, the Program surveyed benthic macroinvertebrate (BMI) communities and physical habitat quality at 22 locations, and algae communities at a subset of locations (n=4) in the Guadalupe River and tributaries. The condition of aquatic life uses were assessed using the preliminary Benthic Index of Biological Integrity (B-IBI) for Santa Clara Valley creeks, previously developed by SCVURPPP. The B-IBI ranks sites into five condition categories (optimal, good, fair, marginal and poor) based on a 0 to 50 scale.

Based on FY 08-09 results, B-IBI scores for all sites in Guadalupe River watershed ranged from 2 to 49 (0 to 50 possible). A total of 17 sites (77%) scored in the "poor" or "marginal" B-IBI categories, including all sampling sites in the Guadalupe River and lower elevation sites for both Alamitos and Los Gatos Creeks. Sites that scored in the "good" or "optimal" categories were upper elevation sites on all three major tributaries (i.e., Alamitos, Guadalupe and Los Gatos Creeks). PHAB scores for sites in the Guadalupe River watershed ranged from 8 to 58 (0 to 60 possible), with scores generally increasing in an upstream direction. The highest physical habitat scores occurred in Alamitos and Guadalupe Creeks.

B-IBI scores generally exhibited a longitudinal pattern, increased in an upstream direction. In addition, scores were partially correlated with elevation and qualitative physical habitat (PHAB) quality. Sites directly downstream of dams had considerably lower B-IBI scores than those above the dams. In addition, sites in the lower and middle reaches of Alamitos Creek had "poor" B-IBI scores, despite having good physical habitat and coarse substrate.

Benthic algae bioassessments were conducted to better understand the process of data collection, field techniques and data analysis methods. For benthic algae, the preliminary metric results indicate some differences in the condition of the algae/diatom community for the sites sampled within three different water bodies. The number of samples (n=4), however, was too small to develop conclusions about the condition of aquatic life uses and compare to BMI data collected in the Guadalupe River watershed.

Recommended next steps include conducting a second year of bioassessments to develop additional information on the condition of aquatic life uses in the Guadalupe River watershed, and considering the analysis of sediment chemistry and toxicity testing at selected sites. Both types of information will provide additional insight into the potential causes of low B-IBI scores in the Guadalupe River and tributaries.

For additional information, please refer to the full technical report entitled *Watershed Monitoring and Assessment Summary Report: Guadalupe River (Monitoring and Assessment Summary Report)* within Appendix C-2.

Continued Evaluation of Toxicity in Stevens Creek

The San Francisco Bay Regional Water Quality Control Board's (Water Board) Surface Water Ambient Monitoring Program (SWAMP) and the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) have conducted water and sediment bioassays (i.e., toxicity tests) at numerous sites in San Francisco Bay area urban creeks over the last eight years. Results indicate that sediment toxicity is present at a number of sites, while water toxicity is less prevalent. Due to the aquatic toxicity observed by SWAMP (FY 02-03), the steelhead population present, and the resulting listing on the 303(d) list, the Program developed a study designed to evaluate the extent, magnitude, and cause(s) of aquatic toxicity observed in Stevens Creek. During FY 07-08, the SCVURPPP initiated an investigative monitoring study to identify potential sources and causes of toxicity in Stevens Creek watershed.

The Program collected sediment samples from three sites on January 21. Samples were subsequently analyzed for chemistry (i.e., pyrethroids and metals) and toxicity. On May 20, samples were collected from seven sites and analyzed for pyrethroid pesticides. Sampling sites were located downstream of major storm drain outfalls that discharge to the study area. Two water samples were also collected at Stevens Creek Blvd on May 11, one sample from an outfall discharge on west side of culvert, and second sample from receiving water about 10 feet downstream of outfall.

Total recoverable metal concentrations were below corresponding threshold effect levels (Sediment Quality Quotient (SQQ) < 1.0), with the exception of nickel. In contrast to metals, pyrethroid pesticides were observed at detectable levels at 8 of 10 sites sampled either in January or May 2009. Specific pesticides detected during the study include bifenthrin, cyflurin, cypermethrin, esfenvalerate and permethrin. During the first sampling event, bifenthrin concentrations were highest at site STE063, which was also the site where 100% mortality was observed. The combination of 100% mortality of test organisms and the high concentration of bifenthrin (85 ng/g) in sediment collected at site STE063 suggested that pyrethroid pesticides were likely the contaminant causing the observed toxicity.

Further chemical analysis of sediment collected at seven sites upstream of STE063 indicate that five pyrethroid pesticides (including bifenthrin) were present at concentrations that one would expect to observe some degree of toxic response. This information provides strong support to the conclusion that pyrethroid pesticides are causing toxicity in bedded sediments in this reach of Stevens Creek.

The longitudinal pattern of SQQ values observed in May 2009 suggests that sources of pyrethroid pesticides reaching Stevens Creek are present within the watershed area draining to the two stormwater outfalls directly upstream of site STE066. Based on reconnaissance, it appears that this watershed area is primarily comprised of single-family residential land uses. Based on the results from this study, recommended actions include conducting enhanced public outreach and education to residents and landscape maintenance staff in the watershed area in an effort to reduce the potential impacts of pyrethroid pesticides on Stevens Creek water quality and beneficial uses.

For additional information, please refer to the full technical report entitled *Investigative Monitoring Project: Potential Sources and Causes of Toxicity in Stevens Creek, Santa Clara County, California* within Appendix C-3.

Regional Collaborative Monitoring Activities

BASMAA Monitoring Committee

Over the past decade, the BASMAA Monitoring Committee (MC) met periodically to discuss and coordinate monitoring activities among Bay area urban runoff management programs. In FY 08-09, the main emphasis for MC representatives, including Program and Co-permittee staff, was to participate in development of the monitoring and pollutant of concern-related sections of the Municipal Regional Permit (MRP), while continuing to implement current monitoring programs. Therefore, BASMAA MC meetings were held less frequently in FY 08-09 than in previous fiscal years. Based on the need for meetings and updates among attendees, MC meetings will continue to be held on an as needed basis in FY 09-10.

Regional Monitoring Coalition (RMC)

In FY 09-10, BASMAA MC representatives have continued to discuss the benefits of developing a BASMAA Regional Monitoring Coalition (RMC) consistent with the intent of Provision C.8.a in the Draft MRP Tentative Order, dated February 11, 2009. Based on initial discussions, the intent of the BASMAA RMC would be to continue to foster collaboration on monitoring activities in a similar manner as the BASMAA MC in recent years (e.g., Joint Stormwater Project for PCBs and Hg). More specifically, collaboration would occur through the collection, analysis and management of regionally consistent and comparable data that will be required by the MRP.

Tasks started in FY 08-09 by the BASMAA RMC Visioning Workgroup (RMC Workgroup), which includes Program staff, include:

- RMC Scope and Organizational Structure - During this fiscal year, the RMC visioning workgroup began outlining potential areas of collaboration via the RMC, based on the monitoring tasks that will likely need to be conducted in compliance with the MRP. Examples of areas of collaboration include, monitoring design, quality assurance and control, information management, data analysis and reporting (see below). Additional discussions of alternative organizational structures for the RMC (e.g., decision-making process, membership and communication structure) and levels of collaboration for specific tasks were also discussed.
- Development of Monitoring (Experimental) Design – Although not fully clear at the time this annual report was completed, it is likely that the RMC will undergo a development of a regional monitoring design for status and trends monitoring in creeks. Initial discussions have focused on using similar designs to those used by the Southern California Stormwater Monitoring Coalition (SMC), which includes a regional probabilistic design² for creek bioassessments, physical habitat assessments, chemistry and toxicity. Further discussion will continue into FY 09-10 regarding an appropriate monitoring design, and the RMC workgroup will likely seek input and/or direct involvement from scientists and statisticians (i.e., subcontractors) heavily experienced in designing monitoring programs. Deliverables for this activity are expected to include sampling and analysis plans (SAPs), presentations and meeting summaries.

² Specifically, a generalized random-tessellation stratified (GRTS) design similar to the RMP.

- Quality Assurance and Control Programs – To ensure that the highest quality of data are being collected via the RMC, Program staff are also actively participating in the development of data quality assurance and control procedures via the RMC workgroup. In FY 08-09, existing field and laboratory standard operating procedures (SOPs) and forms were reviewed to identify QA/QC processes that still need to be defined. As an outgrowth, the RMC workgroup began to develop a conceptual scope of work for this area of interest.
- Information Management System – As data are collected by RMC participants and received from laboratories, they must be stored and managed in a cost effective manner that allows users to easily access data and information. Through initial discussion amongst the RMC Workgroup, it is likely that the most cost effective way to develop an information management system (IMS) is collectively through the RMC. As a first step, Program staff (on behalf of the RMC) reviewed data structures and the transferability of existing databases (i.e., SWAMP and EDAs) with regard to monitoring activities that will likely be required by the MRP. Based on this review, a conceptual scope was developed for the RMC Workgroup to review. Next steps are currently pending, but it is likely that the RMC will move forward on the development of an IMS that will serve as a regional data center for water quality monitoring data collected by BASMAA member agencies. Deliverables will likely include data structures, technical user manuals, and the databases themselves.

As described in the Program's FY09-10 Work Plan, Program staff plan to continue in the development of the RMC by participating in the RMC workgroup and further developing conceptual scopes for eventual presentation to the BASMAA Board of Directors (BOD).

Regional Stormwater Monitoring and Urban BMP Evaluation (SFEI Proposition 13 Grant)

As a direct result of the TMDLs for Mercury (Hg) and PCBs, significant load reductions (>50%) are required of Bay Area urban runoff programs. This is a difficult prospect for given there is limited quantitative information on where high concentrations of Hg and PCBs occur in urban areas. In addition there is little knowledge or experience on how source and treatment control BMPs or maintenance activities that have been designed and are routinely implemented to control other substances may or may not work for Hg and PCBs. In recognition of these information needs, with support from Water Board and BASMAA, SFEI applied for and received a grant from the Proposition 13 Coastal Non-point-Source Pollution Control Program and work began in 2005. The purpose of the grant is to assist BASMAA and the Water Board to implement the Hg and PCB TMDLs through the development of a science-driven consensus on where and how to apply limited resources to meet the TMDL goals.

From 2005 through 2008, Program staff and additional BASMAA representatives have actively participated and provided in-kind support towards implementing a variety of tasks (see previous annual reports for additional information). In 2009, all grant activities were ceased due to the State's financial crisis, and therefore no work has been completed in 2009. As tasks begin again, Program staff will continue to assist in their completion.

