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October 15, 2017

Mr. Bruce H. Wolfe
Executive Officer
San Francisco Bay Region
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

**Subject: SCVURPPP Pollutant of Concern Monitoring Report - Water Year 2017
Accomplishments & Water Year 2018 Planned Allocation of Effort**

Dear Bruce:

On behalf of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), I am pleased to submit SCVURPPP's *Pollutant of Concern (POC) Monitoring Report – Water Year (WY) 2017¹ Accomplishments and WY 2018² Planned Allocation of Effort*. The POC Monitoring Report is submitted on behalf of all SCVURPPP Permittees in compliance with Provision C.8.h.iv of NPDES Permit # CAS612008 (Order No. R2-2015-0049). The report describes the allocation of sampling effort for POC monitoring in WY 2018 and what was accomplished for POC monitoring in WY 2017. The POC monitoring locations for WY 2017 are included in the report, along with the number and types of samples, purpose of the sampling, and analytes measured in WY 2017 and anticipated monitoring in WY 2018. Exact POC monitoring locations for WY 2018 are under development based on SCVURPPP's on-going efforts to identify likely PCB and mercury source properties and high interest Watershed Management Areas (WMAs) for these pollutants.

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Very truly yours,

Adam W. Olivieri, Dr. P.H., P.E.
Program Manager

Submitted on behalf of the Santa Clara Valley Urban Runoff Pollution Prevention Program (per Management Committee direction)

CC: SCVURPPP Management Committee Members
Tom Mumley, Janet O'Hara, and Richard Looker, SF Bay Water Board
Chris Sommers, SCVURPPP Project Manager

Attachments: SCVURPPP POC Monitoring Report - WY 2017 Accomplishments & WY 2018 Planned Allocation of Effort

¹ Water Year 2017 is from October 1, 2016 through September 30, 2017

² Water Year 2018 is from October 1, 2017 through September 30, 2018



Pollutants of Concern Monitoring Report

Water Year 2017 Accomplishments & Water Year 2018 Planned Allocation of Effort

Submitted in compliance with Provision C.8.h.iv of NPDES Permit # CAS612008 (Order No. R2-2015-0049)

October 15, 2017

This report is submitted by the agencies participating in the



City of Campbell
City of Cupertino
City of Los Altos
Town of Los Altos Hills
Town of Los Gatos

City of Milpitas
City of Monte Sereno
City of Mountain View
City of Palo Alto
City of San Jose

City of Santa Clara
City of Saratoga
City of Sunnyvale
County of Santa Clara
Santa Clara Valley Water District

Prepared for:

Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)

Prepared by:

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LIST OF ACRONYMS

AFR	Alternative Flame Retardant
BASMAA	Bay Area Stormwater Management Agency Association
BMP	Best Management Practice
CEC	Contaminants of Emerging Concern
CEDEN	California Environmental Data Exchange Network
ECWG	Emerging Contaminants Work Group of the RMP
HDS	Hydrodynamic Separator
MRP	Municipal Regional Permit
NNE	Nutrient Numeric Endpoints
NPDES	National Pollution Discharge Elimination System
PBDEs	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PFAS	Perfluoroalkyl Sulfonates
PFOS	Perfluorooctane Sulfonates
POC	Pollutant of Concern
RAA	Reasonable Assurance Analysis
RMP	Regional Monitoring Program
RWSM	Regional Watershed Spreadsheet Model
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SPoT	Statewide Stream Pollutant Trend Monitoring
SSC	Suspended Sediment Concentration
SSID	Stressor/Source Identification
STLS	Small Tributary Loading Strategy
TOC	Total Organic Carbon
UCMR	Urban Creeks Monitoring Report
WMA	Watershed Management Area
WY	Water Year

1.0 INTRODUCTION

This Pollutants of Concern (POC) Monitoring Report was prepared by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP or Program) on behalf of its 15 member agencies (13 cities/towns, the County of Santa Clara, and the Santa Clara Valley Water District) subject to the National Pollutant Discharge Elimination System (NPDES) stormwater permit for Bay Area municipalities, referred to as the Municipal Regional Permit (MRP). The MRP was issued by the San Francisco Regional Water Quality Control Board (Regional Water Board) on November 19, 2015 as Order R2-2015-0049. This report fulfills the requirements of Provision C.8.h.iv of the MRP for reporting:

- The allocation of sampling effort for POC monitoring planned for the forthcoming year (i.e., Water Year 2018), and
- What was accomplished for POC monitoring during the preceding water year (i.e., Water Year 2017).

In accordance with Provision C.8.h.iv, this report includes monitoring locations, number and types of samples collected, purpose of sampling (Management Questions addressed), and analytes measured. Data and interpretations will be provided in the Water Year 2017 Urban Creeks Monitoring Report (UCMR) which will be submitted to the Regional Water Board by March 31, 2018. Data collected in receiving waters (e.g., creeks) will be submitted to the San Francisco Bay Area Regional Data Center by March 31, 2018 for upload to the California Environmental Data Exchange Network (CEDEN). Similar reports were submitted for Water Year 2016 POC monitoring.

