# INTEGRATED MONITORING REPORT

# PART D: POLLUTANTS OF CONCERN MONITORING REPORT

## Data Collected in San Mateo County through Water Year 2019



Submitted in Compliance with
NPDES Permit No. CAS612008 (Order No. R2-2015-0049)
Provision C.8.h.v

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

*A Program of the City/County Association of Governments*

March 31, 2020

# CREDITS

**This report is submitted by the participating agencies in the**

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| | |
|---|---|
| BASMAA | Bay Area Stormwater Management Agency Association |
| BMP | Best Management Practice |
| CEC | Contaminants of Emerging Concern |
| CEDEN | California Environmental Data Exchange Network |
| CSCI | California Stream Condition Index |
| CW4CB | Clean Watersheds for Clean Bay |
| DTSC | California Department of Toxic Substances Control |
| ECWG | Emerging Contaminants Work Group of the RMP |
| MRP | Municipal Regional Permit |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollution Discharge Elimination System |
| PBDEs | Polybrominated Diphenyl Ethers |
| PCBs | Polychlorinated Biphenyls |
| PFAS | Perfluoroalkyl Sulfonates |
| PFOS | Perfluorooctane Sulfonates |
| POC | Pollutant of Concern |
| RMC | Regional Monitoring Coalition |
| RMP | San Francisco Bay Regional Monitoring Program |
| RWSM | Regional Watershed Spreadsheet Model |
| SAP | Sampling and Analysis Plan |
| SMCWPPP | San Mateo Countywide Water Pollution Prevention Program (Countywide Program) |
| SFEI | San Francisco Estuary Institute |
| 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 |
| USEPA | US Environmental Protection Agency |
| WLA | Wasteload Allocation |
| WQO | Water Quality Objective |
| WY | Water Year |

# 1.0 INTRODUCTION

This Pollutants of Concern (POC) monitoring report was prepared by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP or Countywide Program), as part of SMCWPPP's March 2020 Integrated Monitoring Report (IMR). SMCWPPP is a program of the San Mateo County City/County Association of Governments (C/CAG). SMCWPPP prepared this report on behalf of San Mateo County local municipal agencies subject to the regional stormwater National Pollutant Discharge Elimination System (NPDES) permit for Bay Area municipalities issued by the San Francisco Regional Water Quality Control Board (Regional Water Board). The stormwater permit is usually referred to as the Municipal Regional Permit (MRP). The version reissued on November 19, 2015 is referred to as MRP 2.0 (Regional Water Board 2015). This report fulfills the requirements of MRP 2.0 Provision C.8.h.iii for reporting a comprehensive analysis of Provision C.8.f. POC Monitoring data collected pursuant to Provision C.8. since the previous IMR. The previous SMCWPPP IMR addressed Water Year (WY) 2011 – WY 2013 (SMCWPPP 2014) and the time period addressed by this report includes WY 2014 – WY 2019[1]. However, please note that:

- For PCBs, this report focuses on progress to-date towards identifying source areas and properties in San Mateo County. In this context, it evaluates all the relevant and readily available sediment and stormwater runoff chemistry data collected in San Mateo County, ranging back to the early 2000s.
- Some sections and summary tables in this report focus on summarizing compliance with MRP 2.0 requirements and thus focus on the POC monitoring and related activities conducted during WY 2016 – WY 2019.

This POC monitoring report is included as an appendix to SMCWPPP's WY 2014 – 2019 IMR. In addition, consistent with MRP Provision C.8.h.ii., POC monitoring data generated from sampling of receiving waters (e.g., creeks) were submitted to the San Francisco Bay Area Regional Data Center for upload to the California Environmental Data Exchange Network (CEDEN)[2].

## 1.1. Urban Creeks Monitoring Report and Integrated Monitoring Report

Per MRP requirements, SMCWPPP submits a comprehensive Urban Creeks Monitoring Report (UCMR) by March 31 of each year, reporting on all data collected during the foregoing October 1 – September 30 period. The UCMR contains summaries of Creek Status, Stressor/Source Identification (SSID) Projects, and POC Monitoring. By March 31 of the fifth year of the Permit term (2020), MRP Permittees submit this IMR in lieu of the annual Urban Creeks Monitoring Report. The IMR is part of the next Report of Waste Discharge for the reissuance of the MRP. The IMR reports on all the data collected since the previous IMR and contains the following:

- A Water Year Summary Table, as described in Provision C.8.h.iii, containing information pertaining to the fourth-year monitoring data;

[1] The water quality monitoring described in this report was conducted on a Water Year basis. A Water Year begins on October 1 and ends on September 30 of the named year. For example, Water Year 2019 (WY 2019) began on October 1, 2018 and concluded on September 30, 2019.

[2] CEDEN has historically only accepted and shared data collected in streams, lakes, rivers, and the ocean (i.e., receiving waters). In late-2016, we were notified that there were changes to the types of data that CEDEN would accept and share. However, pending further clarification, SMCWPPP will continue to submit only receiving water data to CEDEN.

- A comprehensive analysis of all data collected pursuant to Provision C.8 since the previous IMR, (and may include other pertinent studies);
- For POCs, methods, data, calculations, load estimates, and source estimates for each POC parameter, as applicable; and
- A budget summary for each monitoring requirement and recommendations for future monitoring.

In accordance with MRP requirements, this POC monitoring report includes the following standard monitoring report content:

- The purpose of the monitoring and brief descriptions of study design rationale;
- Quality Assurance/Quality Control summaries for sample collection and analytical methods, including a discussion of any limitations of the data;
- Brief descriptions of sampling protocols and analytical methods;
- Sample location description, including water body name and segment and location coordinates;
- Sample ID, collection date (and time if relevant), and media;
- Concentrations detected, measurement units, and detection limits;
- Assessment, analysis, and interpretation of the data for each monitoring program component;
- A listing of non-Permittee entities whose data are included in the report; and
- Assessment of compliance with applicable water quality standards.

## 1.2. POC Monitoring Applicable Permit Requirements

The following sections summarize the POC Monitoring requirements in MRP 1.0 and MRP 2.0, except reporting requirements, which were summarized above.

### 1.2.1. MRP 1.0 POC Monitoring Requirements (WY 2014 and WY 2015)

Provision C.8.e.i of MRP 1.0 required POC loads monitoring to assess inputs of POCs to the Bay from local tributaries and urban runoff, assess progress toward achieving wasteload allocations (WLAs) for TMDLs, and help resolve uncertainties associated with loading estimates for these pollutants. An RMP Small Tributaries Loading Strategy (STLS) developed a comprehensive planning framework to coordinate POC loads monitoring/modeling between the RMP and RMC participants. With concurrence of participating Regional Water Board staff, the framework presented an alternative approach to the POC loads monitoring requirements described in MRP Provision C.8.e.i, as allowed by Provision C.8.e. The STLS loads monitoring framework included intensive monitoring at six bottom-of-the watershed stations, including the Pulgas Creek Pump Station south drainage station in San Mateo County, which was operated by SMCWPPP. See section 2.0 and Gilbreath et al. (2016) for additional information.

### 1.2.2. MRP 2.0 POC Monitoring Requirements (WY 2016 - WY 2019)

Provision C.8.f of the MRP 2.0 (POC Monitoring) requires monitoring of several POCs including polychlorinated biphenyls (PCBs), mercury, copper, emerging contaminants[3], and nutrients. 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 for each POC that must address each Management Question. For example, over the first five years of the permit, a minimum total of 80 PCBs samples must be collected and analyzed. At least eight PCB samples must be collected each year. By the end of year four[4] of the permit term, each of the five Management Questions must be addressed with at least eight PCB samples. It is possible that a single sample can address more than one information need. The MRP's POC Monitoring requirements are summarized in Table 1.

The requirements in MRP 2.0 Provision C.8.f. (POC Monitoring) have been met through a variety of water quality programs and studies:

- SMCWPPP collects POC samples as part of its own water quality monitoring program to directly meet C.8.f. requirements.

[3] Emerging contaminant monitoring requirements will be met through participation in the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) special studies. The special studies will account for relevant contaminants of emerging concern (CECs) in stormwater and will address at least PFOS, PFAS, and alternative flame retardants being used to replace PBDEs.

[4] Note that the minimum sampling requirements addressing information needs must be completed by the end of year four of the permit (i.e., WY 2019); however, the minimum number of total samples does not need to be met until the end of year five of the permit (i.e., WY 2020).