City of Palo Alto Creek Monitoring

San Francisquito Creek Long Term Monitoring and Assessment Plan (LTMAP)

In addition to the monitoring conducted by the Program, the City of Palo Alto operates a sampling station at Newell Road on San Francisquito Creek as part of the LTMAP. The Newell Road sampling station captures nearly the entire San Francisquito watershed, including most of the urbanized portion of the watershed. At the Newell Road location, flows are intermittent, with

flow beginning in the rainy season and tapering off in the late spring or early summer. During each water year, five to six rainfall events are sampled. Samples are analyzed for metals (including low level mercury, dissolved mercury, and methylmercury), nutrients, pesticides (organochlorine, organophosphate, and pyrethroids), and suspended solids. One sample each year is analyzed for dioxins. Stanford University, Stanford Linear Accelerator Center, and Jasper Ridge Biological Preserve operate three additional LTMAP sampling stations in the upper watershed. For additional information on the LTMAP program, see the www.sanfranciscuito.org.

Matadero Creek Metals/Cyanide Monitoring

The City of Palo Alto's NPDES permit for wastewater discharge requires monthly monitoring of Matadero Creek for metals and cyanide. These samples are collected as grab samples at Greer Road and Oregon Expressway. The Renzel Marsh Pond, a freshwater pond enhancement initiated and managed by Palo Alto, discharges to Matadero Creek downstream of the sampling location. For additional information on these data collection efforts, contact staff at the Palo Alto Regional Water Quality Control Plant.

2. SAN FRANCISCO BAY ESTUARY MONITORING

Regional Monitoring Program for Water Quality (RMP)

The Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) is a collaborative effort between the San Francisco Estuary Institute (SFEI), the Water Board and the regulated discharger community (including SCVURPPP). 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.

The RMP is based on management questions and program objectives that are updated by the Water Board, RMP staff, RMP Technical Review Committee (TRC) and RMP Steering Committee (SC) approximately every five years. The RMP updated its core management questions in 2009:

- 1. Are chemical concentrations in the Estuary potentially at levels of concern and are associated impacts likely?*
- 2. What are the concentrations and masses of contaminants in the Estuary and its segments?*
- 3. What are the sources, pathways, loadings, and processes leading to contaminant related impacts in the Estuary?*
- 4. Have the concentrations, masses, and associated impacts of contaminants in the Estuary increased or decreased?*
- 5. What are the projected concentrations, masses, and associated impacts of contaminants in the Estuary?*

The Program actively participated in and contributed approximately \$175,000 to SFEI for FY 08-09 expenditures on the RMP. This funding to SFEI is in addition to funding provided by the three south Bay public owned treatment works (POTWs), which are also SCVURPPP Co-permittees.

In addition, Program staff actively participated on a variety of RMP committees and work groups that included the RMP Steering Committee; Technical Review Committee; Sources, Pathways and Loadings Work Group (SPLWG); and, Contaminant Fate Workgroup. Status and trends monitoring and pilot/special studies conducted by the RMP are summarized in this annual report. These studies are identified as “RMP” and were conducted under the direction of workgroups and committees for which Program staff participated during FY 07/08. More specifically, Program staff represented the SCVURPPP and/or BASMAA by providing in-kind project support (e.g., assisting in the development of project scopes of work and providing technical review and comment on results and conclusions) for these studies, in addition to funding provided by SCVURPPP.

The RMP budget is generally broken into two major program elements: Status and Trends; and Special and Pilot Studies. The following paragraphs provide a brief overview of these programs.

RMP Status and Trends Monitoring Program

The Status and Trends Monitoring Program (S&T Program) is the long-term contaminant-monitoring component of the RMP that was initiated as a pilot study in 1989. S&T began to adapt to changes in our understanding of the Bay in 2005. Regulations focusing on thresholds based on concentrations of contaminants found in biota instead of concentrations in water are starting to develop. The S&T Program completed a redesign in 2007 and major changes began the following year. The S&T program is currently comprised of the following program elements that collect data to address the RMP Management Questions (MQs):

1. *Water/Sediment/Biota Chemistry and Toxicity* monitoring serves as the long-term contaminant monitoring component of the RMP which is designed to characterize status and trends in the Estuary (MQs #1,2 & 4);
2. *Sediment Benthos* monitoring began in 2008 as to complete the sediment triad evaluation.
3. *Small and Large Tributary Loading Studies* are conducted on a routine schedule (e.g., annually or triennially) to develop baseline pollutant loading estimates from tributaries to the Bay, and assess inter- and intra-annual variability of pollutant loads and concentrations (MQ #3).
4. *Small Fish and Sport Fish Contamination Studies* are studies screening fish tissue for contaminants of concern to human health. The Small Fish study will begin to be done annually, the Sport Fish Study continues triennially. (MQs #1,2 & 4);
5. The *Causes of Sediment Toxicity Monitoring* component investigates potential causes of observed toxicity in the Estuary (MQ #3);
6. The *USGS Suspended Sediment, Hydrography and Phytoplankton* monitoring is partially funded by the RMP, and includes monthly water quality measurements in the deep channels of the Estuary (from the Lower South Bay to the confluence of the Sacramento and San Joaquin Rivers), sediment transport monitoring and modeling in the northern Estuary, and phytoplankton monitoring throughout the Estuary (MQs #1,2 & 4); and,
7. The *Bird Egg Monitoring Program* will begin in 2009 and occur triennially thereafter to assess trends in pollutant concentrations bioaccumulated in cormorant and Forster's Tern eggs (MQs 1, 2 & 4).

Appendix C-4 provides summaries of the latest monitoring results available (i.e., 2008) for the RMP Status and Trends Monitoring Program. The 2008 information is from the seventh year the Status and Trends Monitoring Program, which collects water and sediment samples using EPA's Environmental Monitoring Program (EMAP) Generalized Random Tessellation Stratified

(GRTS) sample design. This type of design is appropriate for addressing the RMP management questions #1, 2 and 4 of the RMP. Monitoring data are available for downloading via the RMP website using the *Status and Trends Monitoring Data Access Tool* at www.sfei.org/rmp/data.htm.

RMP Pilot and Special Studies

The RMP also conducts Pilot and Special Studies. Pilot Studies usually are designed to investigate and develop new monitoring measures related to anthropogenic contamination or contaminant effects on biota in the Estuary. Special Studies address specific scientific issues that the TRC and SC identify for further study. These additional studies are developed through an open application process, which starts with an applicant submitting a study idea to the RMP Program Manager for discussion at a TRC quarterly meeting.

Summaries of the most pertinent Pilot and Special Studies conducted in FY 08-09 by the RMP are also provided in Appendix C-4. A summary of past Pilot and Special Studies conducted by the RMP is also available on the RMP website (www.sfei.org/rmp/).

3. POLLUTANT OF CONCERN CONTROL PROGRAMS

The following section provides brief summaries of activities conducted through pollutant-specific control programs not described in other sections (i.e., sections 6 and 7). Control measures and monitoring activities for each pollutant of concern (POC) are described.

PCBs and Dioxin Compounds Control Program (Provision C.9.e)

Provision C.9.e. of the Program's NPDES permit requires development of a control program to reduce or eliminate discharges of polychlorinated biphenyls (PCBs) and dioxin-like compounds from urban runoff conveyance systems from controllable sources (if any). As part of the Program's PCBs/Dioxins Control Program, the activities described below were conducted during FY 08-09.

Polychlorinated Biphenyls (PCBs)

All segments of San Francisco Bay are listed as impaired by PCBs in the Clean Water Act Section 303(d) list. A report prepared by the CEP (*PCBs in San Francisco Bay: Conceptual Model/Impairment Assessment, February 2006*) provides a comprehensive discussion of issues related to PCBs in San Francisco Bay, including a detailed analysis of the status of the impairment and associated uncertainties, and a conceptual model that describes sources, estimated loads, and processes that affect the fate of PCB compounds in the Bay.

The Regional Water Board places high priority on addressing PCBs in the Bay and has developed a PCBs TMDL water quality restoration program. The Program has provided leadership to Bay Area stormwater management agencies in their efforts to assist the Bay PCBs TMDL. This included leading a regional study that characterized the distribution of PCBs concentrations in storm water conveyance sediments in Bay Area watersheds. The Program 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 management agencies. The case studies were aimed at identifying PCBs sources and controls. The Program also prepared 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. To facilitate regional coordination, the Program

led a work group of representatives from BASMAA and Regional Water Board staff and provided a staff to represent BASMAA on the CEP PCBs workgroup.

The Program also completed a report on efforts to develop methods of controlling discharges of PCBs from Bay Area urban runoff conveyances. The study describes 1) past, current and planned efforts to identify PCBs control options in the Bay Area, 2) management practices currently implemented by Bay Area storm water management agencies that may reduce discharges of PCBs from urban runoff conveyances, and 3) potential additional PCBs storm water control options and some of their advantages, limitations and cost factors.

During FY 08-09, the Program continued to work with other Bay Area dischargers and Regional Water Board staff through BASMAA and the RMP to coordinate and plan activities related to PCBs and other pollutants of concern. Efforts included providing funding to the RMP, participating in selected stakeholder meetings, committees and work groups and, as appropriate, reviewing and commenting on relevant documents prepared by RMP and Regional Water Board staff. Program staff continued to represent BASMAA'S interests during development of the Bay PCBs TMDL and to represent BASMAA on the RMP PCB Strategy Work Group, RMP TRC, RMP SPLWG, RMP CFWG, and RMP Sport Fish Work Group. Through participation in these committees and work groups Program staff advocate for stormwater program interests during RMP study design, implementation and reporting. Specific projects related to PCBs are summarized below.

PCB TMDL (Regional Water Board)

Program staff continued during FY 08-09 to help represent the Program's and BASMAA'S interests during development of the San Francisco Bay PCBs TMDL water quality restoration program. This TMDL has been adopted by the Regional Water Board and will be considered next by the State Water Resources Control Board (SWRCB). Program staff reviewed the SWRCB's draft agenda item and resolution for proposed approval of the Basin Plan amendment to establish this TMDL and prepared written comments on behalf of BASMAA.