1.1 POC Monitoring Requirements

Provision C.8.f of the MRP requires monitoring of several POCs including polychlorinated biphenyls (PCBs), mercury, copper, emerging contaminants¹, and nutrients. POC monitoring is conducted on a Water Year (WY) basis, beginning on October 1 and concluding on September 30 of the named year. For example, WY 2017 began on October 1, 2016 and concluded on September 30, 2017. Provision C.8.f specifies yearly (i.e., WY) and total (i.e., permit term) minimum numbers of samples for each POC. In addition, POC monitoring must address the five priority management information needs (i.e., Management Questions) identified in C.8.f:

1. **Source Identification** – identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff;
2. **Contributions to Bay Impairment** – identifying which watershed source areas contribute most to the impairment of San Francisco Bay beneficial uses (due to source intensity and sensitivity of discharge location);
3. **Management Action Effectiveness** – providing support for planning future management actions or evaluating the effectiveness or impacts of existing management actions;
4. **Loads and Status** – providing information on POC loads, concentrations or presence in local tributaries or urban stormwater discharges; and
5. **Trends** – providing information on trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time.

The MRP specifies the minimum number of samples that must be collected and analyzed for each POC.

¹ Emerging contaminant monitoring requirements will be met through participation in Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) special studies. The special study will account for relevant Contaminants of Emerging Concern (CECs) in stormwater and will address at least perfluorooctane sulfonates (PFOS), perfluoroalkyl sulfonates (PFAS), and alternative flame retardants being used to replace PBDEs. Bay Area Stormwater Management Agencies Association (BASMAA) representatives are working with the RMP to develop the work plan.

For example, over the first five years of the permit, a minimum total of 80 PCBs samples must be collected and analyzed. On average 16 PCBs samples should be collected per year to meet the total requirement of 80 samples; however, the Permit requires a minimum of at least 8 PCB samples per year which gives flexibility to collect more samples some years and less other years. The MRP also specifies the minimum number of samples for each POC that must address each Management Question. For example, by the end of Year Four² of the permit term, each of the five Management Questions must be addressed with at least 8 PCB samples. It is possible that a single sample can address more than one Management Question. POC Monitoring requirements are summarized in Table 1. In addition to the required yearly and cumulative total number of samples, Table 1 lists the yearly average number of samples that would need to be analyzed to meet the total sample goal, a good benchmark to consider when planning annual sampling goals.

Other MRP provisions require studies or have information needs that could be addressed through Provision C.8.f (POC Monitoring) and for which related samples will count towards POC monitoring requirements. These other Permit provisions and their associated timelines are listed below.

- Provisions C.11.a and C.12.a require that Permittees provide a list of watersheds (i.e., Watershed Management Areas or WMAs) in which new mercury and PCBs control measures will be implemented during the permit term, as well as the monitoring data and other information used to select the watersheds. Progress toward developing the list was reported on April 1, 2016 and a more complete list with identified control measures will be provided with each Annual Report, beginning with the 2016 Annual Report that was submitted on September 30, 2016. Provision C.8.f (POC Monitoring) is intended to support C.11/12 requirements by requiring monitoring directed toward source identification (i.e., identifying which sources or watershed source areas provide the greatest opportunities for implementing controls to reduce loads of POCs in urban stormwater runoff).
- Provision C.12.e requires that Permittees collect at least 20 composite samples (region-wide) of the caulks and sealants used in storm drains or roadway infrastructure in public rights-of-way. Results of the investigation must be reported with the 2018 Annual Report, due by September 30, 2018. The Bay Area Stormwater Management Agencies Association (BASMAA) is currently conducting a regional project to assist member agencies in meeting this requirement.

1.2 Third-Party Data

SCVURPPP strives to work collaboratively with our water quality monitoring partners to find mutually beneficial monitoring approaches. Provision C.8.a.iii of the MRP allows Permittees to use data collected by third-party organizations to fulfill monitoring requirements, provided the data are demonstrated to meet the required data quality objectives. For example, samples collected in Santa Clara County through the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) and the State's Stream Pollution Trends (SPoT) Monitoring Program may supplement the Program's efforts towards achieving Provision C.8.f monitoring requirements. Third party monitoring conducted or planned by the RMP and SPoT are briefly summarized in this report.

² Note that the minimum sampling requirements addressing information needs must be completed by the end of year four of the permit; whereas, the minimum number of total samples does not need to be met until the end of year five of the permit.

Table 1. Pollutant of Concern monitoring parameters, efforts and types required by the MRP.

Pollutant of Concern	Media	Total Samples ^d	Yearly Minimum	Yearly Average	Minimum # of Samples that Must be Collected for Each Information Need by the End of Year Four				
					Source Identification	Contributions to Bay Impairment	Management Action Effectiveness	Loads and Status	Trends
PCBs	Water or sediment	80	8	16	8	8	8	8	8
Total Mercury	Water or sediment	80	8	16	8	8	8	8	8
Total & Dissolved Copper	Water	20	2	4	--	--	--	4	4
Nutrients ^a	Water	20	2	4	--	--	--	20	--
Emerging Contaminants ^b	--	--	--	--	--	--	--	--	--
Ancillary Parameters ^c	--	--	--	--	--	--	--	--	--

^a. Ammonium³, nitrate, nitrite, total Kjeldahl nitrogen, orthophosphate, total phosphorus (analyzed concurrently in each nutrient sample).

^b. Must include perfluorooctane sulfonates (PFOS, in sediment), perfluoroalkyl sulfonates (PFAS, in sediment), alternative flame retardants. The Permittee shall conduct or cause to be conducted a special study that addresses relevant management information needs for emerging contaminants. The special study must account for relevant Contaminants of Emerging Concern (CECs) in stormwater and would address at least PFOS, PFAS, and alternative flame retardants being used to replace PBDEs.

^c. Total Organic Carbon (TOC) should be collected concurrently with PCBs data when normalization to TOC is deemed appropriate. Suspended sediment concentration (SSC) should be collected in water samples used to assess loads, loading trends, or Best Management Practice (BMP) effectiveness. Hardness data are used in conjunction with copper concentrations collected in fresh water.