- Other MRP provisions require studies or have information needs that are consistent with Provision C.8.f. requirements. The associated POC monitoring is credited towards these other provisions and Provision C.8.f.:
    - MRP Provisions C.11/12.a. require that Permittees develop and maintain a list of management areas (referred to as Watershed Management Areas or WMAs) in which 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 WMAs. Updated lists with identified control measures are provided with each of SMCWPPP's Annual Reports. Provision C.8.f supports C.11/12.a. requirements by requiring monitoring directed towards mercury and PCBs source identification.
    - MRP Provision C.12.e requires that Permittees sample caulk and other sealants used in storm drain or roadway infrastructure in the public right-of-way to investigate whether PCBs are present in such material and in what concentrations. SMCWPPP worked with other MRP Permittees through the Bay Area Stormwater Management Agencies Association (BASMAA) to complete a regional investigation that addressed this requirement. 54 samples of caulk and sealant materials from ten types of roadway and storm drain infrastructure were collected throughout the MRP area and combined into 20 composites that were tested for PCBs. Results of the investigation were documented by BASMAA (2018), a report submitted with the Countywide Program's FY 2017/18 Annual Report.
- To learn more about the effectiveness of selected stormwater treatment controls, SMCWPPP participated in two additional BASMAA regional projects. The studies were developed to satisfy Provision C.8.f requirements for SMCWPPP and other Bay Area stormwater programs to each collect at least eight PCBs and mercury samples that address Management Question No. 3 (Management Action Effectiveness). The studies investigated the effectiveness of hydrodynamic separator (HDS) units and various types of biochar-amended bioretention soil media (BSM) at removing PCBs and mercury from stormwater runoff:
    - A regional study evaluated the effectiveness of biochar-amended bioretention soil media (BSM) to remove PCBs and mercury from stormwater runoff collected in the MRP region. Twenty-six samples consisting of influent/effluent pairs from bench scale column tests of biochar-enhanced BSM were analyzed. Stormwater runoff was run through six columns with five different biochar-enhanced BSM mixes and one standard BSM as a control to evaluate which mix was most effective at removing PCBs and mercury. All five biochar-BSM blends showed evidence of overall improved PCBs and mercury performance compared to the standard BSM; however, the increased benefit relative to increased cost was not analyzed. Hydraulics were found to be a critical factor in achieving good pollutant removal in the columns suggesting that outlet controls could be used to enhance the performance of BMPs. Furthermore, this study suggested that an irreducible minimum concentration of PCBs may be 1,000 pg/L (BASMAA 2019a).
    - A regional study collected samples of the solids captured and removed from eight HDS unit sumps during cleanouts and analyzed for mercury and PCBs. Maintenance records and construction plans were reviewed to develop estimates of the average volume of solids removed per cleanout. This information was combined with the monitoring data to estimate the mass of pollutant removed. Across all eight units, the median percent PCBs removed ranged from 5% - 32% of the catchment pollutant load (BASMAA 2019b).

SMCWPPP also works collaboratively with our water quality monitoring partners to find mutually beneficial monitoring approaches. MRP Provision C.8.a.iii 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 San Mateo County through the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP), the Clean Watersheds for a Clean Bay (CW4CB) EPA grant-funded project, and the State's Stream Pollution Trends (SPoT) Monitoring Program are used by SMCWPPP to help address Provision C.8.f monitoring requirements.

Finally, MRP Provision C.12.g requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. The provision states: "the specific information needs include understanding the in-Bay transport of PCBs discharged in urban runoff, the sediment and food web PCBs concentrations in margin areas receiving urban runoff, the influence of urban runoff on the patterns of food web PCBs accumulation, especially in Bay margins, and the identification of drainages where urban runoff PCBs are particularly important in food web accumulation." C.12.g requires Permittees to report in this IMR "the findings and results of the studies completed, planned, or in progress as well as implications of studies on potential control measures to be investigated, piloted or implemented in future permit cycles." Attachment 1 provides a summary of a multi-year project by the San Francisco Bay (Bay) Regional Monitoring Program (RMP) that is addressing the requirements of Provision C.12.g. by identifying, modeling, and investigating embayments along the Bay shoreline designated "Priority Margin Units" (PMUs). The project:

- Identified four PMUs for initial study that are located downstream of urban watersheds where PCBs management actions are ongoing and/or planned;
- Is developing conceptual and PCBs mass budget models for each of the four PMUs; and
- Is conducting monitoring in the PMUs to evaluate trends in pollutant levels and track responses to pollutant load reductions.

## 1.3. Third-Party Data

The Countywide Program strives to work collaboratively with water quality monitoring partners to develop 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. As such, samples collected in San Mateo County through two ongoing programs, (1) the Small Tributary Loading Strategy (STLS) of the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) and (2) the State's Stream Pollution Trends (SPoT) Monitoring Program, supplement the Countywide Program's efforts towards achieving Provision C.8.f monitoring requirements. In addition, Clean Watersheds for a Clean Bay (CW4CB), a BASMAA project that was funded by a grant from USEPA and ended in 2017, provided data from WY 2012, WY 2013, and WY 2016. Third party monitoring conducted by the RMP, SPoT, and CW4CB also provides context for reviewing and interpreting Countywide Program monitoring results. As in past years, this POC Data Report evaluates PCBs and mercury data from third-party POC monitoring efforts, along with data collected by the Countywide Program.

### 1.3.1. RMP STLS

The RMP's Small Tributary Loading Strategy (STLS) Team typically conducts annual monitoring for POCs on a region-wide basis (Gilbreath et al., in preparation). SMCWPPP 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 addressing both short- and long-term municipal stormwater permit management questions. POC monitoring activities conducted by the STLS in recent years focused on pollutant loading monitoring at six region-wide stations (WY 2012 – WY 2014) (see Section 2.0), and wet weather characterization monitoring in catchments of interest (WY 2015 – present). The wet weather characterization sampling uses a similar approach to the PCBs and mercury sampling that has been implemented by SMCWPPP, and Countywide Program staff has assisted the STLS to select all of its PCBs and mercury monitoring stations in San Mateo County (see Section 4.2).

RMP STLS monitoring in WY 2020 is continuing to focus on wet weather characterization, targeting two stations in San Mateo County. Like WY 2019, in WY 2020 STLS monitored stations that were previously sampled but did not have elevated PCBs concentrations. Additional stations may be monitored using un-manned "remote" samplers that capture suspended sediment from the water column throughout the duration of their deployment which is typically during one storm event. The STLS Team has been pilot testing these devices since WY 2015 and recently concluded that they generate data adequate for evaluating whether a WMA should be prioritized for source property investigations.

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 and modeling 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 monitoring design concept included 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 2021.

### 1.3.2. SPoT Monitoring Program

SPoT conducts annual dry season monitoring (subject to funding constraints) of sediments collected from a statewide network of selected rivers and streams throughout California. The goal of the SPoT monitoring program is to investigate long-term trends in sediment toxicity and sediment contaminant concentrations and relate contaminant concentrations and toxicity to watershed land uses. Sites are targeted in bottom-of-the-watershed locations with slow water flow and appropriate micromorphology to allow deposition and accumulation of sediments, including a station (204SMA020) near the mouth of San Mateo Creek in the City of San Mateo.

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 a station near the mouth of San Mateo Creek. In most years, sediments are analyzed for PCBs, mercury, metals (including copper) toxicity, pesticides, and organic pollutants. In WY 2019, SPoT monitoring in San Mateo Creek did not include mercury or copper but samples were analyzed for PCBs, pesticides, organic pollutants, and toxicity. It is likely that SPoT monitoring in WY 2020 program will include mercury, copper, pesticides, and toxicity, but not PCBs (K. Siegler personal communication, August 2019). 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 208 through 2014 (Phillips et al. 2016). This report will be updated in the future.

**Table 1. MRP Provision C.8.f Pollutants of Concern Monitoring Requirements.**

| Pollutant of Concern | Media | Total Samples by the End of Year Five[d] | Yearly Minimum | Minimum Number 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 | 8 | 8 | 8 | 8 | 8 |
| Total Mercury | Water or sediment | 80 | 8 | 8 | 8 | 8 | 8 | 8 |
| Total & Dissolved Copper | Water | 20 | 2 | -- | -- | -- | 4 | 4 |
| Nutrients[a] | Water | 20 | 2 | -- | -- | -- | 20 | -- |
| Emerging Contaminants[b] | -- | -- | -- | -- | -- | -- | -- | -- |
| Ancillary Parameters[c] | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

[a] Ammonium[5], 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 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.

[5] There are several challenges to collecting samples for "ammonium" analysis. Therefore, samples are analyzed for total ammonia which is the sum of un-ionized ammonia ($NH_3$) and ionized ammonia (ammonium, $NH_{4+}$). Ammonium concentrations are calculated by subtracting the calculated concentration of un-ionized ammonia from the measured concentration of total ammonia. Un-ionized ammonia concentrations are 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.

# 2.0 POLLUTANT LOADING STATION (WYs 2014 AND 2015)

Provision C.8.e.i of MRP 1.0 required POC loads monitoring to assess inputs of POCs to the Bay from local tributaries and urban runoff, assess progress toward achieving wasteload allocations (WLAs) for TMDLs, and help resolve uncertainties associated with loading estimates for these pollutants. An RMP Small Tributaries Loading Strategy (STLS) was developed in 2009 by the STLS Team, which included representatives from BASMAA, Regional Water Board staff, RMP staff, and technical advisors. The objective of the STLS was to develop a comprehensive planning framework to coordinate POC loads monitoring/modeling between the RMP and RMC participants. With concurrence of participating Regional Water Board staff, the framework presented an alternative approach to the POC loads monitoring requirements described in MRP Provision C.8.e.i, as allowed by Provision C.8.e.