Taking Action for Clean Water (SFEP/BASMAA Partnership)

In November 2006, the State Water Resources Control Board awarded the San Francisco Estuary Project (SFEP) a Proposition 50 Coastal Nonpoint Source Pollution grant (Taking Action for Clean Water). The project includes several tasks to further implementation of Bay Area TMDLs, including a task that involves addressing the historic use of PCBs in building materials. The primary goal is to develop Bay Area-specific BMPs to prevent release of PCBs from building materials into urban runoff during renovation, maintenance or demolition of structures. This will help reduce PCB stormwater loads to San Francisco Bay. Bay Area-specific information about the presence of PCBs in building materials will be obtained through a field sampling program, so that management actions can be targeted specifically to the structures most likely to contain PCBs and threaten water quality. SFEP will coordinate development of the BMPs by completing trial implementation projects in cooperation with BASMAA and local municipalities. During FY 2008/09, Program staff continued to assist BASMAA to participate in the project as a stakeholder and project partner, with initial emphasis on planning the field sampling portion of the project. Due to California's budget difficulties funding for the project was frozen in December 2008, but it is now poised to restart with funding from the American Recovery and Reinvestment Act (ARRA – i.e., federal stimulus funds). During May and June 2009 Program staff worked with other BASMAA staff and the SFEP project manager to revise the scope and schedule of the project for restart under ARRA funding. In the future Program staff will continue to represent BASMAA during all phases of the project.

Dioxins

All segments of San Francisco Bay are listed as impaired by certain dioxin compounds in the Clean Water Act Section 303(d) list. A report prepared by the CEP (*Dioxins in San Francisco Bay: Conceptual Model/Impairment Assessment, January 2005*) provides a comprehensive discussion of issues related to dioxins in San Francisco Bay.

The Program has developed and implemented three work plans related to dioxins. In March 2002, the Program submitted an initial work plan. This work plan specified reviewing readily available data on methods used to characterize dioxins in storm water runoff and surface waters and concentrations typically found in the Bay Area and other areas. The completed review revealed that dioxins have been found in urban runoff in the Bay Area and other locations, and in sediments in the Bay and other estuaries. It was concluded that existing data are not sufficient to characterize the distribution in urban runoff among Bay Area land uses or calculate loadings to the Bay. The second work plan was completed in March 2004 and described the Program's collaboration with other Bay area storm water management agencies to develop an introductory report on dioxins. The completed report emphasized issues related to urban runoff in the Bay area, including regulatory context, impacts, sources, pathways, review of relevant Bay Area, national and international studies, and qualitative review of potential storm water controls. The third work plan was completed in March 2004. It specified that Program Staff will track regional, state and federal efforts to address dioxins and encourage Co-permittees to track, understand, and participate in these programs, as appropriate. A memorandum documenting the results of this tracking was completed in FY 04-05.

During FY 05-06, Program staff surveyed the Co-permittees regarding dioxins pollution prevention actions they currently implement and any related formal policies, resolutions or ordinances already adopted. The survey revealed that Co-permittees currently implement a wide range of activities that may help prevent formation of dioxins. In particular, the survey revealed most Co-permittees are taking measures that may help address what are the potentially the largest contemporary sources of dioxins in the Bay Area: residential wood burning, diesel exhaust and use of the pesticide 2,4-D. Program staff also continued to track regional, state and federal efforts to address dioxins.

During FY 06-07, Program staff prepared a fact sheet on dioxins, which may be downloaded from the Program's web site. The fact sheet describes dioxins and how they are produced, the Bay Area regulatory background, potential sources of dioxins to the environment and stormwater runoff, and the Program's accomplishments in addressing dioxins.

Dioxins Control Program - FY 08-09 Activities (SCVURPPP)

During FY 08-09, the Program continued to work with other Bay Area dischargers and Regional Water Board staff through BASMAA and the RMP to coordinate and plan activities related to dioxins and other pollutants of concern. Program staff represented BASMAA's interests through participation in the RMP Dioxin Strategy Work Group. This work group met in September 2008 to begin developing a monitoring strategy that will expand existing RMP monitoring programs to address key information needs for developing a Water Quality Attainment Strategy (e.g., a TMDL) to address the 303(d) listing of dioxins in San Francisco Bay.

Copper and Nickel Control Measures (Provisions C.9.a and b)

Management Activities

2007 Basin Plan Amendment

In June 2007, a Basin Plan Amendment (BPA) was approved by the Water Board adopting north of Dumbarton Bridge (NDB) copper site-specific water quality objectives (SSOs), translators and a Bay-wide Implementation Plan. A simplified Bay-wide Copper Action Plan (CAP) replaced the complex South Bay CAP that was adopted in the 2002 Basin Plan (as part of the South San Francisco Bay copper and nickel SSO project) and included in the South Bay POTW NPDES permits and Program's NPDES permit.

NDB POTW NPDES permits issued since March 2008 have included a one page Copper Action Plan table in the Permit Provisions that reflects the new BPA Bay-wide requirements. The draft MRP and POTW NPDES permits have been revised to delete the outdated CAP/NAP requirements and include the new BPA Bay-wide requirements. These revisions were implemented as part of the draft MRP issuance and reissuance of the POTW NPDES permits (San Jose/Santa Clara and Palo Alto in April 2009 and Sunnyvale in August 2009).

The Bay-wide copper SSO Implementation Plan replaced the CAP/NAP requirements in the Basin Plan. It includes the following:

- Required studies to address technical uncertainties (possible copper sediment toxicity and sublethal effects on salmonids);
- Mandatory effluent limits for all municipal and industrial wastewater dischargers;
- Best management practices for major sources of copper (urban runoff, wastewater treatment facilities, lagoons and marine anti-fouling coatings); and
- An ambient water quality monitoring program (discussed below) designed to detect small changes in dissolved copper concentrations in the Bay that may trigger additional control measures.

The draft MRP contains the following five copper control measures:

- Manage waste generated from cleaning and treating copper architectural features, including copper roofs during construction and post-construction;
- Manage discharges from pools, spas and fountains that contain copper-based chemicals;
- Participate in the Brake Pad Partnership process;
- Educate industrial inspectors on industrial facilities likely to use copper and ensure that proper BMPs are in place to minimize discharges of copper;
- Conduct technical studies to investigate possible copper sediment toxicity and technical studies to investigate sublethal effects of salmonids.

Implementation of CAP/NAP Baseline Activities (SCVURPPP)

The majority of baseline actions are implemented at the Program level (except for those assigned to San Jose, Sunnyvale and Palo Alto), and are included in the Program's Annual Reports and Work Plans. In mid-2003, the Program identified the following copper control activities that were deemed appropriate to implement at the Co-permittee level:

- CB-1: Measures to reduce copper discharges from vehicle washing operations;

- CB-3: Measures to control copper in discharges of stormwater in targeted industrial sources;
- CB-6, 7: Measures to reduce traffic congestion/promote alternative transportation;
- CB-8: Measures to classify and assess watersheds and improve institutional arrangements for watershed protection;
- CB-11: Measures to improve street sweeping controls and stormwater system operation and Maintenance;
- CB-12: Measures to control copper discharges from pools and spas;
- CB-21: Measures to discourage architectural use of copper; and
- NB-1: Measures to control nickel discharges from construction sites (sediment).

During FY 08-09, specific accomplishments included:

- Distributed Watershed Watch campaign brochures to residents who requested them through the Watershed Watch website and telephone hotline (CB-1);
- Distributed (Cities of San Jose and Sunnyvale) fact sheet to applicable facilities with roof vents that may be potential sources of copper. This fact sheet discusses why roof runoff from metal finishing and electroplating processes could contribute copper to stormwater runoff. Best management practices to prevent rooftop pollution are provided (CB-3);
- Prepared (City of Palo Alto) eighth annual Copper Action Plan Report (CB-4.3);
- Continued to actively support the Brake Pad Partnership (BPP) (CB-5), providing resources to fund and advocate BPP through BASMAA, actively tracking activities of BPP and efforts under the Proposition 13 grant;
- Continued to work with and support the Santa Clara Basin Watershed Management Initiative Land Use Subgroup (SCBWMI LUS). Tasks included finalizing a PowerPoint presentation based on information presented within the fact sheet entitled *Top Ten Development Tips to Protect Creeks*; and assisting with developing the advanced track of the Program's annual C.3 Workshop held on June 17, 2009. (CB-6 and CB-7);
- Implemented the seventh year of the Multi-Year Monitoring Plan (including sediment sampling and analyses for all metals including copper and nickel) (CB-8.4);
- Continued to implement Co-permittee street sweeping and catch basin cleaning programs consistent with performance standards (aimed at reducing discharges of pollutants, including copper and nickel, to storm drains and receiving waters). Summarized the amount of material collected and miles swept within the Program's jurisdiction (CB-11);
- Continued distributing the updated brochure entitled *Keep Pool, Spa and Fountain Water Out of Storm Drains, Creeks, and the Bay* (aimed at reducing discharges of pool water, which can contain copper and nickel, to storm drains and receiving waters.) (CB-12);
- Reviewed the copper "uncertainty studies" research tracking web portal. This web portal is available on the Program's website (www.scvurppp.org). A link to the web portal was also placed on the SFEI website (www.sfei.org)(CB-17(1)).

Brake Pad Partnership (SCVURPPP Participation)

The Brake Pad Partnership (BPP) is a multi-stakeholder effort to understand the environmental impacts of automobile brake pad wear debris (which contains copper). Manufacturers, regulators, stormwater management agencies (e.g., SCVURPPP) and environmentalists are working together to understand these impacts. Historic BPP efforts were aimed at developing an approach to evaluate potential impacts of copper (from brake pad debris) affecting water quality in the South San Francisco Bay. Brake pad manufacturers have committed to adding

this evaluation approach (to existing practices) for designing products that are safe for the environment while meeting performance requirements.

By late 2007, the BPP had substantially completed its technical work on local air deposition monitoring; generation and characterization of a representative sample of brake pad wear debris; estimating the amount of copper released to the watershed from brake and non-brake sources; watershed modeling; and San Francisco Bay water quality monitoring. Interim results were presented at a BPP stakeholder meeting on July 31, 2007 in Oakland. Project reports and related BPP documents can be found at <http://www.suscon.org/brakepad/documents.asp>

In February 2008, the BPP transitioned from being only conducted by Bay Area and Sacramento agencies to an effort including municipal agency partners in the Los Angeles, San Diego, Orange County, and Monterey areas. This inclusion was the result of metals, copper, or toxics listings / TMDLs in these areas generating interest in copper sources and solutions. Since this effort has expanded statewide, it was not feasible for BASMAA to act as the convener of the municipal agencies that are partnering with water quality regulators and the manufacturers as the BPP. Since CASQA is a statewide association, it was agreed that they would be the new convener of the expanded list of municipal agencies with interest in the BPP, and will play the role through its Watershed Management and Impaired Waterbodies Subcommittee.