^d. Total samples that must be collected over the five-year Permit term.

2.0 POC MONITORING ACCOMPLISHMENTS (WY 2017) AND GOALS (WY 2018)

In compliance with Provision C.8.f of the MRP, the Program conducted POC monitoring in WY 2017 for PCBs, mercury, copper, and nutrients. The MRP-required yearly minimum number of samples was met or exceeded for all POCs. The total number of samples collected for each POC in WY 2017, the agency conducting the monitoring, and the Management Questions addressed are listed in Table 2. Table 2 also includes this information for WY 2016 and shows cumulative progress towards the MRP minimum sample requirements. Specific monitoring stations are listed in Table 3 and Appendix A and illustrated in Figure 1. The sections below describe details of the monitoring accomplished in WY 2017 and the planned allocation of effort for WY 2018. A summary of the planned allocation of effort for WY 2018 is presented in Table 4.

³ There are several challenges to collecting samples for “ammonium” analysis. Therefore, samples will be analyzed for total ammonia which is the sum of un-ionized ammonia (NH₃) and ionized ammonia (ammonium, NH₄⁺). Ammonium concentrations will be calculated by subtracting the calculated concentration of un-ionized ammonia from the measured concentration of total ammonia. Un-ionized ammonia concentrations will be calculated using a formula provided by the American Fisheries Society that includes field pH, field temperature, and specific conductance. This approach was approved by Regional Water Board staff in an email dated June 21, 2016.

Table 2. SCVURPPP and Third-Party POC Monitoring Accomplishments, WY 2016 – WY 2017.

Pollutant of Concern/ Agency	Number of Samples	Management Question Addressed ^a					Sample Type and Comments
		1. Source Identification	2. Contributions to Bay Impairment	3. Management Action Effectiveness	4. Loads and Status	5. Trends	
PCBs & Mercury							
(WY 2017)							
SCVURPPP (Mercury & PCBs)	16	16	16	--	16	--	Stormwater runoff samples to characterize high interest catchments
SCVURPPP (Mercury & PCBs)	75	75	--	--	--	--	Upland sediment samples to identify source properties
RMP STLS (Mercury & PCBs)	2	2	2	--	2	--	Stormwater runoff samples to characterize high interest catchments
RMP STLS (PCBs)	1	--	1	--	1	1	High flow sample collected in Guadalupe Creek
RMP STLS (Mercury)	14	--	14	14	14	14	High flow sample collected in Guadalupe Creek
SPoT (Mercury & PCBs)	2	--	--	--	--	2	Sediment samples to assess trends (only 1 analyzed for mercury)
(WY 2016)							
SCVURPPP (Mercury & PCBs)	9	9	9	--	9	--	Stormwater runoff samples to characterize high interest catchments
RMP STLS (Mercury & PCBs)	6	6	6	--	6	--	Stormwater runoff samples to characterize high interest catchments
Mercury - Total / MRP Minimum ^b	124/80	108/8	47/8	14/8	47/8	16/8 ^c	
PCBs - Total / MRP Minimum ^b	111/80	108/8	34/8	0/8	34/8	2/8 ^c	
Copper							
(WY 2017)							
SCVURPPP	2	--	--	--	2	2	Copper analyzed on a subset of PCBs/Hg stormwater runoff samples
SCVURPPP	3	--	--	--	3	3	Creek water samples collected during storm event
SPoT	1	--	--	--	--	1	Sediment sample to assess trends at long-term monitoring station
(WY 2016)							
SCVURPPP	4	--	--	--	4	4	Copper analyzed on a subset of PCBs/Hg stormwater runoff samples
Copper - Total / MRP Minimum ^b	10/20	--	--	--	9/4	10/4	
Nutrients							
(WY 2017)							
SCVURPPP	4	--	--	--	4	--	Samples collected during storm event and following dry weather
(WY 2016)							
SCVURPPP	2	--	--	--	2	--	Water samples collected from Stressor Source Identification (SSID) study
Nutrients - Total / MRP Minimum ^b	6/20	--	--	--	6/20	--	

a. Individual samples can address more than one Management Question.

b. The MRP overall minimum number of samples must be met by the end of the five-year permit term. The MRP minimum number of samples for each Management Question must be met by the end of year four of the permit.

c. Only one of the SPoT samples was analyzed for mercury.