The STLS loads monitoring framework included intensive monitoring at six bottom-of-the watershed stations over several years to collect data needed in developing loading estimates from small tributaries for priority POCs. Four stations were set up and monitored beginning in October 2011. The monitoring was extended to include two additional stations, including the Pulgas Creek Pump Station south drainage station in San Mateo County (Figure 1), which were established in October 2012 to complete the monitoring network:

1. Lower Marsh Creek (Contra Costa County), established WY 2012
2. Guadalupe River (Santa Clara County), established WY 2012
3. Lower San Leandro Creek (Alameda County), established WY 2012
4. Sunnyvale East Channel (Santa Clara County), established WY 2012
5. North Richmond Pump Station (Contra Costa County), established WY 2013
6. Pulgas Creek Pump Station south drainage (San Mateo County), established WY 2013

The Pulgas Creek Pump Station south drainage station was operated by SMCWPPP. Discrete and composite stormwater runoff samples were collected over the rising, peak and falling stages of the hydrographs. Samples collected were analyzed PCBs, mercury, and other analytes consistent with MRP 1.0 Provision C.8.e., and turbidity was recorded continuously. A total of 33 stormwater runoff samples have been collected from this location, including four samples collected in WY 2011 before this location was established as a pollutant loading station:

- WY 2011 – four samples collected in February and March 2011.
- WY 2013 – four samples collected in March 2013.
- WY 2014 – 25 samples collected from November 2013 through March 2014.

The 33 samples had a highly elevated average PCBs particle ratio of 8,220 ng/g (see Section 4.2 for further details regarding San Mateo County stormwater runoff monitoring for PCBs and mercury). Gilbreath et al. (2016) provides complete details about the methods used and monitoring results for all six of the pollutant loading stations.

# 3.0 WY 2016 – 2019 POC MONITORING ACCOMPLISHMENTS

This section summarizes POC monitoring accomplishments during WY 2016 – WY 2019 in compliance with MRP 2.0 requirements.

In compliance with MRP Provision C.8.f. of MRP 2.0, SMCWPPP conducted POC monitoring for PCBs, mercury, copper, and nutrients in WY 2019. 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 2019, the agency conducting the monitoring, and the Management Questions addressed are listed in Table 2 (PCBs), Table 3 (mercury), Table 4 (copper), and Table 5 (nutrients). These tables also include this information for WY 2016 through WY 2019 and show cumulative progress towards the Provision C.8.f minimum sample requirements. Tables 2 through 5 show that the MRP-required minimum number of samples addressing each Management Question by the end of year four of the permit term was met or exceeded for all POCs.

Section 4.0 summarizes the QA/QC program that was implemented by the Countywide Program covering all aspects of POC monitoring during WYs 2014 – 2019. Figure 1 shows the POC monitoring stations in San Mateo County. Figure 1 includes all the relevant and readily available sediment and stormwater runoff sample stations in San Mateo County where PCBs were collected, ranging back to the early 2000s, in the context of evaluating progress to-date towards identifying PCBs source areas and properties in San Mateo County (discussed in Section 5.0). Section 6.0 discusses the results for monitoring for copper, nutrients, and emerging contaminants. Compliance with applicable water quality objectives (WQOs) is discussed in Section 7.0. Section 8.0 summarizes and discusses the POC monitoring data presented in this report.

# 4.0 SUMMARY OF DATA QUALITY FOR WYs 2016 – 2019

In accordance with MRP 1.0 and MRP 2.0 requirements, a comprehensive QA/QC program was implemented by the Countywide Program covering all aspects of POC monitoring conducted during WYs 2016 – 2019. The QA/QC protocols have been described in previous SMCWPPP UCMRs (SMCWPPP 2017a, 2018a, 2019a) and continued to be based upon the Quality Assurance Project Plan (QAPP) developed for the CW4CB project (AMS 2012) and the BASMAA Regional Monitoring Coalition (RMC) QAPP (BASMAA 2016).

Data were assessed for seven data quality attributes: (1) Representativeness, (2) Comparability, (3) Completeness, (4) Sensitivity, (5) Contamination, (6) Accuracy, and (7) Precision. Data Quality Objectives (DQOs) related to these categories were established to ensure that the data collected are of adequate quality for the intended uses. Attachment 2 contains a report summarizing the results of the WY 2019 data validation. Validation of data collected during WYs 2016 – 2018 is described in previous SMCWPPP UCMRs (SMCWPPP 2017a, 2018a, 2019a). Overall, the results of the QA/QC reviews suggest that the POC monitoring data generated during WYs 2016 – 2019 were of sufficient quality for the purposes of the POC monitoring program.

**Table 2. SMCWPPP/BASMAA and Third-Party POC Monitoring Accomplishments, PCBs, WYs 2016 - 2019.**

| Pollutant of Concern/ Organization | Number of PCBs 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 | |
| **WY 2019** | | | | | | | |
| SMCWPPP | 25 | 25 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| RMP STLS | 2 | 2 | 2 | -- | 2 | 2 | Stormwater runoff samples to characterize WMAs |
| SPoT | 1 | -- | -- | -- | -- | 1 | Creek bed sediment sample to assess trends (PCBs only, no mercury) |
| **WY 2018** | | | | | | | |
| SMCWPPP | 13 | 13 | 13 | -- | 13 | 13 | Stormwater runoff samples to characterize WMAs |
| SMCWPPP | 57 | 57 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| BASMAA | 5 | 5 | -- | -- | -- | -- | Regional public infrastructure caulk/sealant samples (1/4 of project total) |
| BASMAA | 8 | -- | -- | 8 | -- | -- | Regional HDS unit & biochar effectiveness study (1/4 of project total) |
| RMP STLS | 2 | 2 | 2 | -- | 2 | 2 | Stormwater runoff samples to characterize WMAs |
| SPoT | -- | -- | -- | -- | -- | -- | Creek bed sediment sample to assess trends |
| **WY 2017** | | | | | | | |
| SMCWPPP | 17 | 17 | 17 | -- | 17 | 17 | Stormwater runoff samples to characterize WMAs |
| SMCWPPP | 67 | 67 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| RMP STLS | 4 | 4 | 4 | -- | 4 | 4 | Stormwater runoff samples to characterize WMAs |
| SPoT | 1 | -- | -- | -- | -- | 1 | Creek bed sediment sample to assess trends (PCBs only, no mercury) |
| **WY 2016** | | | | | | | |
| SMCWPPP | 8 | 8 | 8 | -- | 8 | 8 | Stormwater runoff samples to characterize WMAs |
| RMP STLS | 7 | 7 | 7 | -- | 7 | 7 | Stormwater runoff samples to characterize WMAs |
| CW4CB | -- | -- | -- | 3 | -- | -- | BMP effectiveness samples at Bransten Road bioretention facilities |
| Total / MRP Minimum[b] | 217 / 80 | 207 / 8 | 53 / 8 | 11 / 8 | 53 / 8 | 55 / 8 | |

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

[b] The MRP overall minimum number of POC 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.

**Table 3. SMCWPPP/BASMAA and Third-Party POC Monitoring Accomplishments, Mercury, WYs 2016 - 2019.**

| Pollutant of Concern/ Organization | Number of Mercury 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 | |
| **WY 2019** | | | | | | | |
| SMCWPPP | 25 | 25 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| RMP STLS | 2 | 2 | 2 | -- | 2 | 2 | Stormwater runoff samples to characterize WMAs |
| SPoT | -- | -- | -- | -- | -- | -- | Creek bed sediment sample to assess trends |
| **WY 2018** | | | | | | | |
| SMCWPPP | 13 | 13 | 13 | -- | 13 | 13 | Stormwater runoff samples to characterize WMAs |
| SMCWPPP | 57 | 57 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| BASMAA | 8 | -- | -- | 8 | -- | -- | Regional HDS unit & biochar effectiveness study (1/4 of project total) |
| RMP STLS | 2 | 2 | 2 | -- | 2 | 2 | Stormwater runoff samples to characterize WMAs |
| SPoT | 1 | -- | -- | -- | -- | 1 | Creek bed sediment sample to assess trends (mercury only, no PCBs) |
| **WY 2017** | | | | | | | |
| SMCWPPP | 17 | 17 | 17 | -- | 17 | 17 | Stormwater runoff samples to characterize WMAs |
| SMCWPPP | 67 | 67 | -- | -- | -- | -- | Urban sediment samples to identify source areas |
| RMP STLS | 4 | 4 | 4 | -- | 4 | 4 | Stormwater runoff samples to characterize WMAs |
| SPoT | -- | -- | -- | -- | -- | -- | Creek bed sediment sample to assess trends |
| **WY 2016** | | | | | | | |
| SMCWPPP | 8 | 8 | 8 | -- | 8 | 8 | Stormwater runoff samples to characterize WMAs |
| RMP STLS | 7 | 7 | 7 | -- | 7 | 7 | Stormwater runoff samples to characterize WMAs |
| CW4CB | -- | -- | -- | 3 | -- | -- | BMP effectiveness samples at Bransten Road bioretention facilities |
| Total / MRP Minimum[b] | 211 / 80 | 202 / 8 | 53 / 8 | 11 / 8 | 53 / 8 | 54 / 8 | |

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

[b] The MRP overall minimum number of POC 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.