Another transition of the BPP was to change its focus from technical work to legislation which translates technical results and the agreements predicated on those results into a control measure (i.e., regulation) on brake pad composition. In 2008, the CASQA BPP Work Group built a team of agencies and supporters to obtain financial and project management support, including hiring a lobbyist. The BPP drafted legislation that would restrict the use of copper and other toxic materials in "brake friction materials" (term now used to encompass both disc brakes and drum brakes). In 2009, the legislation was sponsored by Senator Kehoe of San Diego (later co-sponsored by Senator Simitian) and assigned bill number SB 346.

SB 346 passed in the Senate and made it to the Assembly in June 2009. While the brake pad manufacturers had been actively engaged in the BPP process since the beginning, and were supportive of it, the automobile manufacturers chose not to participate. Once SB 346 was introduced, automobile manufacturers and certain other interest groups raised considerable concerns about the bill. To provide more time to address those concerns, the bill's sponsor chose not to proceed further with the bill in the Assembly during the 2009 legislative session. It was turned into a two-year bill and will be taken up in the 2010 legislative session.

Monitoring Activities

Lower South Bay Ambient Monitoring (City of San Jose)

In February 1997, the City of San Jose, on behalf of all local agencies in the South Bay, began sampling total and dissolved copper and nickel concentrations at ten stations in the Lower South San Francisco Bay (LSSB). In October 1997, two fresh water stations were added, one each in the lower reaches of Coyote Creek and the Guadalupe River, bringing the total number of stations to twelve (Figure 4-1). The sampling design from the CAP/NAP requires monthly compliance sampling. Ten locations in South San Francisco Bay have been monitored to compare mean dry season dissolved copper and nickel concentrations to respective trigger levels. Results from monthly monitoring at ten stations during FY 08-09 show ambient concentrations continue to be well below the adopted SSOs for copper and nickel. Ambient concentrations have remained consistent (no upward or downward trend) and below the stringent Action Plan trigger values (established as NPDES permit requirements in 2000) for

copper and nickel, respectively. The monitoring results are located on http://www.sanjoseca.gov/esd/pub_res.asp, the City of San Jose's Environmental Services Department website. During FY 09-10, the City of San Jose will continue a reduced level of South San Francisco Bay Cu/Ni monitoring (quarterly at seven stations) even though it is no longer mandated.

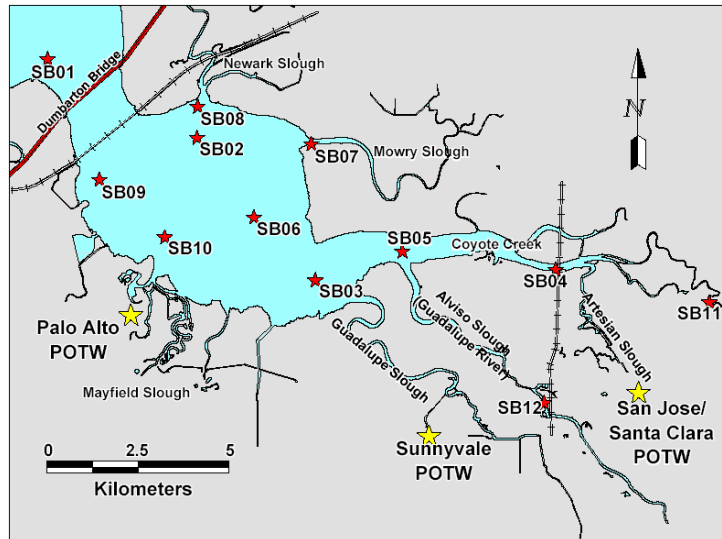


Figure 4-1: Map of monitoring station locations in LSSB (City of San Jose)

Bay-wide Ambient Monitoring Program (RMP)

The North of Dumbarton Copper SSO Basin Plan amendment (June 2007) includes the Bay-wide Ambient Monitoring Program. With the Bay-wide Ambient Monitoring Program, specific copper concentration triggers will be compared to dissolved copper concentration data collected as part of the baseline status and trends effort of the RMP. This comparison will involve calculating every year the three-year rolling mean of RMP copper concentrations in segments of San Francisco Bay. The rolling mean concentrations will be compared to trigger concentration values for each segment. The goal of the comparison is to determine if ambient concentrations have increased to levels of concern.

The trigger concentrations were calculated to detect a change in dissolved copper concentration of about 1 $\mu\text{g/L}$ with a statistical power of 99%. If a trigger concentration is exceeded in any Bay segment, the Water Board will investigate causes of the exceedance and potential control options. Wastewater and urban runoff dischargers will be required to investigate whether the trend in their discharged copper concentration has increased. If so, the discharger will need to identify and submit a plan and schedule to implement controls to resolve their contribution to the exceedance.

The dissolved copper ($\mu\text{g/L}$) trigger concentrations at 99% statistical power for each Bay segment (or portion thereof) are as follows:

- Suisun Bay - 2.8 $\mu\text{g/L}$,
- San Pablo Bay - 3.0 $\mu\text{g/L}$,
- Central San Francisco Bay and Lower San Francisco Bay (north of Hayward Shoals) - 2.2 $\mu\text{g/L}$,
- Lower San Francisco Bay (south of Hayward Shoals) - 3.6 $\mu\text{g/L}$, and

- South San Francisco Bay (SSFB) - 4.2 µg/L.

Once per year during the dry season, the RMP will collect three samples from each of the four northerly bay segments and five samples from South San Francisco Bay. The results will be used to calculate the three-year moving average values for annual comparison to the triggers.

Sediment Control Program (Provision C.9.f)

Provision C.9.f of the Program's NPDES permit contains three sub-provisions related to conducting analyses of excess sediment impairment in urban streams and assessing management practices that are currently being implemented and additional management practices that will be implemented to prevent or reduce excess sediment impairment. The first two sub-provisions (C.9.f.i and ii) are specific to San Francisquito Creek, which is currently listed on the 303(d) of impaired waterbodies. Studies designed to meet the requirements of these sub-provisions have been managed by the Santa Clara Valley Water District and are briefly summarized below.

The third sub-provision (C.9.f.i) is specific to creeks in the Santa Clara Valley (other than San Francisquito Creek) that may be impaired by sediment. Under Management Committee direction, SCVURPPP took the lead on addressing the requirements within this sub-provision. As a first step, a report which identified creeks that are potentially impaired by sediment from anthropogenic activities was submitted to the Water Board as part of the Program's FY 02-03 Work Plan, in fulfillment of Permit Provision C.9.f.iii paragraph 1. In addition, the Program developed a *Work Plan for Conducting a Watershed Analysis and Management Practice Assessment in Other Creeks Potentially Impaired by Sediment from Anthropogenic Activities* (Work Plan) in fulfillment of Permit Provision C.9.f.iii paragraph 2. The Work Plan identifies a two-phased approach to assess watersheds previously identified by the Program as high priority for watershed analysis due to the potential for anthropogenic sediment impairment. Phase I includes conducting a Limiting Factors Analysis (LFA) and sediment management practices assessment. Phase II includes conducting a rapid sediment budget, which will only be conducted when the Phase I study results indicate that excessive sediment from anthropogenic sources is impacting beneficial uses in the watershed. It was agreed that all projects/studies associated with this sub-provision would be coordinated by the Program's Watershed Analysis AHTG.

Stevens Creek, Upper Penitencia Creek and Saratoga Creek were identified as high priority creeks that may be impaired by sediment from anthropogenic activities. Previous Annual Reports have summarized studies conducted in Stevens and Upper Penitencia Creek watersheds. Additional information is presented below Saratoga Creek. Following the completion of studies described in this Annual Report, the Program will have fulfilled all requirements in C.9.f.iii.

San Francisquito Creek

Sediment TMDL and Habitat Enhancement Plan

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 were completed in the San Francisquito Creek Watershed: 1) Analysis and Sediment Reduction Plan (Plan), administered by the San Francisquito Creek Joint Powers Authority (JPA); and 2) the Aquatic Habitat Assessment and Limiting Factors Analysis (AHALFA), managed by the Santa Clara Valley Water District (SCVWD). The Plan fulfills Permit Provisions C.9.f.i and C.9.f.ii of the Program's NPDES permit.

In June 2007, the Water Board released a Preliminary Project Report and requested comments from major stakeholders. The Project Reports states that a TMDL will be developed for the San Francisquito Creek in the near future (time uncertain). As the TMDL process continues to unfold, the Program will continue to follow and participate in the sediment-related activities within the San Francisquito watershed.

Saratoga Creek

Waterbody Assessment and Sediment Impact Analysis (SCVURPPP)

Following Upper Penitencia Creek, Saratoga Creek (upstream of the San Jose Water Company diversion) was the next highest priority creek scheduled for investigation of potential sediment impairment due to anthropogenic activities. In July 2007, the Program released the *Waterbody Assessment and Sediment Impact Analysis – Saratoga Creek* for review by Co-permittees and interested stakeholders. Significant comments were received in August/September 2007 and in turn, revisions were made by Program staff. The final document is currently available on the Program's website.

Sediment Management Practices Assessment (SCVURPPP)

Following the completion of the *Waterbody Assessment and Sediment Impact Analysis – Saratoga Creek*, the Program conducted a Sediment Management Practices Assessment for the Saratoga Creek watershed, as described in the Work Plan. The objective of the sediment management practices assessment were to: 1) Document current sediment management practices in the watershed; 2) Assess the effectiveness of these practices in preventing excess sediment reaching Saratoga Creek and its tributaries; and, 3) Recommend improvements to existing practices and/or recommend new practices that are within or outside of the Program's jurisdictional boundaries. The Draft Saratoga Creek Sediment Management Practices Assessment was released for comments in September 2008. Revisions were recently made based on the comments received and the assessment report is posted on the Program's website.

Trash Characterization and Management Activities

On November 14, 2001, the Water 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 ...", Water Board staff will review information concerning trash in the next listing cycle to determine whether specific water bodies warrant 303(d) listing. In a proactive response to the 303(d) Staff Report, the Program's Management Committee formed a Trash AHTG (first meeting on February 21, 2002). The Trash AHTG developed a Work Plan (submitted March 1, 2003) to identify a strategy for addressing trash problem areas that occur in or near urban streams and waterways of the Santa Clara Basin.

In Fiscal Years 03-04, 04-05 and 05-06, the Program assisted Co-permittees in completing the following Work Plan tasks: 1) document existing trash management practices implemented by municipalities and agencies within the Program's jurisdiction; 2) identify and map high priority trash problem areas and sources of trash in Santa Clara Basin watersheds; 3) develop a strategy to conduct trash evaluations in or near creeks; 4) sponsor a training workshop on how to use existing trash assessment tools (i.e., Water Board Rapid Trash Assessment Protocol and Keep America Beautiful (KAB) Litter Index); and 5) develop standardized reporting format for documenting and evaluating trash management and monitoring activities. Summaries of Program efforts to complete these tasks have been provided in previous Annual Reports.