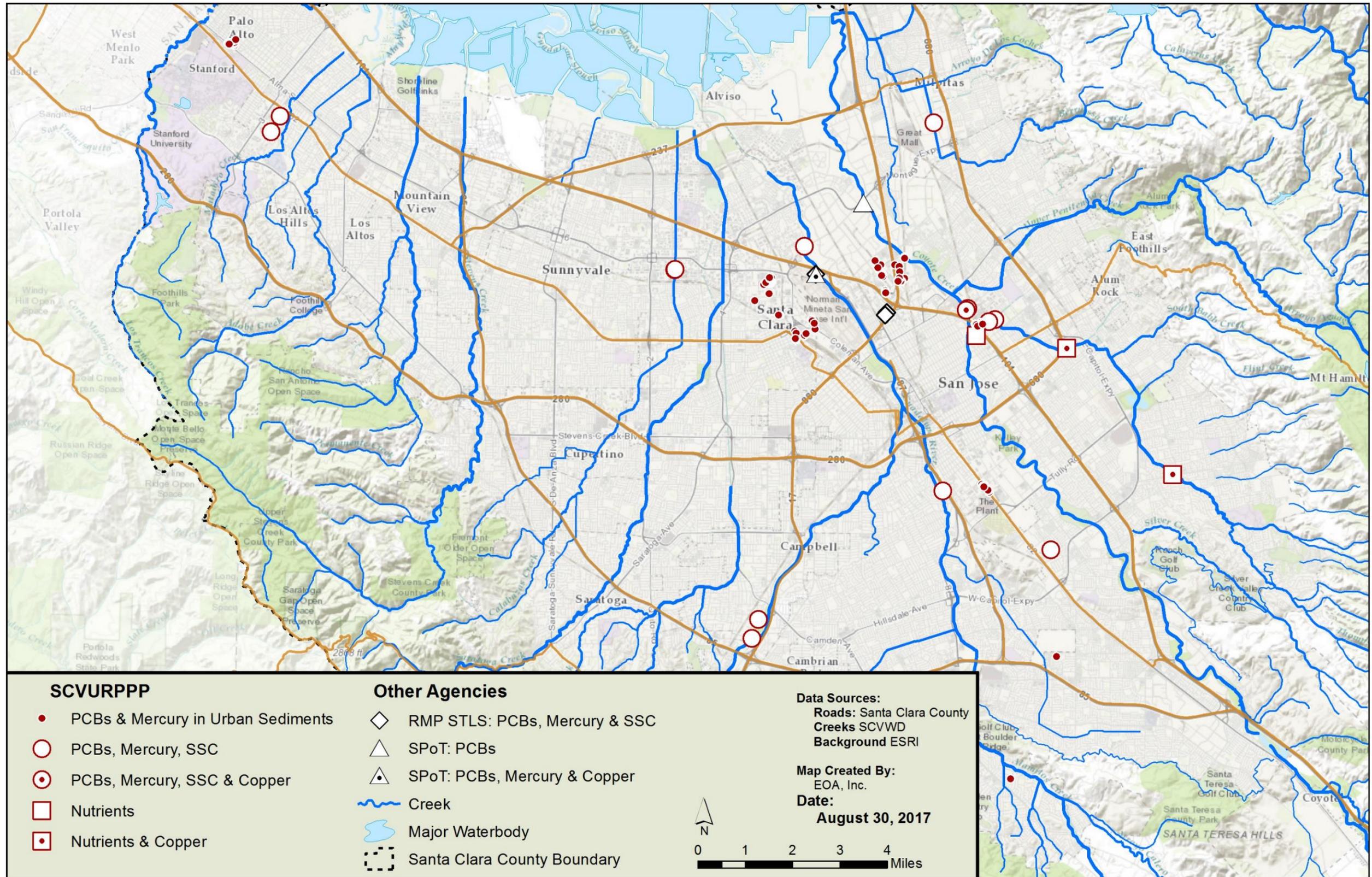


Figure 1. SCVURPPP and Third-Party POC Monitoring Stations in WY 2017.

Table 3. SCVURPPP and Third-Party POC Monitoring Stations in WY 2017.

Agency	Station Code	Sample Date	Latitude	Longitude	Matrix	PCBs	Mercury	Suspended Sediment Concentration	Total Copper	Dissolved Copper	Hardness as CaCO3	Nutrients ^b
SCVURPPP	Miquelita	12/15/2016	37.3604	-121.8637	water	x	x	x				
SCVURPPP	067SCL120	12/15/2016	37.3597	-121.8661	water	x	x	x				
SCVURPPP	SCH-K_A	12/15/2016	37.4141	-122.1429	water	x	x	x				
SCVURPPP	031SCH250A	12/15/2016	37.419	-122.1396	water	x	x	x				
SCVURPPP	036BYC091A	12/23/2016	37.4202	-121.8884	water	x	x	x				
SCVURPPP	099GAC240A	1/7/2017	37.3078	-121.8828	water	x	x	x				
SCVURPPP	050GAC020A	1/7/2017	37.3819	-121.9373	water	x	x	x				
SCVURPPP	049CZC900A	1/7/2017	37.3741	-121.9870	water	x	x	x				
SCVURPPP	049CZC910A	1/7/2017	37.3742	-121.9868	water	x	x	x				
SCVURPPP	067CTC350A	1/10/2017	37.3636	-121.8742	water	x	x	x	x	x	x	
SCVURPPP	067CTC351A	1/10/2017	37.3631	-121.8748	water	x	x	x	x	x	x	
SCVURPPP	100CTC600A	2/7/2017	37.2903	-121.8410	water	x	x	x				
SCVURPPP	067CTC750A	2/7/2017	37.2903	-121.8410	water	x	x	x				
SCVURPPP	067CTC810A	2/7/2017	37.2903	-121.8410	water	x	x	x				
SCVURPPP	113LGC670A	2/9/2017	37.2676	-121.9528	water	x	x	x				
SCVURPPP	113LGC900A	2/9/2017	37.2618	-121.9551	water	x	x	x				
SCVURPPP	See Appendix A ^c				sediment	x	x					
SCVURPPP	205COY180	1/9/2017	37.3554	-121.8708	water				x	x	x	x
SCVURPPP	205COY180	6/1/2017	37.3554	-121.8708	water							x
SCVURPPP	205COY185 ^d	1/9/2017	37.3519	-121.8360	water				x	x	x	x
SCVURPPP	205COY205 ^d	1/9/2017	37.3138	-121.7947	water				x	x	x	x
RMP STLS	066GAC550B	1/8/2017	37.3620	-121.9053	water	x	x	x				
RMP STLS	066GAC550C	1/8/2017	37.3612	-121.9059	water	x	x	x				
RMP STLS	USGS 11169025	1/8/2017	37.3734	-121.9328	water	x	x	x				
SPoT	205GUA020	June 2017	37.3734	-121.9328	sediment	x	x		x			
SPoT	205COY060	June 2017	37.3954	-121.9148	sediment	x						

a. Specific sample dates have not yet been provided by the RMP STLS.

b. Ammonia (for ammonium), nitrate, nitrite, total Kjeldahl nitrogen, orthophosphate, and total phosphorus are analyzed concurrently in each nutrient sample.

c. SCVURPPP collected 75 sediment samples for PCBs and mercury analysis during the spring and summer of 2017. See Appendix A for station codes, sample dates, and latitude/longitude.

d. These stations (205COY185 and 205COY205) were also sampled for nutrients in spring/summer 2017 as part of the bioassessment monitoring program.