**Table 4. SMCWPPP/BASMAA and Third-Party POC Monitoring Accomplishments, Copper, WYs 2016 - 2019.**

| Pollutant of Concern/ Organization | 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 | |
| **WY 2019** | | | | | | | |
| SMCWPPP | 2 | -- | -- | -- | 2 | -- | Dry season creek water samples from mixed-use watersheds |
| **WY 2018** | | | | | | | |
| SMCWPPP | 4 | -- | -- | -- | 4 | 4 | Creek water samples collected during storm event and spring base flows |
| SPoT | 1 | -- | -- | -- | -- | 1 | Creek bed sediment samples to assess trends |
| **WY 2017** | | | | | | | |
| SMCWPPP | 1 | -- | -- | -- | 1 | -- | Copper analyzed on a subset of PCBs/Hg stormwater runoff samples |
| SMCWPPP | 5 | -- | -- | -- | 5 | 2 | Creek water samples collected during storm event and spring base flows[c] |
| SPoT | 1 | -- | -- | -- | -- | 1 | Creek bed sediment samples to assess trends |
| **WY 2016** | | | | | | | |
| SMCWPPP | 3 | -- | -- | -- | 3 | -- | Copper analyzed on a subset of PCBs/Hg stormwater runoff samples |
| Total / MRP Minimum[b] | 17 / 20 | NA | NA | NA | 15 / 4 | 8 / 4 | |

NA = Not Applicable. For this pollutant, the MRP does not require sampling to address the management question.

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

[b] The MRP overall minimum number of POC 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] One of these five samples was a PCBs/Hg stormwater runoff sample that was also analyzed for copper.

**Table 5. SMCWPPP/BASMAA and Third-Party POC Monitoring Accomplishments, Nutrients, WYs 2016 - 2019.**

| Pollutant of Concern/ Organization | 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 | |
| **WY 2019** | | | | | | | |
| SMCWPPP | 9 | -- | -- | -- | 9 | -- | Dry season creek samples at stations also sampled during spring base flows |
| **WY 2018** | | | | | | | |
| SMCWPPP | 4 | -- | -- | -- | 4 | -- | Creek water samples collected during storm event and spring base flows |
| **WY 2017** | | | | | | | |
| SMCWPPP | 5 | -- | -- | -- | 5 | -- | Creek water samples collected during storm event and spring base flows |
| **WY 2016** | | | | | | | |
| SMCWPPP | 2 | -- | -- | -- | 2 | -- | Creek water samples collected from bottom-of-the-watershed stations |
| Total / MRP Minimum[b] | 20 / 20 | NA | NA | NA | 20 / 20 | NA | |

NA = Not Applicable. For this pollutant, the MRP does not require sampling to address the management question.

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

[b] The MRP overall minimum number of POC 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.

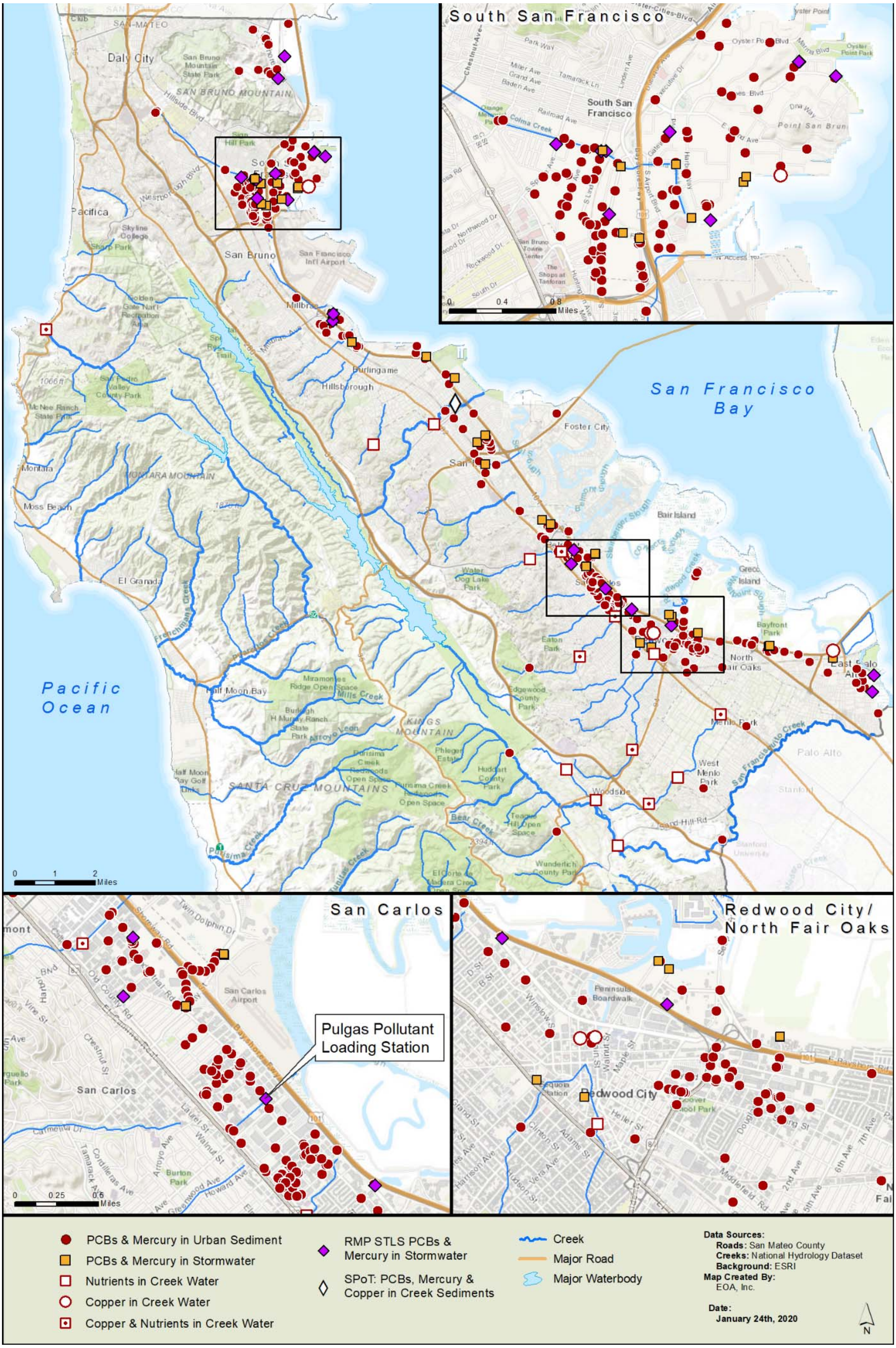


**Figure 1. POC Monitoring Stations in San Mateo County (includes all samples from early 2000s to WY 2019).**

# 5.0 Progress To-date Identifying PCBs and Mercury Sources

The below sections summarize progress to-date using POC monitoring (informed by records reviews) to identify sources of PCBs and mercury in San Mateo County stormwater runoff. The Countywide Program's PCBs and mercury monitoring has been focused on catchments in San Mateo County (referred to as Watershed Management Areas or WMAs) containing high interest parcels with land uses potentially associated with PCBs such as old industrial, electrical and recycling. PCBs and mercury monitoring conducted by SMCWPPP has primarily focused on addressing Management Question No. 1 (Source Identification), while contributing to the regional dataset being used to address Management Questions No. 2 (Contributions to Bay Impairment) and No. 3 (Loads and Status).

In addition to the efforts described in the below sections, during the past several years the RMP has conducted stormwater runoff monitoring in San Mateo County and other parts of the Bay Area through the STLS. As described earlier (Section 1.3.1), the STLS monitoring in San Mateo County was coordinated with SMCWPPP, with SMCWPPP staff assisting with selection of sampling stations and coordination with staff from local agencies. Monitoring objectives have included characterizing PCBs and mercury concentrations in stormwater runoff from the bottom of selected urban catchments with potential pollutant source areas. SMCWPPP (2017a, 2018a, and 2019a) include additional information on the STLS efforts in San Mateo County.

## 5.1. Sampling Summary and Chronology

The following sections summarize the general chronology of PCBs and mercury monitoring conducted in San Mateo County to characterize pollutant concentrations across the urban landscape and to identify source areas and properties. To-date, about 60 composite samples of stormwater runoff[6] have been collected from the bottom of San Mateo County WMAs and about 400 individual and composite grab samples of sediment have been collected within priority WMAs to help characterize the catchments and identify source areas and properties. Most samples were collected in the public ROW. The grab sediment samples were collected from a variety of types of locations, including manholes, storm drain inlets, driveways, streets, and sidewalks, often adjacent to or nearby high interest parcels with land uses associated with PCBs and/or other characteristics potentially associated with pollutant discharge (e.g., poor housekeeping, unpaved areas). SMCWPPP's PCBs and mercury monitoring program also included collecting sediment samples in the public ROW (e.g., from streets and the MS4) by every known PCBs remediation site in San Mateo County, to the extent applicable and feasible.