Building on the existing Trash Work Plan, SCVURPPP developed a *Trash Management and Effectiveness Assessment Strategy* (Trash Strategy) in October 2006 that identifies three areas of focus:

1. Trash Problem Area and Source Identification;
2. Pilot Testing and Implementing Trash Control Measures; and,
3. Water Body and BMP Effectiveness Assessments.

The following paragraphs provide summaries of trash-related tasks conducted by SCVURPPP during FY 08-09. Previous years and FY 09-10 tasks are also provided. Tasks are organized by the three focus areas listed above.

Trash Problem Area and Source Identification

This task is intended to assist Co-permittees in identifying trash problem areas and sources that will allow the effective implementation of trash control measures. This task encompasses Program activities conducted in previous fiscal years and in FY 08-09. FY 09-10 Program tasks are also provided.

Program tasks completed in previous years include:

- Identification and Documentation of Known Trash Problem Areas Memorandum (i.e., Trash Problem Area Survey) (SCVURPPP) – Completed November 2003. The memorandum requested that Co-permittees document and compile relevant information regarding known trash problems within their jurisdiction.
- Trash Problem Area Survey Results Memorandum (SCVURPPP) – Completed May 2004. The memorandum provided survey results for 195 potential trash problem areas within the Program’s jurisdiction.

Program tasks conducted/completed in FY 08-09 include:

- Planned Trash Hot Spot Selection Process (SCVURPPP) - During FY 08-09, Program staff, in anticipation of proposed MRP requirements for trash reduction developed the preliminary framework for identifying a minimum number of “in-creek” trash hot spots that will be the focus of required future trash cleanups and assessments. As part of this identification process, Co-permittee staff and interested stakeholders will need to develop the “initial list” of trash hot spots. Once the initial list is developed, Co-permittee and Program staff will review the initial list to determine what hot spots should be selected and proposed for cleanup and assessment. Final hot spot selection will be in accordance with specific selection criteria developed by the Trash AHTG and approved by the Management Committee. The Program intends to start the trash hot spot selection process using the framework once MRP trash reduction requirements are more defined, most likely in FY 09-10 (see below).

Planned FY 09-10 Program Tasks include:

- Identifying Trash Hot Spots and Dominate Pathways (SCVURPPP) - In coordination with Co-permittee staff, Program staff intend to select trash hot spots and identify dominate pathways of trash to these sites, which will help direct effective management activities. This task will include the analysis of existing data and may involve some additional field work to identify and verify appropriate hotspots and pathways.
- Conducting On-going Trash Assessments (SCVURPPP) - Based on discussions with Water Board staff, it is likely that at least one trash assessment per year will be required

at each trash hot spot, although the methodology is not yet defined. As a result, the Program intends to conduct trash assessments at selected hotspots, develop quality assurance plans, manage trash data and develop an initial technical report on the condition and trends of trash at selected hot spots.

Pilot Testing and Implementing Trash Control Measures

The second of the four main areas of focus included in the Trash Strategy is the selection and implementation of appropriate control measures at high priority problem areas. This includes developing a better understanding of potential trash control measures, and beginning the process of implementing structural treatment controls as part of a trash pilot demonstration project. This task encompasses Program activities conducted in previous fiscal years and in FY 08-09. Proposed FY 09-10 Program tasks are also provided.

Program tasks completed in previous years include:

- Developing Trash BMP Tool Box (SCVURPPP) – Completed September 2007. The Trash BMP Tool Box includes twelve technical information sheets which describe available structural treatment control devices and institutional controls which may be implemented to control and capture trash within the storm drain conveyance system and urban landscape.
- Developing Pilot Trash Structural Treatment Control Study Implementation Plan (SCVURPPP) – Completed March 2008. The Implementation Plan provides guidance on implementing a trash demonstration pilot study within the Program's jurisdiction.

Program tasks conducted/completed in FY 08-09 include:

- Feasibility of Trash Removal at Pump Stations (SCVURPPP)- In response to the Water Board proposing 26 water bodies be listed for trash on the 303 (d) list of impairment in early 2009; specific language in the draft revised MRP requiring all permittees to inspect and remove all trash discharged from their stormwater pump stations; and the continued accumulation of trash in urban creeks and watersheds, the Program conducted an evaluation of existing trash management practices and the possibility of implementing additional trash controls at pump stations within the Program's jurisdiction. As part of the evaluation, the following was conducted: investigated existing pump station configurations and operations; recommended potential types of retrofits for trash management; discussed the feasibility of potential retrofits; and provided associated benefits, technical challenges (e.g., head losses and maintenance) and estimated costs of potential retrofits. The results of the investigation are presented within a technical report entitled *Feasibility of Trash Removal at Pump Stations* (See Appendix C-5). The technical report provides specific conclusions and recommendations on implementing these enhanced practices. Some benefits include lengthening the lifespan of pumps; simplifying trash removal from stormwater conveyance systems; and reducing water quality impacts. However, all enhanced management practices must be tailored to individual pump stations depending on factors related to pump station performance. The technical report is also available on the Program's website.

Pilot Demonstration of Trash Treatment Controls (Cities of San Jose and Sunnyvale) - During FY 07-08, the Cities of San Jose and Sunnyvale began implementing the trash demonstration pilot study (Pilot Study) in accordance with Pilot Trash Structural Treatment Control Study Implementation Plan. In 2007, the City of San Jose installed approximately 46 StormTek™ catch basin inserts. On March 28, 2008, City of San Jose

staff inspected and performed necessary maintenance (i.e., clean-out of debris) of installed catch basin inserts. Preliminary results indicate that StormTek™ catch basin inserts are effective at preventing material from entering the stormwater conveyance system, without significantly affecting catch basin function or capacity; and that the majority of material captured is leafy debris. In summer 2008, an additional 40 StormTek™ catch basin inserts were installed within the City of San Jose. On September 16, 2008, the City of San Jose manually removed debris from eleven randomly selected retrofitted inlets. All debris was taken to a processing area where litter was sorted from the leafy debris (e.g., deciduous leaves, conifer needles, and twigs), weighed (wet weight) and the volume estimated. A total of 115.75 lbs of leafy debris and 13.5 lbs of trash were removed from the retrofitted inlets. The total estimated volume of debris removed was 48.075 gallons; and the estimated volume of trash was 10.375 gallons. As part of normal storm drain inlet maintenance activities, the City of San Jose cleaned all catch in October 2008. In February 2009, twelve catch basins were inspected and cleaned. The total volume of debris captured was also estimated.

The City of Sunnyvale also installed eleven StormTek™ catch basin inserts in January 2008. Two additional catch basin inserts were installed in 2008. On February 8, 2008, City of Sunnyvale staff inspected the eleven installed catch basin inserts to determine their performance. The inspection revealed all units to be functioning well. Some were beginning to fill with debris (mostly leaf litter), but were not filled to the point where bypass would occur. The retrofitted inlets were cleaned on May 19, 2008. All debris was removed with a clamshell shovel, bagged, labeled, and taken to a processing area where litter was sorted from the leaf debris, weighed (wet weight), and approximate volumes for both leaf debris and litter were measured. A total of 830 lbs of leafy debris and 32 lbs of trash were removed. This was approximately 1.2 cubic yards of leafy debris and 0.2 cubic yards of litter. The leafy debris (deciduous leaves, conifer needles, and twigs) appeared to be from the local street trees and was not from material being dumped or discarded by residents or businesses. The City of Sunnyvale requires the use of green-waste carts by residents for yard debris pick-up.

From August to October 2008, the City of Sunnyvale inspected the retrofitted inlets as part of normal storm drain inlet maintenance activities. During this period, no debris had accumulated in quantities which required maintenance. Routine wet-season monthly inspections started during November 2008. Five catch basins were cleaned in December 2008 due to being filled with 50 % or more of inlet capacity; and two catch basins were cleaned in February 2009. The two catch basins cleaned in February 2009 were also cleaned in December 2008. Both catch basins were shallow, near large street trees and next to a commercial complex/grocery store. Minor street ponding was also observed at both catch basins in February 2009.

Similar to FY 07-08, the City of Sunnyvale decided to clean and characterize trash in each catch basin after the wet season. On May 18, 2009, twelve catch basins were cleaned. One catch basin was cleaned on June 5, 2009. The total amount of debris collected from each catch basin ranged from 4 lbs to 34 lbs, with an average of 133.5 lbs (wet weight). A total of 1563 lbs of leafy debris and 38 lbs of trash were removed. This was approximately 46.7 cubic feet of leafy debris and 5.75 cubic feet of litter. In May 2009, Program staff began compiling trash data from the City of San Jose and Sunnyvale to calculate preliminary trash loading rates for each catch basin. The percentage of major land use types were calculated for each catch basin drainage area to develop preliminary trash loading rates relative to land use type. To increase the level

of certainty of trash loading rates, Program staff assisted the City of San Jose (at their request) in the selection of additional catch basins for trash monitoring during summer 2009.

- Creek Clean-ups** - To better coordinate creek cleanup efforts within Santa Clara County, the Creek Connections Action Group (CCAG) was formed in the fall of 1995 by several coordinators from local public agencies and non-profit organizations. These agencies include the Santa Clara Valley Water District, Santa Clara County Parks and Recreation, and the City of San José. Since the group's inception, thousands of volunteers have participated in hundreds of cleanups, removing thousands of pounds of trash each year from creeks, rivers, and lakes in Santa Clara County. In FY 08-09, the CCAG sponsored two creek clean-up events: Coastal Clean-up Day on September 20, 2008 and National Rivers Clean-up Day on May 16, 2009. The Program provided financial support for one of the events (National Rivers Clean-up Day). A total of 2,298 volunteers participated in cleaning 56 sites and removed approximately 162,551 pounds of materials (trash and recyclables) from the creeks during the two events. The total and average (per site) amount of trash and recyclables collected during the two annual creek cleanup events since FY 98-99 are plotted in the figures below:

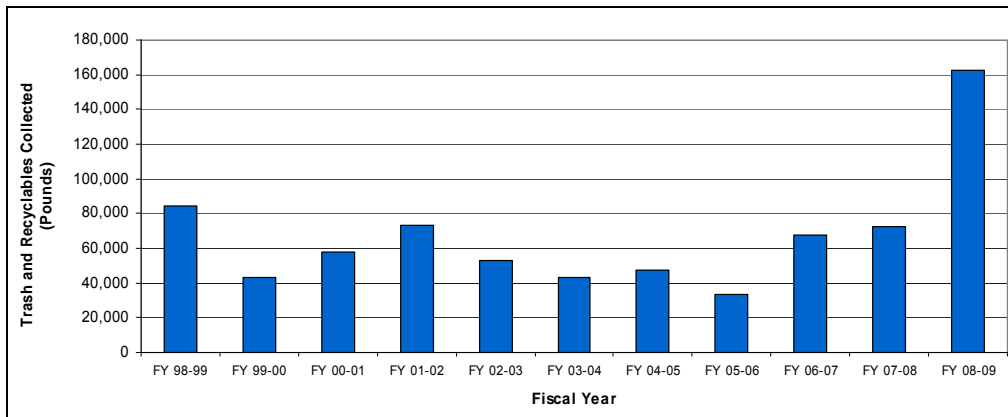


Figure 4-2. Amount of trash and recyclables (by weight) collected during annual creek cleanup events in Santa Clara County between FY 98-99 and FY 08-09.