2.1 PCBs and Mercury

During WY 2017 the Program collected 16 stormwater runoff samples and analyzed each for PCBs and mercury. Additional stormwater runoff samples were collected in Santa Clara County through the RMPs Small Tributary Loading Strategy (STLS) and analyzed for mercury (17 samples) and PCBs (3 samples). These combined SCVURPPP and RMP STLA samples address Management Questions #1 (Source Identification) and #2 (Contributions to Bay Impairment). Data may also be used by the RMP STLS to improve calibration of the Regional Watershed Spreadsheet Model (RWSM) which is a land use based planning tool for estimation of overall POC loads from small tributaries to San Francisco Bay at a regional scale (i.e., Management Question #4 – Loads and Status).

Additionally, SCVURPPP also collected 75 sediment samples to address Management Question #1 (Source Identification). Two sediment samples were collected in Santa Clara County by the SPoT program and were analyzed for PCBs to address Management Question #5 (Trends). One of two SPoT samples was also analyzed for mercury and copper.

2.1.1 SCVURPPP Accomplishments and Goals

The primary goal of PCBs and mercury monitoring conducted by the Program in **WY 2017** was to inform identification of WMAs and source properties where control measures could be implemented to comply with MRP requirements for load reductions of PCBs and mercury. There were two types of PCBs and mercury monitoring approaches implemented in WY 2017.

- The Program collected 16 storm composite samples from the stormwater conveyance system in WMAs containing high interest parcels with land uses associated with PCBs (such as old industrial, electrical and recycling). WMAs were identified and prioritized for sampling by evaluating several types of data, including: PCBs and mercury concentrations from prior sediment and water sampling efforts, land use data, municipal storm drain data showing pipelines and access points (e.g., manholes, outfalls, pump stations), catchment areas delineated from municipal storm drain data, and logistical/safety consideration. Station identification and sample collection were consistent with the *Water Year 2016 Pollutant of Concern Monitoring - Sampling and Analysis Plan* (SCVURPPP 2015b). Composite samples consisting of six to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for the “RMP 40” PCB congeners (method EPA 1668C), total mercury (method EPA 1631E), and SSC (method ASTM D3977-97). Two of the samples were also analyzed for total and dissolved copper (method EPA 200.8) and hardness (method SM 2340C).
- The Program collected 75 sediment samples as part of the source property investigation program. The goal of this program is to identify source properties that can be referred to the Regional Water Board for abatement. These samples were collected in the right-of-way near parcels with a history of PCBs use and/or in WMAs with previously observed PCBs concentrations above certain thresholds. Sample collection methods were similar to the methods implemented in WY 2015 for the reconnaissance sediment sampling program summarized in SCVURPPP (2016b). Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for the “RMP 40” PCB congeners (method EPA 8082), total mercury (method EPA 7471B⁴), and total solids⁵ (method EPA 160.3M).

⁴ The lab mistakenly analyzed one batch of samples for mercury using the higher resolution method EPA 1631E.

⁵ Samples were analyzed for total solids so that dry weight calculations could be made.

As stated above, WY 2017 PCBs and mercury monitoring conducted by the Program primarily focused on addressing Management Questions #1 (Source Identification) and #2 (Contributions to Bay Impairment), while contributing to the regional dataset being used to address Management #3 (Loads and Status). A similar focus is planned for **WY 2018**. The Program intends to collect 10 to 15 storm composite samples from WMAs, primarily to continue informing classification of WMAs. In some cases, WMAs previously targeted may be resampled in order to confirm unexpected results and develop a more robust dataset. An additional 40 to 60 sediment samples will be collected within WMAs, primarily to identify specific source properties that may eventually be referred to the Regional Water Board for investigation and abatement by the Regional Water Board or another appropriate regulatory agency with investigation and cleanup authority. The specific coordinates for the WY 2018 samples are not yet known and will be influenced by several logistical field considerations such as tidal conditions during storm events (for storm samples), the presence of sampleable sediment within the storm drain system and right-of-way (for sediment samples), and ongoing review of the WY 2017 dataset.

In WY 2019, PCBs and mercury monitoring will include addressing Management Question #3 (Management Action Effectiveness) and addressing MRP Provision C.12.e through a regional project being implemented by BASMAA.

- The BASMAA “POC Monitoring Project for Source Identification and Management Action Effectiveness” includes two somewhat independent monitoring studies. The Best Management Practices (BMP) Effectiveness Study will collect a total of 32 samples (8 samples for each of the four counties subject to Provision C.8.f POC monitoring requirements) to a) quantify PCBs and mercury load removal during maintenance of hydrodynamic separator (HDS) units and b) identify biochar media amendments that improve PCBs and mercury load removal by bioretention BMPs. A major consideration of the study is collection of data in support of conducting the Reasonable Assurance Analysis (RAA) that is required by Provision C.12.c.iii.(3) which must be submitted with the 2020 Annual Report (September 30, 2020).
- The PCBs in Infrastructure Caulk Study will satisfy the Provision C.12.e requirement to collect 20 composite caulk samples throughout the MRP permit area. The study will evaluate whether PCBs are present in right-of-way infrastructure caulk and sealants in the Bay Area. Summary reports for both studies are anticipated in late 2018.