When a previously unknown potential source property was revealed via the PCBs and mercury monitoring program, SMCWPPP conducted a follow-up review of current and historical records regarding site occupants and uses, hazardous material/waste use, storage, and/or release, violation notices, and any remediation activities. Apart from databases such as EPA's Toxic Release Inventory (TRI) and Envirofacts, and the State of California's Geotracker and Envirostor, the most useful records were often kept by San Mateo County Department of Environmental Health.

Four previously unknown potential source properties have been identified in San Mateo County, all in WMA 210 (Pulgas Creek Pump Station South) in the City of San Carlos. SMCWPPP is working with the City of San Carlos to determine next steps for these properties, including potential referral to the

[6] Not including about 30 additional stormwater runoff samples collected at the Pulgas Creek pump station stormwater loading station.

Regional Water Board (see Section 5.5.6 for more details). In addition, SMCWPPP's PCBs and mercury monitoring program has resulted in SMCWPPP referring four properties (two sets of two adjacent properties, all in San Carlos) to the Regional Water Board for potential further PCBs investigation and abatement (see Section 5.5.6).

### 5.1.1. WY 2000 through WY 2014

From 2000 to 2015, SMCWPPP and others conducted periodic sediment sampling programs in San Mateo County to begin to characterize the distribution of PCBs in various land uses throughout the urban landscape and identify catchments and properties within catchments that are potential sources of PCBs to the MS4. During this period, over 270 sediment samples were collected in San Mateo County, mainly from streets and MS4s in the public right-of-way (e.g., storm drain lines accessed via manholes, storm drain inlets, drainage channels, and pump station sumps). The samples were analyzed for PCBs congeners, total mercury, and ancillary analytes (KLI and EOA 2002, SMSTOPPP 2002, 2003, and 2004, Yee and McKee 2010, SMCWPPP 2015, and CW4CB 2017a).

The initial step in the sediment sampling programs was a 2000 and 2001 collaborative project among SMCWPPP and other Bay Area countywide stormwater programs referred to as the Joint Stormwater Agency Project (JSAP). The JSAP measured concentrations of PCBs, mercury and other pollutants in sediments collected from stormwater conveyance systems in San Mateo County and other parts of the Bay Area (KLI and EOA 2002). The primary goal was to characterize the distribution of pollutants among land uses in watersheds draining to the Bay.

In follow-up to the JSAP regional survey, SMCWPPP and other Bay Area countywide stormwater programs began performing "case studies" in some areas where relatively elevated PCBs were found during the JSAP. The primary goals were to develop methods to identify PCBs sources and begin to identify measures to address any controllable sources found. The techniques employed included collection and analysis of stormwater conveyance sediment samples and research on historical and current land use. In the early 2000s, SMCWPPP completed PCBs case study work in four San Mateo County areas where elevated levels of PCBs were found during the JSAP survey. The case studies investigated the Bradford and Broadway pump station drainages in Redwood City, the South Maple pump station drainage in South San Francisco, an area in the vicinity of Colma Creek, and the Pulgas Creek pump station drainage in San Carlos (SMSTOPPP 2002, 2003, and 2004).

In 2007, a State of California Proposition 13 grant-funded study by the San Francisco Estuary Institute (SFEI) collected street dirt and MS4 sediment samples in the City of San Carlos in San Mateo County and other parts of the Bay Area (Yee and McKee 2010). In addition, beginning in 2010 SMCWPPP partnered with the Bay Area Stormwater Management Agencies Association (BASMAA) in the USEPA grant-funded Clean Watersheds for a Clean Bay (CW4CB) project to conduct additional investigation of PCBs sources to the MS4 in the Pulgas Creek pump station drainage in San Carlos (CW4CB 2017a).

In WY 2014, SMCWPPP worked with San Mateo County MRP Permittees to conduct a process to screen for "high interest parcels" for PCBs in the county. The process was generally consistent with a framework developed through a collaboration of SMCWPPP and the other Bay Area countywide stormwater programs in consultation with Regional Water Board staff. The screening covered all land areas in the county that drain to the Bay, focusing on about 160,000 urban parcels. Parcels were identified that were industrialized in 1980 or earlier (i.e., old industrial parcels) or have other land uses associated with PCBs (i.e., electrical, recycling, and military). SMCWPPP then worked with municipal staff to prioritize these parcels based on the evaluation of existing information on current land uses and practices (e.g., redevelopment status, extent and quality of pavement, level of current housekeeping, any history of stormwater violations, and presence of electrical or heavy equipment, storage tanks, or stormwater treatment), local institutional/historical knowledge, and surveys of site conditions (windshield, Google Street View, and/or aerial photograph). The prioritization resulted in a list of about 1,600 high interest parcels for PCBs in San Mateo County (SMCWPPP 2015).

### 5.1.2. WY 2015

In January and February 2015, SMCWPPP designed a monitoring plan based on the results of the 2014 screening for high interest parcels. SMCWPPP then collected 101 sediment samples from the urban storm drainage system (e.g., manholes, storm drain inlets) and public right-of-way surfaces (e.g., street gutters). The general goal was to continue attempting to identify potential source areas for PCBs. Samples were distributed among the nine municipalities that collectively encompass 93% of the old industrial land use in San Mateo County that drains to San Francisco Bay (SMCWPPP 2015).

### 5.1.3. WY 2016

Provisions C.11.a.iii and C.12.a.iii require that Permittees provide a list of management areas in which new PCBs and mercury control measures will be implemented during the permit term. These management areas were designated Watershed Management Areas (WMAs). In FY 2016, SMCWPPP implemented a process to identify WMAs and prioritize them based on the potential for controls (especially source property referrals) to reduce PCBs loads. Progress toward developing the list was initially submitted in a report dated April 1, 2016 (SMCWPPP 2016a) and the initial list was submitted with SMCWPPP's FY 2015/16 Annual Report (SMCWPPP 2016b).

The 1,600 high interest parcels described above are almost entirely located within 105 "catchments of interest" with high interest parcels comprising at least 1% of their area (and usually with existing pollutant controls). WMAs were defined as the sum of the 105 catchments of interest and an additional 25 catchments with existing or planned stormwater pollutant controls (e.g., GI implemented on parcels per Provision C.3 requirements, built on public lands such as parks, or retrofitted into the public ROW), for a total of about 130 catchments designated as WMAs (SMCWPPP 2016a and b). It should be noted that WMA catchments are stormwater runoff hydrologic catchments in San Mateo County that drain to 24-inch or larger diameter outfalls. These urban catchments were originally delineated at this geographical scale as part of SMCWPPP's program to help local agencies develop trash controls in San Mateo County (SMCWPPP 2014).[7]

Finally, during the WY 2016 rainy season SMCWPPP collected eight composite samples of stormwater runoff. The samples were collected from outfalls at the bottom of WMAs that contain high interest parcels (i.e., with land uses associated with PCBs such as old industrial, electrical and recycling, as described above). The RMP STLS collected an additional seven stormwater runoff composite samples in

[7] The WMA numbering system starts with the numerical designations (ranging from 0 to 408) used by SMCWPPP (2014). Additional WMAs were delineated for areas that contain parcels of interest but were not delineated in 2014, with numerical designations ranging from 1000 to 1017. These 18 WMAs were not necessarily hydrologic catchments. They combine areas that drain to outfalls ≥ 24-inches, drain directly to natural waterways including the Bay, and/or private drainages. Finally, additional WMAs were delineated that lack parcels of interest but include pollutant controls (mainly GI in old urban parcels that were redeveloped). These WMAs are not hydrologic catchments and were delineated for each Permittee that drains to the Bay. They were designated "Other –" followed by three letters representing the jurisdiction (e.g., Other – SSF for South San Francisco).

San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2017a).

### 5.1.4. WY 2017

SMCWPPP's major WY 2017 POC monitoring efforts included the following:

- Collected 17 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs. The RMP STLS collected an additional four stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2018a).
- Collected 61 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2018a).
- Continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2018b).

### 5.1.5. WY 2018

SMCWPPP's major WY 2018 POC monitoring efforts included the following:

- Collected 13 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs. The RMP STLS collected an additional two stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2019a).
- Collected 50 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2019a).
- Continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2019b).

### 5.1.6. WY 2019

During WY 2019, SMCWPPP collected 25 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes. In addition, the RMP STLS collected two stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. The results of the WY 2019 and prior PCBs and mercury monitoring are summarized in the following sections.

As part of continuing to develop strategies for reducing PCBs and mercury loads in stormwater runoff, the Countywide Program evaluated its WY 2019 PCBs and mercury stormwater runoff and sediment data, additional WY 2019 stormwater runoff sample data collected through the RMP STLS (see Section 1.3.1), and similar data from previous water years collected by the Countywide Program and through the STLS. Objectives included attempting to identify source areas and properties within WMAs, identifying which WMAs provide the greatest opportunities for implementing cost-effective PCBs controls, and prioritizing WMAs for potential future investigations. The results of the evaluation are described in the remaining subsections in Section 5.0.