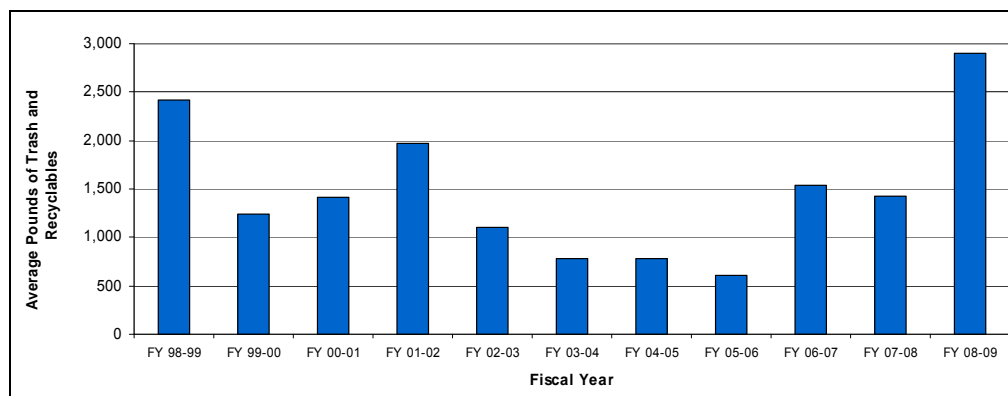


Figure 4-3. Average amount of trash and recyclables (by weight) collected per site during annual creek cleanup events in Santa Clara County between FY 98-99 and FY 08-09.

From the data presented in the Figures 4-2 and 4-3, it can be concluded that the total amount of trash and recyclables collected shows a decreasing trend from FY 98-99 to

FY 05-06. However, the amount of trash and recyclables collected has increased in the last three years. This increase is related to targeting and addressing high priority trash problem areas where significant amounts of trash are accumulating. In the past, some sites were chosen due to their familiarity and close proximity to certain local organizations participating in the creek cleanup. In some instances, these sites did not have significant levels of trash but were targeted due to familiarity and convenience. In addition, the number of sites (i.e., 51 sites in FY 07-08 to 56 sites in FY 08-09) and the number of volunteers (i.e., 1,534 volunteers in FY 07-08 to 2,298 volunteers in FY 08-09) increased in FY 08-09.

Volunteers are becoming more aware of current trash issues within local creeks and San Francisco Bay. As a result, the level of effort of removing all observed trash and recyclables has increased resulting in more thorough trash cleanups. Co-permittees intend to continue participating in future creek cleanups, as they provide a valuable opportunity for citizen participation as well as an important element of a trash management program.

Planned FY 09-10 Program Tasks include:

- Pilot Demonstration Project of Trash Treatment Controls Final Report (SCVURPPP) – A final report detailing the results of the pilot demonstration project of trash treatment controls will be developed in FY 09-10. The final report will include an analysis of the data collected in March 2008, May 2008 and during the wet season of 2008-2009. Information on trash loading rates from specific land uses to the stormwater conveyance system; detailed information on the types of debris removed; maintenance frequency required for proper operations; and operation and maintenance cost estimates will be included.
- Identifying and Prioritizing Trash Full Capture Treatment Areas (SCVURPPP) – It is assumed that a majority of Co-permittees will be required to implement trash full capture devices during the term of the MRP. As a first step to identifying the most optimal and feasible locations to implement trash full capture devices, Program staff will assist and guide applicable Co-permittees by analyzing existing information and prioritizing land areas based on information such as estimated trash loading rates, site specific features and feasibility. Program staff will coordinate this task with direct input from Co-permittees through the Trash AHTG.

Developing a Pilot Watershed Management and Assessment Plan for Trash (SCVURPPP) – The concept of using a “watershed approach” to manage and assess trash impacts on creeks was consistently supported throughout discussions with Co-permittees on the proposed MRP trash requirements. As a follow-up to trash source and pathway analyses conducted in FY 08-09 and proposed for FY 09-10, the Program intends to develop Pilot Watershed Management and Assessment Plans (and guidance) for trash in two watersheds (i.e., one within San Jose, such as Coyote Creek, and Stevens Creek). To the extent possible, these watershed-based trash plans will identify trash hot spots, sources and pathways of trash to the creek, recommended management activities to reduce trash, and key stakeholders and participants, as well as develop a robust trash assessment strategy aimed at tracking and evaluating effectiveness over time. These pilot watershed plans will serve as models and guidance for all Co-permittees to use in other watersheds in the Santa Clara Basin. (The Program will seek input from the county-wide trash work group and incorporate such input, where appropriate, to help guide future county-wide efforts).

Water Body Assessments and BMP Effectiveness Evaluations

Assessing the condition of urban creeks (as related to trash) and evaluating the effectiveness of control measure implementation over time is the third focus area identified in the trash strategy. Program tasks completed in previous years include:

- Estimating Costs of Trash Full Capture Devices in the San Francisco Bay Area Memorandum (SCVURPPP) – Completed February 2008. This memorandum, which was developed in collaboration with BASMAA, provides preliminary cost estimates for implementing full capture devices (i.e., catch basin inserts and small and large hydrodynamic separators) in the San Francisco Bay area.

Co-permittee tasks conducted/completed in FY 08-09 include:

- Creek and Watershed Trash Assessments (SCVURPPP Co-permittees) - During FY 04-05, Co-permittee staff and volunteers from watershed stakeholder groups conducted a total of 189 trash evaluations (146 using the KAB Litter Index and 43 using the Water Board Rapid Trash Assessment Protocol). A summary of the trash evaluation results was provided in the Program's *FY 04-05 Annual Report*.

In FY 05-06, the Program revised the Water Board's RTA Protocol (Version 7.0) to improve the effectiveness of the evaluation tool to better assess trash problem areas in urban streams. The revised Urban Rapid Trash Assessment (Urban RTA) Protocol (Version 1.0) was implemented by Co-permittees for trash evaluations of creek sites. In FY 05-06, a total of 149 unique sites were assessed (128 KAB and 19 Urban RTA). In addition, the Program revised the format for reporting trash evaluation results to improve consistency of Co-permittee responses and to enhance the analysis of trash assessment data on a Program-wide basis.

In FY 06-07, Co-permittees conducted a total of 228 trash evaluations, including 168 using the KAB Litter Index (i.e., non-creek sites) and 60 using the Urban RTA Protocol (Version 1.0) (i.e., creek sites). A total of 164 unique sites were assessed. The KAB Litter Index was used at 114 sites and the Urban RTA Protocol at 39 sites. A combination of the KAB and Urban RTA Protocol was used at two sites.

In FY 08-09, Co-permittees conducted a total of 139 trash evaluations, including 100 using the KAB Litter Index (i.e., non-creek sites) and 39 using the Urban RTA Protocol (Version 1.0) (i.e., creek sites). *Table 1: Summary Results of FY 08-09 Trash Evaluations* (see Appendix C-6) provides scores (for both KAB and RTA trash evaluations) by watershed. A total of 79 unique sites were assessed. The KAB Litter Index was used at 71 sites and the Urban RTA Protocol at 9 sites. A combination of the KAB and Urban RTA Protocol was used at one site.

Evaluation scores are provided within the following tables in Appendix C-6:

- *Trash Problem Area Evaluations Results by Watershed*
- *Trash Problem Area Evaluations Results by Co-permittee and Watershed*
- *Trash Problem Area Evaluations Results by Assessment Tool*

The following paragraphs provide brief summaries of the results from assessments conducted in FY 08-09:

KAB Litter Index – Non-Creek Sites

In summary, KAB assessments results indicate that:

- 76% of the sites were scored as “no litter” or “slightly littered”, 20% of the sites were scored as “littered”, and four sites were scored as “extremely littered”;
- San Tomas Aquino Creek and Guadalupe River watersheds had the greatest number of sites, eighteen and twelve respectively, that were scored as “no litter” or “slightly littered”;
- San Tomas Aquino Creek and Calabazas Creek watersheds had the greatest number of sites, seven and five, respectively, that were scored as “littered”;
- Trash problem areas in non-creek locations occurred adjacent to residential homes (22%), commercial areas (21%), roadways (21%) and parks/trails (14%);
- 70% of the suspected trash sources reported by Co-permittees during KAB evaluations (n=148) included litter from both vehicular traffic (36%) and pedestrians (34%);
- Approximately 30% of the remaining trash sources reported were from a combination of litter at commercial areas, illegal dumping, restaurants, schools, trash receptacles/dumpsters, upstream/stormdrain catchment, recreational areas and other sources.

During FY 08-09, a greater number of trash evaluations were conducted in non-creek areas (n=100) compared to FY 07-08 (n=90). Trash scores were very similar for both years with eighty-three (FY 07-08) and seventy-six percent (FY 08-09) of all sites scored as “no litter” or “slightly littered”. Similar to past years, there was no consistent pattern in changes of trash condition over time at non-creek sites. In addition, KAB assessment results did not indicate any spatial relationships between littered non-creek sites and creek sites with poor/marginal trash condition. The KAB assessment results were not conclusive for identifying and prioritizing trash problem areas that are sources of litter in the creeks.

SCVURPPP Urban Rapid Trash Assessment (RTA) – Creek Sites

In summary, RTA assessments results indicate the following:

- 87% of the sites were scored as “optimal” (n=27) or “suboptimal” (n=7);
- 13% of the sites were scored as “marginal” (n=5);
- No sites were scored as “poor”;
- The majority of trash problem areas in creek areas occurred adjacent to residential homes (46%), roadways (28%) and park/trail land uses (8%);
- Over 89% of the suspected trash sources reported by Co-permittees (n=98) during Urban RTA evaluations included litter from homeless encampments (35%); illegal dumping (33%) and litter from pedestrians (21%); and,
- Approximately 11% of the remaining trash sources reported were from upstream/stormdrain catchments.