Other PCBs and mercury monitoring approaches for future years are not yet known.

2.1.2 Third-Party Accomplishments and Goals

The **RMP's STLS** Team typically conducts annual monitoring for POCs region-wide. SCVURPPP is an active participant in the STLS and works with other Bay Area municipal stormwater programs to identify opportunities to direct RMP funds and monitoring activities towards supplementing monitoring required by the municipal stormwater permit. POC monitoring activities conducted by the STLS in recent years have focused on pollutant loading monitoring at six region-wide stations (WY 2012 – WY 2014) and wet weather characterization monitoring in catchments of interest (WY 2015 – present). In **WY 2017**, the STLS Team continued wet weather characterization sampling using a similar approach to the PCBs and mercury sampling that was implemented by the Program (see SCVURPPP 2015b and SCVURPPP 2016a for details). Three catchments (i.e., six storm composite samples) were sampled for PCBs and mercury by the RMP's STLS in Santa Clara County in WY 2017. Additionally, the RMP conducted mercury monitoring in the Guadalupe River during large storm events in WY 2017 to fill an important data gap. This monitoring was conducted through RMP contingency funds in an effort to evaluate mercury concentrations and loads during rare large storm events in the watershed.

RMP STLS monitoring in **WY 2018** will continue to focus on wet weather characterization. The number of stations in Santa Clara County that will be targeted by the STLS Team will likely be limited to two to four,

some of which may be stations that were previously sampled but had unexpectedly low PCBs concentrations. In future years, RMP STLS monitoring is expected to shift towards Management Question #5 (Trends). The STLS Trends Strategy Team, initiated in WY 2015, is currently developing a regional monitoring program to assess trends in POC loading to San Francisco Bay from small tributaries. The STLS Trends Strategy will initially focus on PCBs and mercury, but will not be limited to those POCs. The preliminary design concept includes additional monitoring at one or two of the region-wide loadings stations to gain a better understanding of the variability in PCBs concentrations/loadings in the existing dataset. However, uncertainties about the utility of developing a trends monitoring program that targets just one or two watersheds coupled with unknowns about how to extrapolate findings to the region has prompted the Trends Strategy Team to delay monitoring and focus instead on identifying practical modeling approaches. STLS Trends monitoring is not anticipated to commence before WY 2019.

The **SPoT Monitoring Program** conducts annual dry season monitoring (subject to funding constraints) of sediments collected from a statewide network of large rivers. The goal of the SPoT Program is to investigate long-term trends in water quality (Management Question #5 – Trends). Sites are targeted in bottom-of-the-watershed locations with slow water flow and appropriate micromorphology to allow deposition and accumulation of sediments, including stations near the mouth of Coyote Creek and the Guadalupe River. In most years, sediments are analyzed for PCBs, mercury, metals, toxicity, pesticides, and organic pollutants (Phillips et al. 2014). In WY 2017, the Guadalupe station was samples for the full suite of constituents (including PCBs, mercury, and copper); however, Coyote Creek was only monitored for PCBs. It is anticipated that the full monitoring program will be implemented in WY 2018. The most recent technical report prepared by SPoT program staff was published in 2016 and describes seven-year trends from the initiation of the program in 2008 through 2014 (Phillips et al. 2016). An update to the report is anticipated in late 2018.

2.2 Copper

In WY 2017, SCVURPPP collected two copper samples from storm drain outfalls concurrently with the PCBs and mercury storm composite samples. Three additional samples were collected during a large storm event at stations along Coyote Creek. The goal of this approach is to address Management Question #4 (Loads and Status) and long-term trends (Management Question #5) by characterizing copper concentrations in stormwater runoff from highly urban catchments. These data are supplemented by the one SPoT sample collected in Guadalupe Creek that was analyzed for copper to assess long-term trends (Management Question #5). The Program is planning a similar allocation of effort (i.e., four samples) and sampling approach for WY 2018. If possible, three of the four samples will be collected concurrently with Provision C.8.g.iii Wet Weather Pesticides and Toxicity Monitoring. At this time, the specific watersheds that will be targeted are unknown. The process for identifying watersheds will include land use analysis and logistical considerations related to stream access and field crew safety.

2.3 Nutrients

Nutrient monitoring addresses Management Question #4 (Loads and Status). Nutrients were included in the POC monitoring requirements to support Regional Water Board efforts to develop nutrient numeric endpoints (NNE) for the San Francisco Bay Estuary. The “Nutrient Management Strategy for San Francisco Bay” is part of a statewide initiative to address nutrient over-enrichment in State waters (Regional Water Board 2012). The suite of nutrients required in the MRP (i.e., ammonium, nitrate, nitrite, total Kjeldahl nitrogen, orthophosphate, and total phosphorus) closely reflects the list of analytes measured by the RMP and BASMAA partners at the six regional loading stations (including Santa Clara County stations on Guadalupe Creek and Sunnyvale East Channel) monitored in WY 2012 and WY 2013. The prior data were used by the Nutrient Strategy Technical Team to develop and calibrate nutrient loading models.

In WY 2017, POC monitoring for nutrients in Santa Clara County was conducted at three stations located along Coyote Creek during a large storm event. Follow up monitoring at all three stations was conducted

during the dry season concurrent with bioassessment monitoring in the spring. Two of the three dry season samples are not counted towards Provision C.8.f POC monitoring requirements because they apply instead to Provision C.8.d Creek Status Monitoring. All sampling results will be assessed in the POC interpretive report to be submitted with the Urban Creeks Monitoring Report by March 31, 2018.