## 5.2. San Mateo County Stormwater Runoff Monitoring for PCBs and Mercury

To prioritize WMAs for stormwater sampling, SMCWPPP evaluated several types of data, including: land use, PCBs and mercury concentrations from prior sediment and stormwater runoff sampling efforts, municipal storm drain maps showing pipelines and access points (e.g., manholes, outfalls, pump stations), and logistical/safety considerations. Composite samples, consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations), are analyzed for the 40 PCBs congeners used by the RMP for Bay samples[8] (method EPA 1668C), total mercury (method EPA 1631E), and suspended sediment concentration (SSC; method ASTM D3977-97).

During WYs 2016 – 2018, SMCWPPP collected 38 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels (SMCWPPP did not collect stormwater runoff samples in WY 2019). From WYs 2015 – 2019, an additional 21 composite stormwater samples were collected through the RMP's STLS, with four of the RMP's STLS samples being at previously sampled sites. Prior to that, from WYs 2011 – 2014, the RMP STLS collected 43 grab samples at four sites, with the majority being at the Pulgas Creek Pump Station south catchment loading station. The total of about 100 samples (at 59 unique sites) primarily help address Management Questions No. 1 (Source Identification) and Management Question No. 4 (Loads and Status). These data will 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. PCBs and mercury stormwater runoff sampling results are summarized in Attachment 3.

Of the 59 stormwater runoff samples collected in San Mateo County from WY 2015 - 2019 by the Countywide Program and the RMP, ten samples had PCBs particle ratios greater than 0.5 mg/kg, twelve were between 0.2 and 0.5 mg/kg, and the remainder were below 0.2 mg/kg.

Table 6 summarizes PCBs, mercury, and SSC monitoring results for stormwater runoff samples collected in San Mateo County (by the Countywide Program and RMP STLS) through WY 2019. "Total PCBs" was calculated as the sum of the RMP 40 congeners. Particle ratio is calculated by dividing the total pollutant (PCBs or mercury) concentration by SSC. Assuming a pollutant is entirely bound to suspended sediments in the water sample, particle ratios estimate the average concentration of pollutant on the suspended sediment and are sometimes referred to as particle concentration. Since PCBs and mercury are hypothesized to primarily be bound to sediment in aquatic environments, particle ratios are often used to normalize pollutant concentrations in samples with varying levels of suspended sediment.

[8] PCBs congeners 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, 203.

**Table 6. Descriptive Statistics – PCBs and Mercury Concentrations in San Mateo County Stormwater Runoff and Natural Waterway Water Samples through WY 2019[a]**

| | PCBs (ng/L)[b] | Hg (ng/L) | SSC (mg/L) | PCBs Particle Ratio (ng/g)[c] | Hg Particle Ratio (ng/mg)[c] |
|---|---|---|---|---|---|
| **Min** | ND[d] | 0.44 | 3.20 | ND | 0.008 |
| **10th Percentile** | 1.79 | 2.86 | 13.9 | 30.3 | 0.03 |
| **25th Percentile** | 1.82 | 3.33 | 14.2 | 34.3 | 0.04 |
| **50th Percentile** | 6.20 | 12.6 | 43.7 | 167 | 0.31 |
| **75th Percentile** | 13.0 | 20.5 | 68 | 365 | 0.48 |
| **90th Percentile** | 49.5 | 40.2 | 148 | 936 | 0.74 |
| **Max** | 448 | 71.1 | 719 | 8,222 | 2.28 |
| **Mean** | 22.0 | 16.4 | 76.3 | 524 | 0.39 |

[a] Based upon 59 PCBs sampling stations and 38 mercury sampling stations. Results have been averaged for stations with more than one sample.
[b] Total PCBs calculated as sum of RMP 40 congeners.
[c] PCBs and Hg Particle Ratios calculated by dividing total PCBs and Hg concentrations by SSC, respectively.
[d] Not Detected.

For sites with more than one sample, total PCBs concentrations were averaged in Table 6. In addition, for sites with multiple samples, particle ratios in Table 6 were calculated by dividing the sum of PCBs concentrations by the sum of suspended sediment concentrations. This averaging is essentially equivalent to compositing all the individual samples that have been collected at a site. This is consistent with the RMP STLS approach to data evaluation (Gilbreath et al., in preparation).

Low PCBs concentrations in composite stormwater runoff samples from the bottom of WMA catchments have suggested that either PCBs sources are not prevalent in the catchment or the samples are "false negatives." False negatives could be the result of low rainfall/runoff rates failing to mobilize sediments from source areas and/or other factors. Only a few stormwater runoff sampling stations in San Mateo County have been resampled, but the results from two such stations in South San Francisco, as described by SMCWPPP (2018), suggested small storm sizes may have resulted in false negatives. SMCWPPP, in collaboration with the SCVURPPP, has recently preliminarily developed a method to normalize results from this type of stormwater runoff monitoring based upon storm intensity. However, the high variability in many of the parameters involved led to a high degree of uncertainty in the evaluation results. SMCWPPP and the SCVURPPP will continue to evaluate normalization methods and results as more data become available in future years, in coordination with related efforts by the RMP (referred to as the RMP's "Advanced Data Analysis").

## 5.3. Regional Stormwater Runoff Monitoring for PCBs and Mercury

This section evaluates data collected by the Countywide Program to-date on PCBs concentrations in stormwater runoff and natural waterways in the context of similar data collected regionally. The analysis included data from other Bay Area countywide stormwater programs and the RMP STLS (Gilbreath et al., in preparation). The dataset includes stormwater runoff samples collected from 138 municipal separate storm sewer system (MS4) bottom of catchment stations and water samples from 28 natural waterways (usually creeks with generally natural channels) throughout the Bay Area. The MS4 catchment sites included storm drain manholes, outfalls, pump stations, and artificial channels.[9] Many of the sites have been sampled more than once and/or have multiple sample results reported for individual storm events. Nineteen of the 138 MS4 sites have multiple sample results (sample counts of 2 to 80) and 18 of the 28 natural waterway sites have multiple sample results (sample counts of 2 to 126).

PCBs concentrations in Bay Area stormwater runoff and natural waterway samples (n=166) are shown in Figure 2. PCBs particle ratios are shown in Figure 3. Figures 2 and 3 compare samples collected in San Mateo County to samples collected outside of the County. Two of the four highest PCBs concentrations in the overall stormwater runoff sample dataset are for samples collected in San Mateo County, with Pulgas Creek Pump Station South having the highest PCBs concentration (average 448 ng/L) and SM-SCS-75A (Industrial Road Ditch) having the fourth highest concentration (160 ng/L). The 33 samples collected at Pulgas Creek Pump Station South station had very elevated PCBs concentrations. The site has had the two highest PCBs concentrations (6,669 ng/L and 4,084 ng/L) measured out of 748 total individual samples collected regionally and the four highest PCBs particle ratios (37 mg/kg, 21 mg/kg, 15 mg/kg, and 15 mg/kg).

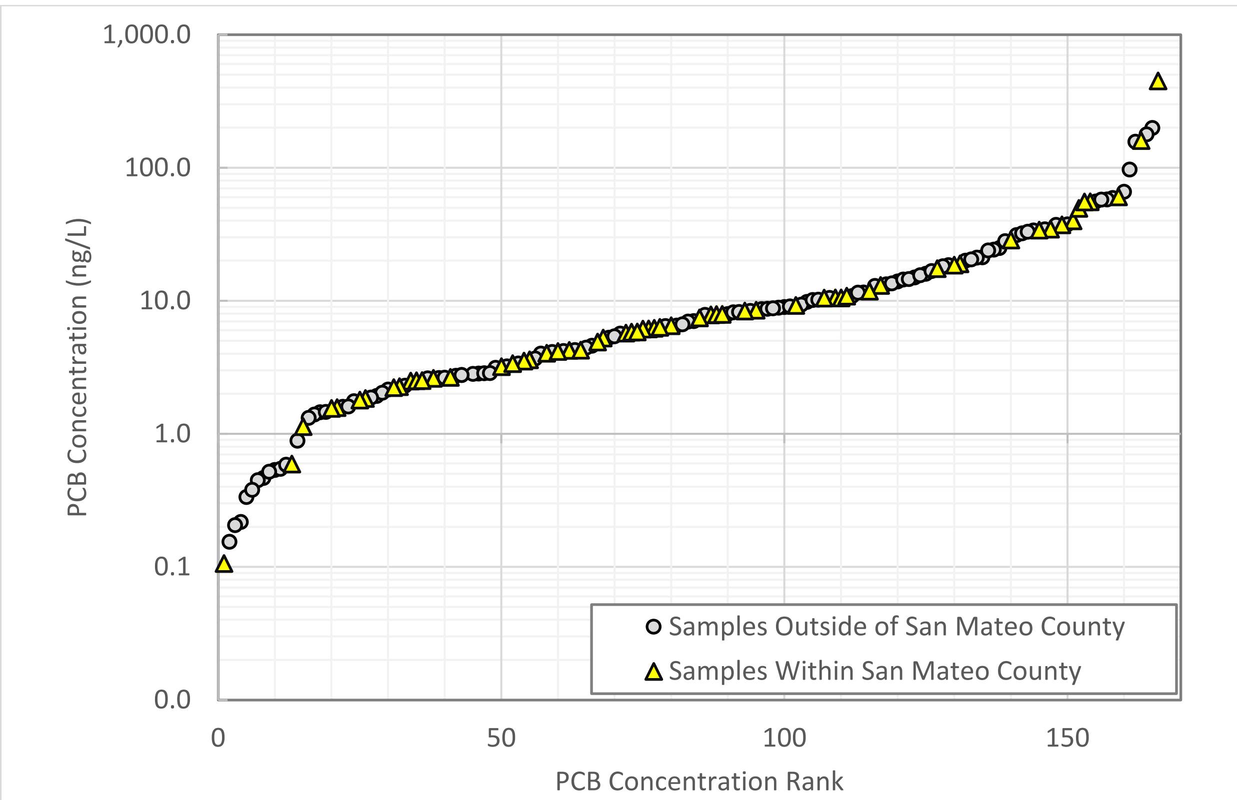


**Figure 2. PCBs Concentrations in Stormwater Runoff Samples Collected in MS4s and Natural Waterways in the Bay Area.**

[9] Stormwater runoff samples have also been collected from inlets and/or treatment systems (e.g., bioretention) during special studies. However, those are not included in this analysis.