During FY 08-09, a smaller number of trash evaluations were conducted in creeks (n=39) compared to FY 07-08 (n=60). Overall trash scores for creek sites evaluated in FY 08-09 were slightly lower than creek sites evaluated in FY 07-08. Eighty-seven percent of the creek sites evaluated in FY 08-09 were scored “optimal” or suboptimal”, while ninety-four percent of the creek sites evaluated in FY 07-08 were scored “optimal” or suboptimal”.

Planned FY 09-10 Program Tasks include:

- Watershed Management and Assessment Plan for Trash (SCVURPPP) – See above. This task will also include developing estimates of trash loading rates from MS4s by: 1) evaluating data collected at catch basin inserts (i.e., pilot implementation project) and 2) conducting trash evaluations over time at selected hot spots.

Other Trash-Related Activities

- Proposed Revisions to the 303(d) List of Impaired Water Bodies in the San Francisco Bay Region - On December 4, 2008, Program staff submitted a letter to the Water Board entitled *Proposed Revisions to the 303(d) List of Impaired Water Bodies in the San Francisco Bay Region* (with attachments). This letter included the Program's comments regarding the proposed 2008 revisions to the 303(d) list. The letter was organized into the following four categories: 1) General comments for all pollutant listings; 2) General comments on the proposed trash listings (including brief summary on the development and implementation of trash assessments by SCVURPPP Co-permittees); 3) Watershed specific comments on proposed trash listings; and 4) Comments on proposed listings for other pollutants. More specifically, issues were raised by the Program regarding the use of the rapid trash assessment methodology to list creek as impaired by trash; the temporal variability in trash data at particular sites; and the spatial extent of the proposed listings based on available data. Although many concerns were raised by SCVURPPP and Bay area municipalities, the Water Board adopted the proposed listing in February 2009. Action on the proposed listings adopted by all Water Boards is expected to be heard by the State Water Resources Control Board (State Board) in late 2009. The Program is currently discussing the need to raise similar issues discussed above at the State Board hearing.

Control Actions to Reduce Multiple Pollutants and Impacts

Summary of Co-Permittee Street Sweeping Results

A summary of street sweeping activities conducted by Co-permittees is provided within the table entitled *Summary of Co-permittee Street Sweeping Activities- FY 2008-2009* (see Appendix C-7). During FY 08-09, Co-permittees swept approximately 192,491 miles of paved streets and removed approximately 81,652 yd³ or 53,033 tons of material³. Approximately 31,005 yd³ of leaf litter was removed by Co-permittees who have leaf removal programs other than routine street sweeping. In addition, approximately 176,017 tons of yard waste (which includes large amounts of leaves) was routinely collected by Co-permittees.

One way to measure street sweeping effectiveness is to determine what solids and associated pollutants are collected within street sweeping debris. A typical unit of measure is the total volume of the pollutant removed by the sweeper relative to the curb length swept (e.g., yd³/curb mile). This unit is typically referred as the removal rate. In the case of this effectiveness evaluation, the Program uses average removal rate to show the effectiveness of Co-permittee street sweeping activities within the Program's jurisdiction. The average Co-permittee removal rate during FY 08-09 was 0.42 yd³/curb mile (see Appendix C-7) with a range from 0.11 yd³/curb

³ To determine the total volume of material removed in tons, it is necessary to convert cubic yards to tons. It is estimated that the average density of street sweeping material is 1,299 pounds per cubic yard (0.6495 tons per cubic yard) (Source: EOA, Inc., October 1996, Estimation of Copper Collected Through Street Sweeping Efforts. Prepared for San Mateo Countywide Stormwater Pollution Prevention Program). A value of 53,033 tons is calculated when 81,652 cubic yards is converted over to tons (81,652 cubic yards* .6495 tons/cubic yard= 53,033 tons).

mile (City of Los Altos Hills) to 0.72 yd³/curb mile (City of Palo Alto). In comparison, the average Co-permittee removal rate during FY 07-08 was 0.46 yd³/curb mile. The removal rate is influenced by a number of factors including accumulation rates of pollutants, the relationship between rainfall and sweeping frequencies, particle size, pavement condition and automobile parking controls⁴. As a result, effectiveness (i.e., removal rate) may vary each year depending on a change to any one of these factors. Many studies have shown that street sweeping removes significant quantities of dirt and debris from street surfaces⁵. However, results also demonstrate that the coefficient of variation of copper values and other metals (e.g., lead and zinc) in street sweeping debris is quite high⁶.

To illustrate the effectiveness of street sweeping activities for pollutant removal, Program staff estimated the mean pollutant reduction for the following four metals: copper, nickel, lead and zinc. These estimates are provided within the tables entitled *Summary of Co-permittee Street Sweeping Activities and estimated Mean Pollutant Load Reduction for Copper and Nickel- FY 2008- 2009* and *Summary of Co-permittee Street Sweeping Activities and estimated Mean Pollutant Load Reduction for Lead and Zinc- FY 2008- 2009*. Both tables are provided within Appendix C-7.

To determine the estimated pollutant load reduction (in pounds), the volume of material collected (in cubic yards) for each Co-permittee land use type (i.e., residential, commercial and industrial) was determined. This value was then multiplied by the mean concentration of trace metal content for street sweeping samples collected in the study entitled *Chemical and Physical Characteristics of Street Sweeping Sediments in Tampa, Florida, May 1999* and converted to pounds of pollutant removed (mean concentration values and the algorithm used to calculate the pounds of pollutant removed are provided in Appendix C-7). The estimated mean pollutant load reduction values for each land use type were then summed. Estimated pollutant load reductions for copper, nickel, lead and zinc via street sweeping in FY 08-09 are presented in Table 4-1.

In addition, the estimated pollutant load reduction is dependant on the volume of material collected. Therefore, more material collected results in increased pollutant load reductions. Using the information currently available on pollutant concentrations in street sweeping debris, the estimated pollutant load reduction is highly dependant on the volume of material collected (i.e., the more material collected, the greater the pollutant removal).

It is important to note that there is uncertainty with these estimates since certain assumptions were made regarding the exact volume of material collected from a particular land use type.

⁴ Woodward Clyde Consultants, December 1994. *Street Sweeping Literature Review/Storm Inlet Modification*, Prepared for Alameda County Urban Runoff Clean Water Program.

⁵ Sartor, J. and G. Boyd, 1972. *Water Pollution Aspects of Street Surface Contaminants*. Prepared for United States Environmental Protection Agency, Washington, DC.

⁶ EOA, Inc, October 1996. *Estimation of Copper Collected Through Street Sweeping Efforts: Final Report*. Prepared for San Mateo Countywide Stormwater Pollution Prevention Program.

Table 4-1. Estimated average pollutant load reduction from street sweeping conducted by SCVURPPP Co-permittees in FY 08-09.

Land Use Type	Estimated Mean Pollutant Load Reduction (Pounds)			
	Copper	Nickel	Lead	Zinc
Residential	1093	2160	2036	2741
Commercial	471	933	2250	1594
Industrial	501	97	470	387
Total	2065	3190	4756	4722

It is estimated that street sweeping activities from FY 04-05 through FY 08-09 resulted in the following pollutant removals for copper, nickel, lead and zinc (see Figure 4-4). During FY 08-09, a decrease in pollutant removals was observed when compared to FY 07-08 totals. As mentioned above, this decrease is due to a decrease in the total volume of material collected (90,004 yd³ in FY 07-08 and 81,652 yd³ in FY 08-09).

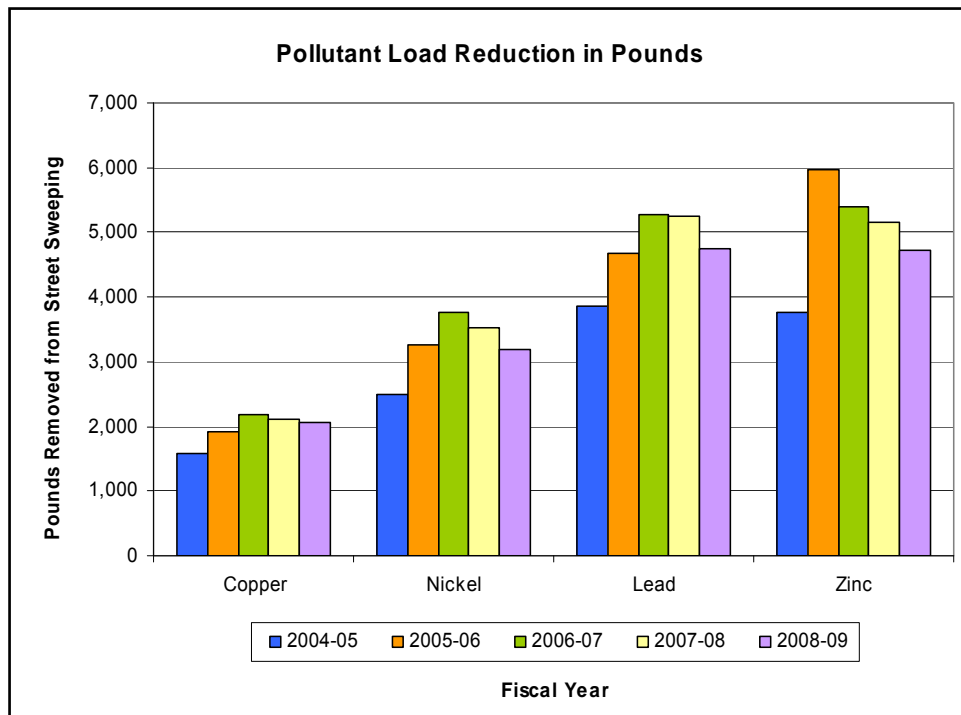


Figure 4-4. Estimated pollutant load reductions from Co-permittee street sweeping activities (in pounds) from FY 04-05 through FY 08-09.