A minimum of two nutrient samples will be collected in WY 2018, likely from bottom-of-the-watershed locations in mixed land-use watersheds. If possible, due to the association of nutrient concentrations with storm runoff, samples will be collected concurrently with Provision C.8.g.iii Wet Weather Pesticides and Toxicity Monitoring. At this time, the specific watersheds that will be targeted are unknown. The process for identifying watersheds will include land use analysis and logistical considerations related to stream access and field crew safety.

2.4 Emerging Contaminants

Emerging contaminant monitoring is being addressed through Program participation in the RMP. The RMP has been investigating Contaminants of Emerging Concern (CECs) since 2001 and established the RMP Emerging Contaminants Work Group (ECWG) in 2006. The purpose of the ECWG is to identify CECs that have the potential to impact beneficial uses in the Bay and to develop cost-effective strategies to identify and monitor, and minimize impacts. The RMP published a CEC Strategy “living” document in 2013 (Sutton et al. 2013; Sutton and Sedlak 2015) and updated the document in 2015 (Sutton and Sedlak 2015). The CEC Strategy document guides RMP special studies on CECs using a tiered risk and management action framework.

In 2018 the RMP⁶ STLS plans to implement a special study that will inform ECWG’s planning activities related to alternative flame retardants (AFRs). The STLS study will compile and review available polybrominated diphenyl ether (PBDE) stormwater data and conceptual models and will report on the strengths and weaknesses of the available models for addressing AFR information needs in relation to stormwater. This study is intended to satisfy the POC monitoring requirement for CECs that is included in MRP provision C.8.f.

⁶ The Emerging Contaminants Workgroup is also conducting monitoring on a number of other emerging contaminants that are not identified in the MRP. These include microplastics and perfluorinated chemicals.

Table 4. Planned Allocation of SCVURPPP and Third-Party POC Monitoring Efforts in WY 2018.

Pollutant of Concern/ Agency	Planned Number of Samples (WY 2018)	Yearly Minimum	Management Question Addressed ^a					Sample Type and Comments
			1. Source Identification	2. Contributions to Bay Impairment	3. Management Action Effectiveness	4. Loads and Status	5. Trends	
PCBs & Mercury								
SCVURPPP	10 to 20	8	X	X	--	X	--	Stormwater runoff samples to characterize high interest WMAs
SCVURPPP	40 to 60		X	--	--	--	--	Urban street/storm drain/surface sediment samples in WMAs to identify source properties
RMP STLS	5 to 10		X	X	--	X	--	Stormwater runoff samples to characterize high interest WMAs
SPoT	2		--	--	--	--	X	Long-term trends monitoring program (sediment samples from creek bed)
Copper								
SCVURPPP	4	2	--	--	--	X	--	Copper analyzed in large watersheds during storm events and, if needed, on a subset of PCBs/Hg stormwater runoff samples
Nutrients								
SCVURPPP	2	2	--	--	--	X	--	Water samples collected from bottom-of-watershed stations during storm events

^a. Individual samples can address more than one Management Question simultaneously.

3.0 REFERENCES

- Phillips, B.M., Anderson, B.S., Siegler, K., Voorhees, J., Tadesse, D., Webber, L., Breuer, R. (2014). Trends in Chemical Contamination, Toxicity and Land Use in California Watersheds: Stream Pollution Trends (SPoT) Monitoring Program. Third Report – Five-Year Trends 2008-2012. California State Water Resources Control Board, Sacramento, CA.
- Phillips BM, Anderson BS, Siegler K, Voorhees J, Tadesse D, Webber L, Breuer, R. (2016). Spatial and Temporal Trends in Chemical Contamination Relative to Land Use in California Watersheds: Stream Pollution Trends (SPoT) Monitoring Program. Fourth Report - Seven-Year Trends 2008-2014. California State Water Resources Control Board, Sacramento, CA. SWAMP-MR-2016-0008.
- SCVURPPP. 2015a. Urban Creeks Monitoring Report. Water Quality Monitoring Water Year 2014 (October 2013 September 2014). March 15, 2015.
- SCVURPPP. 2015b. Water Year 2016 Pollutant of Concern Monitoring. Sampling and Analysis Plan. November 16, 2015.
- SCVURPPP. 2016a. Urban Creeks Monitoring Report. Water Quality Monitoring Water Year 2015 (October 2014 September 2015). March 31, 2016.
- SCVURPPP. 2016b. PCBs and Mercury Source Area Identification, Water Year 2015 POC Monitoring Report.
- Regional Water Board. 2012. Nutrient Management Strategy for San Francisco Bay. November 2012.
- Regional Water Board. 2015. San Francisco Bay Region Municipal Regional Stormwater NPDES Permit. Order R2-2015-0049, NPDES Permit No. CAS612008. November 19, 2016. 152 pp plus Attachments A-G.
- Sutton, R., Sedlak, M., and Yee, D. (2013). Contaminants of Emerging Concern in San Francisco Bay: A Strategy for Future Investigations. San Francisco Estuary Institute, Richmond, CA. Contribution # 700.
- Sutton, R. and Sedlak, M. (2015). Contaminants of Emerging Concern in San Francisco Bay: A Strategy for Future Investigations. 2015 Update. San Francisco Estuary Institute, Richmond, CA. Contribution # 761.