Table 7 provides descriptive statistics for PCBs and mercury concentrations in the Bay Area stormwater runoff and natural waterway dataset (n=166). The median PCB concentration is 6.98 ng/L and the mean is 18.9 ng/L. The median PCB particle ratio is 0.01 mg/kg and the mean is 0.37 mg/kg. As can be seen in Figures 2 and 3, which are plotted on a log scale, there are a few catchments with highly elevated in PCBs (such as the Pulgas Creek Pump Station catchments) that greatly influence the mean concentration relative to the median (i.e., 50th percentile).

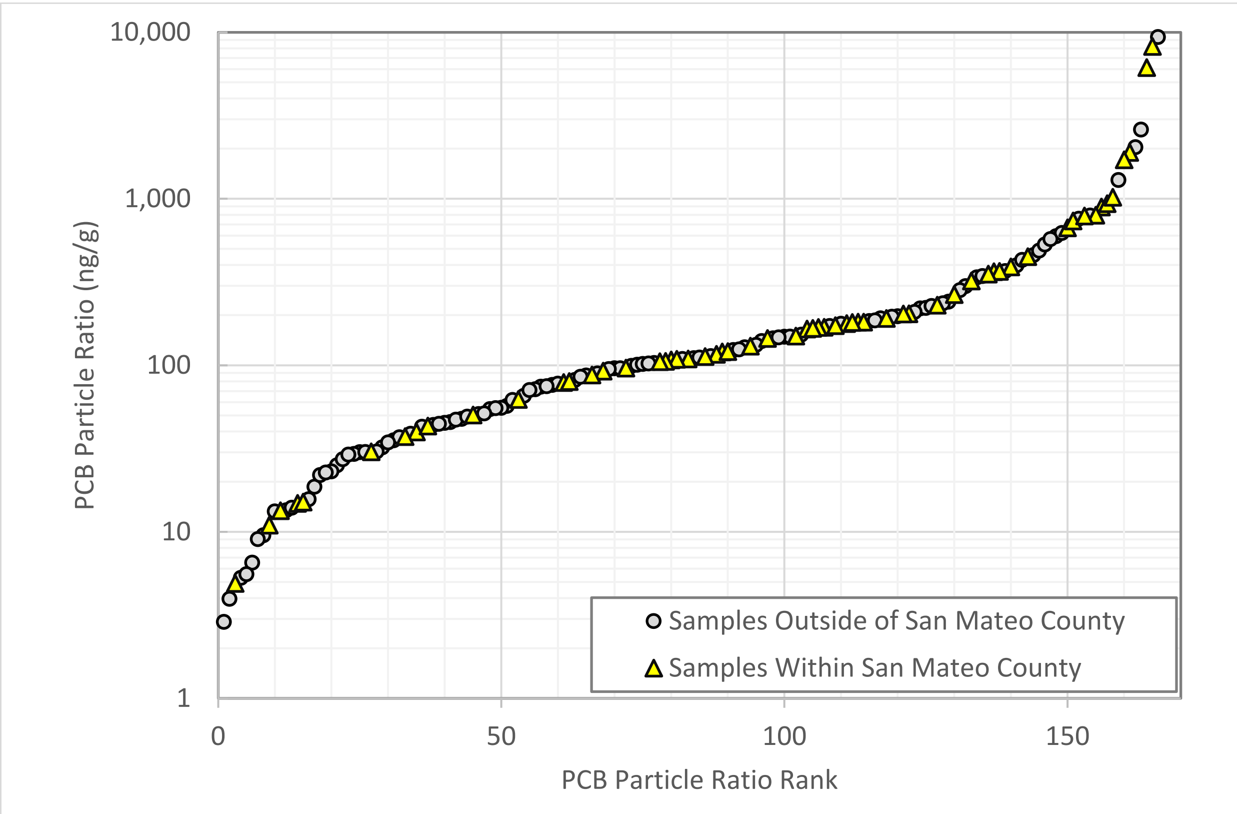


**Figure 3. PCBs Particle Ratio in Stormwater Runoff Samples Collected in Large MS4s and Natural Waterways in the Bay Area.**

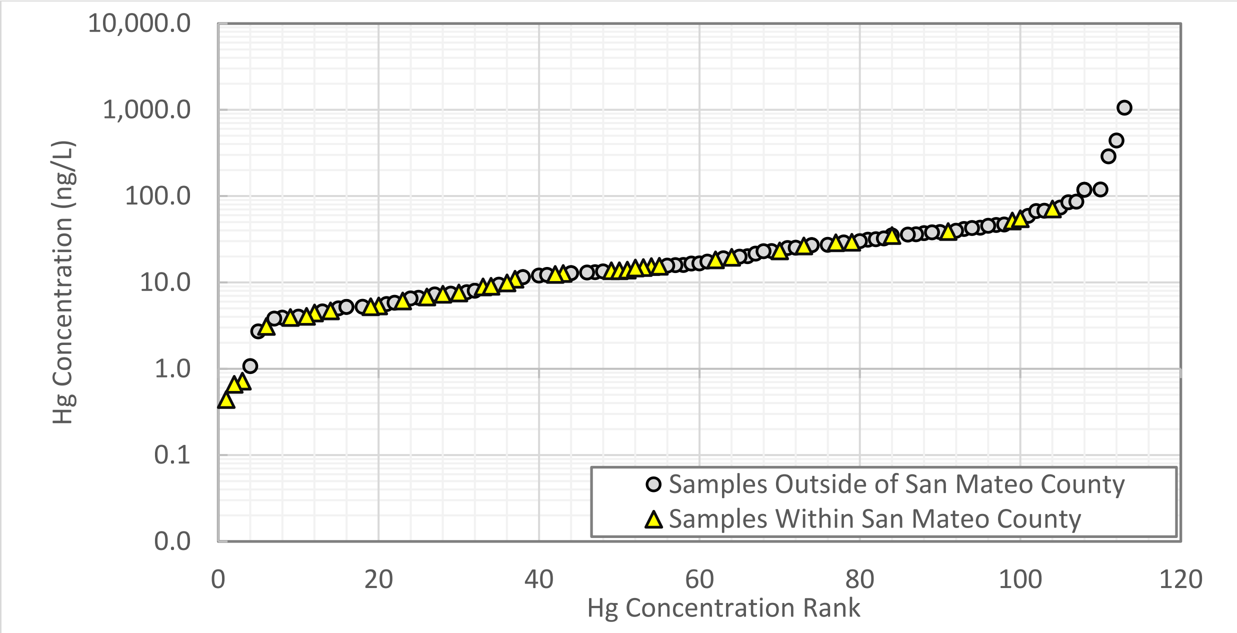


**Figure 4. Mercury Concentrations in Stormwater Runoff Samples Collected in MS4s and Natural Waterways in the Bay Area.**