**Table 4-1
Status of FY 2008-2009 Monitoring Activities¹**

Title/Subtitle	Category/ Monitoring Priority (MP) ² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s) ³	Status Schedule
Santa Clara Basin Creeks/Rivers Monitoring						
FY 08-09 Receiving Waters Monitoring and Assessment	Permit Provision C.7(c)	Permit	Conduct water/sediment quality monitoring, toxicity evaluations, and biological and physical habitat assessment activities in Santa Clara Basin watersheds to meet Program and Permit monitoring objectives.	Conducted by SCVURPPP	<i>Watershed Monitoring and Assessment Summary Report: Guadalupe River Watershed^{4a,b}</i>	Completed-9/15/09
	MP #2	RWQCB Review of Program's Monitoring Program	Develop and implement a quality assurance and control plan for the Program's Multi-Year Receiving Waters Monitoring Program.	Developed by SCVURPPP	<i>Sediment Quality and Toxicity in Stevens Creek, Santa Clara County, California^{4a,b}</i> <i>Draft Quality Assurance Project Plan</i>	Completed-9/15/09 Pending completion (on hold until adoption of MRP)

¹ Projects reviewed and approved by Budget Ad Hoc Table Group for inclusion in Work Plan.

² Monitoring Priorities (updated at Monitoring AHTG meeting November 8, 1999):

- 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

³ Refer to Appendix C-1 for additional details

⁴ a) Provided within *FY 08-09 Annual Report*

b) Provided on Program's website (www.scvurppp.org)

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP)²/ Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s)³	Status Schedule
FY 09-10 Annual Monitoring Program Work Plan	Permit Provision C.7(c)	Permit	Develop an annual monitoring plan that identifies Program monitoring activities in Santa Clara Basin watersheds that will be implemented in FY 09-10.	Developed by SCVURPPP	<i>FY 09-10 Annual Water Quality Monitoring Program Plan^{4b}</i>	Completed-3/1/09
BASMAA Monitoring Committee	MP #4	BASMAA	Coordinate monitoring activities conducted by the Bay area urban runoff management programs.	Active participation in Committee by Program staff	SCVURPPP Summaries	Completed as needed
Regional Monitoring Coalition (RMC)	MP #4	BASMAA	Foster collaboration of monitoring activities similar to the BASMAA Monitoring Committee. Collaboration will occur through the collection, analysis and management of regionally consistent and comparable data required by the MRP.	Active participation in Committee by Program staff	Conceptual scopes/presentations on RMC future organization and processes	To be completed during FY 09-10
Regional Stormwater Monitoring and Urban BMP Evaluation (SFEI Proposition 13 Grant)	MP#1	Hg/PCBs TMDLs	Through the completion of a variety of tasks, provide direction to BASMAA and the Water Board on how to apply limited resources to meeting TMDL goals.	Financial contribution and active participation by Program staff Active participation and in-kind support from Program staff	Draft Project Report In 2009, all activities were suspended due to the State's financial crisis.	Completed December 2008 On hold

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP) ² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s) ³	Status Schedule
Palo Alto Creek Monitoring	MP#1, 3	City of Palo Alto	<i>San Francisquito Creek Long Term Monitoring and Assessment Plan (LTMAP)</i> - Collect and analyze water samples for metals, nutrients, pesticides, and suspended solids.	Active participation by Co-permittees and tracking by SCVURPPP Program staff	See http://www.sanfrancisquito.org/projects/monitoring/index.htm .	On-going
			<i>Matadero Creek Metals/Cyanide Monitoring</i> – Collect and analyze water samples for metals and cyanide in accordance with NPDES permit for wastewater discharge.	Active participation by City of Palo Alto	Monitoring results	On-going
San Francisco Bay Estuary Monitoring						
<i>Regional Monitoring Program for Water Quality(RMP)⁵</i>						
RMP Status and Trends Monitoring Program	MP #4, Permit Provision C.7(b)	Permit	Provide water quality information needed to manage the Estuary effectively, by monitoring water sediment, bivalves, benthos and toxicity.	Financial contribution and active participation in Committees by Program staff	Annual Monitoring Results; 2008 <i>Pulse of the Estuary</i> http://www.sfei.org/rmp/pulse/ ; various other technical reports (see summaries of specific studies in Appendix C-4)	Completed Annually

⁵ Additional descriptions detailing the status of RMP-related projects conducted during FY 08-09 are provided within Appendix C-4 (text and Table 1).

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP)² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s)³	Status Schedule
RMP Pilot and Special Studies	MP#4	RMP	Investigate and develop new monitoring measures related to anthropogenic contamination or contamination effects on biota in the San Francisco Bay Estuary.	Financial contribution and active participation by Program staff	Monitoring results; various technical reports (see summaries of specific studies in Appendix C-4) http://www.sfei.org/rmp	Ongoing
Pollutant of Concern Control Programs						
<i>PCBs/Dioxins-Compounds Control Program</i>						
Taking Action For Clean Water (Proposition 50)	Permit Provision C.9(e)	BASMAA	Assessing the concentrations of PCBs used in historic building materials to potentially help reduce PCB stormwater loads to San Francisco Bay.	Active participation and in-kind support by Program staff	SCVURPPP Summaries	On-going
Dioxins Control Program	Permit Provision C.9(e)	Permit	Work with other Bay area dischargers and Water Board staff through BASMAA and RMP to coordinate and plan activities related to dioxins and other pollutants of concern.	Conducted by SCVURPPP	SCVURPPP Summaries	On-going
<i>Copper/Nickel Control Measures</i>						
Copper and Nickel Action Plans (SCVURPPP)	Permit Provision C.9.a & b	Permit	Review of the Copper Action Plan and Nickel Action Plan	Conducted by SCVURPPP	Summary in Annual Report (See Section 4 and Co-permittee Sections)	Annual Reports

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP) ² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s) ³	Status Schedule
Brake Pad Partnership – Support Brake Pad Legislation	MP#2	BASMAA	Provide funding and technical participation to the Brake Pad Partnership (BPP). Provide input on developing brake pad legislation.	Financial contribution and active participation by Program staff	SCVURPPP Summaries See http://www.suscon.org/brakepad/index.asp	On-going
Lower South Bay Ambient Monitoring	MP#1, 3	City of San Jose	Collect and analyze water samples for total and dissolved copper and nickel concentrations at ten stations in the Lower South San Francisco Bay. Samples are collected and analyzed monthly.	Active participation by Co-permittees and tracking by SCVURPPP Program staff	See http://www.sanjoseca.gov/esd/pub_res.asp	Starting in FY 09-10, the City of San Jose will reduce sampling to quarterly at seven stations.
Bay-wide Ambient Monitoring Program	MP#4	RMP	Collect and analyze water samples for dissolved copper concentrations from each of the three northly bay segments and South San Francisco Bay once per year during the dry season.	Financial contribution by SCVURPPP	Monitoring results used to calculate the three-year moving averages values for annual comparison to the triggers.	Ongoing in accordance with North of Dumbarton Copper SSO Basin Plan amendment
<i>Sediment-Control Program</i>						
San Francisquito Sediment TMDL and Habitat Enhancement Plan	Permit Provision C.9 (f)	Permit	Track development of the San Francisquito Creek Watershed TMDL for Sediment by attending meetings and reviewing technical results and reports.	Conducted by SCVURPPP	SCVURPPP Summaries	On-going

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP)² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s)³	Status Schedule
Waterbody Assessment and Sediment Impact Analysis (Saratoga Creek)	Permit Provision C.9 (f)	Permit	Characterize the nature and degree of potential sediment-related effects (i.e., Rainbow Trout) in the Saratoga Creek watershed.	Conducted by SCVURPPP	<i>Waterbody Assessment and Sediment Impact Analysis-Saratoga Creek</i>	Completed in September 2008
Sediment Management Practices Assessment (Saratoga Creek)	Permit Provision C.9 (f)	Permit	Provide an inventory and document management practices relevant to erosion processes and sediment transport and deposition within the Saratoga Creek Watershed, and to evaluate the effectiveness of these practices to the extent possible.	Conducted by SCVURPPP	<i>Sediment Management Practice Assessment Report for Saratoga Creek Watershed</i>	Completed in late 2008
<i>Trash Characterization and Management Activities</i>						
Trash Problem Area and Source Identification						
Planned Trash Hot Spot Selection Process	MP#2	Provision C.1	Develop preliminary framework for identifying a minimum number of "in-creek" trash hot spots that will be the focus of required future trash cleanups and assessments.	Conducted by Program staff	<i>Trash Reduction: Trash Hot Spot Selection</i>	Completed April 2009

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP)² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s)³	Status Schedule
Pilot Testing and Implementing Trash Control Measures						
Feasibility of Trash Removal at Pump Stations	MP#2	Provision C.1	Evaluate existing trash management practices and determine feasibility of implementing trash controls at pump stations	Conducted by SCVURPPP	<i>Feasibility of Trash Removal at Pump Stations</i>	Completed-7/30/09
Pilot Demonstration of Trash Treatment Controls	MP#2	Provision C.1	Installation and monitoring of catch basin inserts designed to capture trash.	Conducted by Co-permittees with Program staff assistance	Operation and maintenance results, trash characterizations of collected trash and debris	Ongoing
Creek Cleanups	MP#2	Provision C.1	Conduct two creek cleanup events (September and May) each year. Cleanup events are sponsored by the Creek Connections Action Group.	Conducted by Co-permittees with Program staff assistance	Summary reports detailing total poundage of trash and recyclables collected and number of volunteers	Ongoing
Water Body and BMP Effectiveness Assessments						
Creek and Watershed Trash Assessments	MP#2	Provision C.1	Conduct watershed and creek trash assessments to better understand the extent and magnitude of trash impacted sites and potential sources.	Conducted by Co-permittees with Program staff assistance	<i>Summary Results of FY 08-09 Trash Evaluations</i> <i>Stevens Creek Pilot Trash Assessment</i>	Completed September 2008 Completed February 2009

**Table 4-1
Status of FY 2008-2009 Monitoring Activities, continued**

Title/Subtitle	Category/ Monitoring Priority (MP) ² / Permit Provision	Origin	Capsule Scope	SCVURPPP Participation	Anticipated/Completed Product(s) ³	Status Schedule
Proposed Revisions to the #303 (d) List of Impaired Water Bodies in the San Francisco Bay Region	MP#2	Provision C.1	Develop comment letter regarding the proposed 2008 revisions to the 303(d) list of impaired water bodies.	Conducted by Program staff	Comment letter entitled <i>Proposed Revisions to the #303 (d) List of Impaired Water Bodies in the San Francisco Bay Region</i>	Completed December 2008
<i>Control Actions to Reduce Multiple Pollutants and Impacts</i>						
Summary of Co-permittee Street Sweeping Results	MP#2	Permit	Develop summaries for Co-permittee street sweeping activities. Demonstrate loads reduced for copper and other pollutants	Conducted by Program staff	<i>Summary of Co-permittee Street Sweeping Activities</i>	Ongoing