Appendix A

SCVURPPP Sediment Monitoring Stations in WY 2017

**Appendix A. SCVURPPP Sediment Monitoring Stations in WY 2017.
Samples analyzed for PCBs and mercury.**

Station Code	Sample Date	Latitude	Longitude
SC-SCL-02-F	6/12/2017	37.371031	-121.949696
SC-SCL-02-G	6/17/2017	37.370437	-121.950111
SC-SCL-02-H	6/12/2017	37.370779	-121.950108
SC-SCL-02-I	6/12/2017	37.371237	-121.950121
SC-SCL-02-J	6/12/2017	37.371438	-121.950066
SC-SCL-02-K	6/12/2017	37.371495	-121.950053
SC-SCL-02-L	6/13/2017	37.360704	-121.94683
SC-SCL-03-E	6/13/2017	37.3649717	-121.9560228
SC-SCL-04-D	6/12/2017	37.367173	-121.950495
SC-SCL-04-E	6/12/2017	37.372045	-121.949668
SC-SCL-04-F	6/12/2017	37.372496	-121.949666
SC-SCL-05-C	6/12/2017	37.369999	-121.952618
SC-SCL-05-D	6/12/2017	37.371764	-121.950421
SC-SCL-05-E	6/12/2017	37.37215	-121.950451
SC-SCL-26-A	6/13/2017	37.353267	-121.940117
SC-SCL-23-B	6/12/2017	37.355925	-121.950403
SC-SCL-23-C	6/12/2017	37.355293	-121.939948
SC-SCL-23-D	6/13/2017	37.359455	-121.934182
SC-SCL-23-E	6/13/2017	37.359142	-121.93381
SC-SCL-23-F	6/13/2017	37.358432	-121.933
SC-SCL-01-C	6/12/2017	37.354466	-121.937098
SC-SCL-01-E	6/13/2017	37.354505	-121.936922
SC-SCL-01-F	6/13/2017	37.354662	-121.936699
SC-SCL-01-G	6/13/2017	37.355188	-121.936078
SC-SCL-01-H	6/13/2017	37.356564	-121.932693
SC-SJY-47-E	5/24/2017	37.30763	-121.86494
SC-SJY-47-F	5/24/2017	37.30802	-121.86531
SC-SJY-47-G	5/24/2017	37.30817	-121.86549
SC-SJY-47-H	5/24/2017	37.30962	-121.86691
SC-SJY-47-J	5/24/2017	37.30996	-121.86778
SC-SJY-47-K	5/24/2017	37.30948	-121.8673
SC-SJY-47-L	5/24/2017	37.30918	-121.86699
SC-SJY-90-A	5/24/2017	37.25767	-121.83825
SC-SJY-91-A	5/24/2017	37.22004	-121.85523
SC-SJY-17-B	5/23/2017	37.35887	-121.87121
SC-SJY-17-C	5/23/2017	37.35936	-121.869
SC-SJY-17-D	5/23/2017	37.359	-121.86863
SC-SJY-17-E	5/23/2017	37.35909	-121.8685

Station Code	Sample Date	Latitude	Longitude
SC-SJY-17-F	5/23/2017	37.35869	-121.87077
SC-SJY-17-G	5/23/2017	37.35821	-121.87025
SC-SJY-17-H	5/23/2017	37.35885	-121.8684
SC-SJY-07-A	5/22/2017	37.37903	-121.89875
SC-SJY-08-H	5/22/2017	37.37844	-121.8987
SC-SJY-08-I	5/22/2017	37.37668	-121.952533
SC-SJY-08-J	5/22/2017	37.37612	-121.90079
SC-SJY-08-K	5/22/2017	37.37439	-121.90063
SC-SJY-08-L	5/22/2017	37.37255	-121.89857
SC-SJY-08-M	5/22/2017	37.37229	-121.89568
SC-SJY-08-N	5/22/2017	37.37162	-121.89971
SC-SJY-08-O	5/22/2017	37.37185	-121.90025
SC-SJY-08-P	5/22/2017	37.37222	-121.9004
SC-SJY-08-Q	5/22/2017	37.372306	-121.900453
SC-SJY-08-R	5/22/2017	37.37258	-121.90076
SC-SJY-08-T	5/22/2017	37.37176	-121.90114
SC-SJY-08-U	5/22/2017	37.37177	-121.90115
SC-SJY-08-V	5/22/2017	37.371754	-121.901098
SC-SJY-08-W	5/22/2017	37.3716	-121.90106
SC-SJY-10-G	5/22/2017	37.36864	-121.90599
SC-SJY-10-H	5/22/2017	37.36798	-121.90583
SC-SJY-10-I	5/22/2017	37.36802	-121.90587
SC-SJY-10-J	5/23/2017	37.37349	-121.90716
SC-SJY-10-K	5/23/2017	37.37325	-121.90746
SC-SJY-10-L	5/23/2017	37.37292	-121.90695
SC-SJY-10-N	5/23/2017	37.37521	-121.90857
SC-SJY-10-O	5/23/2017	37.37657	-121.90778
SC-SJY-10-P	5/23/2017	37.37783	-121.91004
SC-SJY-10-Q	5/23/2017	37.37569	-121.9089
SC-PAO-18-C	6/13/2017	37.44103	-122.160016
SC-PAO-18-D	6/13/2017	37.440935	-122.159849
SC-PAO-18-G	5/15/2017	37.44036	-122.15763
SC-PAO-18-H	5/15/2017	37.44072	-122.1579
SC-PAO-18-I	5/15/2017	37.4408	-122.15809
SC-PAO-18-J	5/15/2017	37.44117	-122.15814
SC-PAO-18-K	5/15/2017	37.44133	-122.15749
SC-PAO-18-L	5/15/2017	37.44184	-122.15749
SC-PAO-18-M	5/15/2017	37.44219	-122.15712