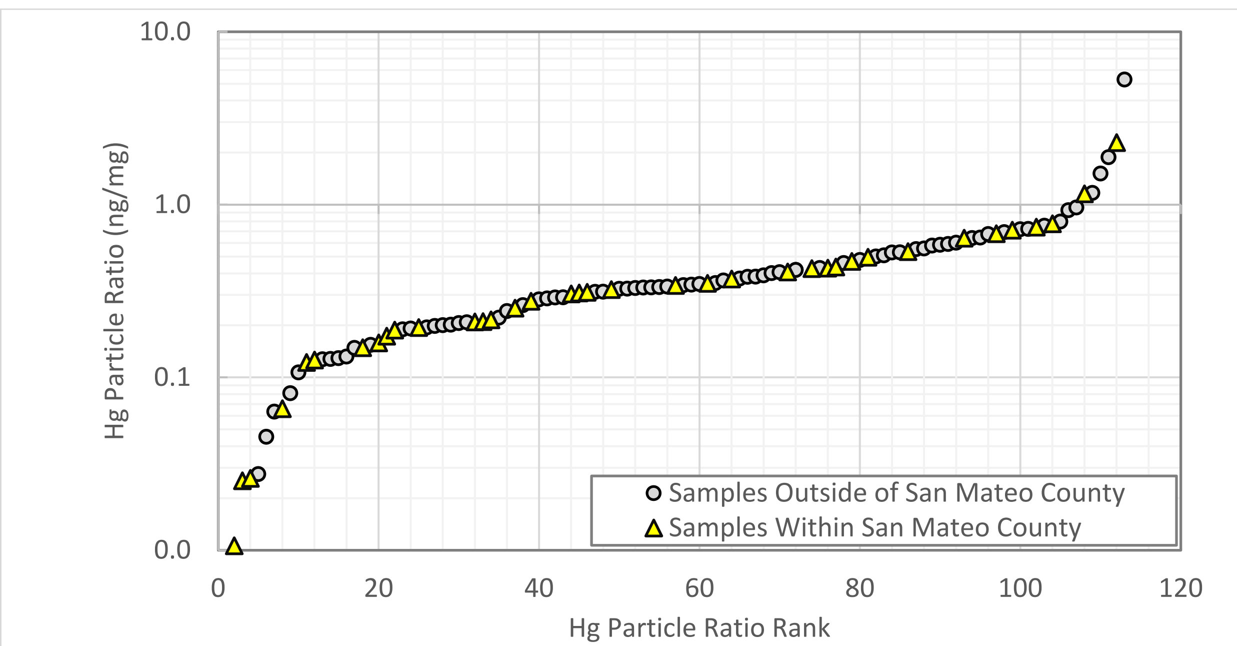


**Figure 5. Mercury Particle Ratio in Stormwater Runoff Samples Collected in Large MS4s and Natural Waterways in the Bay Area.**

**Table 7. Descriptive Statistics – PCBs and Mercury Concentrations in Bay Area Stormwater Runoff and Natural Waterway Water Samples through WY 2019[a]**

| | PCBs (ng/L)[b] | Hg (ng/L) | SSC (mg/L) | PCBs Particle Ratio (ng/g)[c] | Hg Particle Ratio (ng/mg)[c] |
|---|---|---|---|---|---|
| **Min** | ND[d] | 0.44 | 3.20 | ND | 0.008 |
| **10th Percentile** | 1.37 | 4.21 | 15.7 | 17.8 | 0.12 |
| **25th Percentile** | 2.70 | 7.36 | 29.2 | 46.7 | 0.20 |
| **50th Percentile** | 6.98 | 15.8 | 55.0 | 110 | 0.34 |
| **75th Percentile** | 16.1 | 35.4 | 112 | 222 | 0.53 |
| **90th Percentile** | 38.1 | 67.2 | 244 | 690 | 0.75 |
| **Max** | 448 | 1,053 | 2,630 | 9,343 | 5.29 |
| **Mean** | 18.9 | 39.4 | 126 | 367 | 0.46 |

[a] Based upon 166 PCBs sampling stations and 113 mercury sampling stations. Results have been averaged for stations with more than one sample.
[b] Total PCBs calculated as sum of RMP 40 congeners.
[c] PCBs and Hg Particle Ratios calculated by dividing Total PCBs and Hg concentrations by SSC, respectively.
[d] Not Detected.

## 5.4. San Mateo County Sediment Monitoring for PCBs and Mercury

Since WY 2001, about 400 sediment samples have been collected in San Mateo County as part of investigations to identify source properties within WMAs, potentially for referral to the Regional Water Board for further investigation and potential abatement. These samples were collected in the public right-of-way (ROW), including locations adjacent to high interest parcels. Individual and composite sediment samples were collected from manholes, storm drain inlets, driveways, streets, and sidewalks.

Each sample was analyzed for the RMP 40 PCBs congeners and total mercury. Total PCBs was calculated as the sum of the 40 congeners. The laboratory passed all samples through a 2 mm sieve before analysis to remove gravel and cobbles. Table 8 compares the descriptive statistics for POC sediment samples that have been collected in San Mateo County up to WY 2019, WY 2019 samples, and all Bay Area wide samples. The mean and median PCBs concentrations were lower in WY 2019 than previous years. For the WY 2019 PCBs samples, no samples were above 1.0 mg/kg, one was between 0.5 and 1.0 mg/kg, two were between 0.2 and 0.5 mg/kg and 22 were below 0.2 mg/kg. The median was 0.024 mg/kg and the mean was 0.087 mg/kg. For the WY 2019 mercury samples, none was above 1.0 mg/kg, three were between 0.3 and 1.0 mg/kg, and 22 were below 0.3 mg/kg. The median was 0.120 mg/kg and the mean was 0.155 mg/kg.

Attachment 4 summarizes PCBs and mercury sediment monitoring locations and analytical results. The results are discussed by selected WMA in the following sections, along with sediment data from previous Water Years and the stormwater runoff data collected to-date.

**Table 8. Descriptive Statistics – San Mateo County Sediment Sample PCBs and Mercury Concentrations**

| | Bay Area All Samples To-date | | San Mateo County WYs 2001-2018 | | San Mateo County WY 2019 | |
|---|---|---|---|---|---|---|
| **Number of Samples** | **1535** | **1349** | **379[b]** | **327** | **25** | **25** |
| | **PCBs (mg/kg)[a]** | **Hg (mg/kg)** | **PCBs (mg/kg)[a]** | **Hg (mg/kg)** | **PCBs (mg/kg)[a]** | **Hg (mg/kg)** |
| **Min** | ND | ND | ND | 0.006 | ND | 0.010 |
| **10th Percentile** | ND | 0.054 | 0.003 | 0.047 | ND | 0.018 |
| **25th Percentile** | 0.009 | 0.086 | 0.014 | 0.064 | 0.004 | 0.056 |
| **50th Percentile** | 0.041 | 0.149 | 0.044 | 0.100 | 0.024 | 0.120 |
| **75th Percentile** | 0.161 | 0.294 | 0.132 | 0.177 | 0.131 | 0.203 |
| **90th Percentile** | 0.773 | 0.740 | 0.565 | 0.333 | 0.332 | 0.461 |
| **Max** | 193 | 20.6 | 193 | 3.93 | 0.556 | 0.561 |
| **Mean** | 0.652 | 0.410 | 1.00 | 0.211 | 0.087 | 0.155 |

[a] Total PCBs calculated as sum of RMP 40 congeners.
[b] Includes 26 samples from three PCBs cleanup reports in San Carlos and Redwood City.

## 5.5. Watershed Management Area Status

The Countywide Program evaluated the monitoring data to-date to help categorize WMAs by level of PCBs in existing stormwater runoff and sediment samples.[10] Based upon the data collected in San Mateo County to-date by the Countywide Program and other parties (e.g., the RMP's STLS), catchments of interest were categorized into the following five groups:

1. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) greater than 0.5 mg/kg (500 ng/g) and source properties have been identified within the catchment.
2. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) greater than 0.5 mg/kg (500 ng/g) and source properties have not been identified within the catchment.
3. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) between 0.2 – 0.5 mg/kg (200 – 500 ng/g).
4. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) less than 0.2 mg/kg (200 ng/g).
5. No samples collected to-date.

[10] This section focuses on "catchments of interest," which as described earlier (Section 5.1) are a subset of the list of San Mateo County WMAs. The list of 130 WMAs includes 105 "catchments of interest" with high interest parcels for PCBs comprising at least 1% of their area. The remaining 25 WMAs include PCBs and mercury controls such as green infrastructure on parcels but lack high interest parcels.

Figure 6 is a map illustrating the current status of WMAs in San Mateo County, based on the sediment and stormwater runoff monitoring results to-date.[11] Only WMAs with high interest parcels were included in Figure 6.

Attachment 5 provides a summary of PCBs and mercury monitoring results for San Mateo county WMAs. For each WMA, Attachment 5 includes:

- The WMA area, the area of high interest parcels in the WMA, and the percent of the total WMA area that is comprised of high interest parcels;
- A summary of the number of stormwater runoff and sediment samples collected to-date in the WMA; and
- The median and range of PCBs concentrations in the samples collected to-date in the WMA (median and range of PCBs particle ratio for stormwater runoff samples).

Attachments 3, 4 and 5 summarize PCBs and mercury monitoring results for stormwater runoff and sediment samples collected in San Mateo County.[12] Based on the available data to-date (e.g., sediment and stormwater runoff monitoring and land use research through WY 2019), WMAs with stormwater runoff sample PCBs particle ratios and/or sediment sample PCBs concentrations ≥0.2 mg/kg, and/or other features relevant to PCBs investigations, are described in the following sections, which are organized by the applicable municipalities.

[11] Where sediment and stormwater runoff particle ratio analysis results conflict, the higher result was conservatively applied.

[12] The WMA IDs in San Mateo County are numerical (1 – 1017). Sample names consist of a prefix for the county (SM), followed by a three-letter prefix for the Permittee where the sample was collected (e.g., SSF for South San Francisco, SCS for San Carlos), followed by the WMA ID, and followed by a letter (e.g., A, B, C) to distinguish the sampling site from the WMA in which that sample was collected. Samples collected previously may have a different sample naming convention.

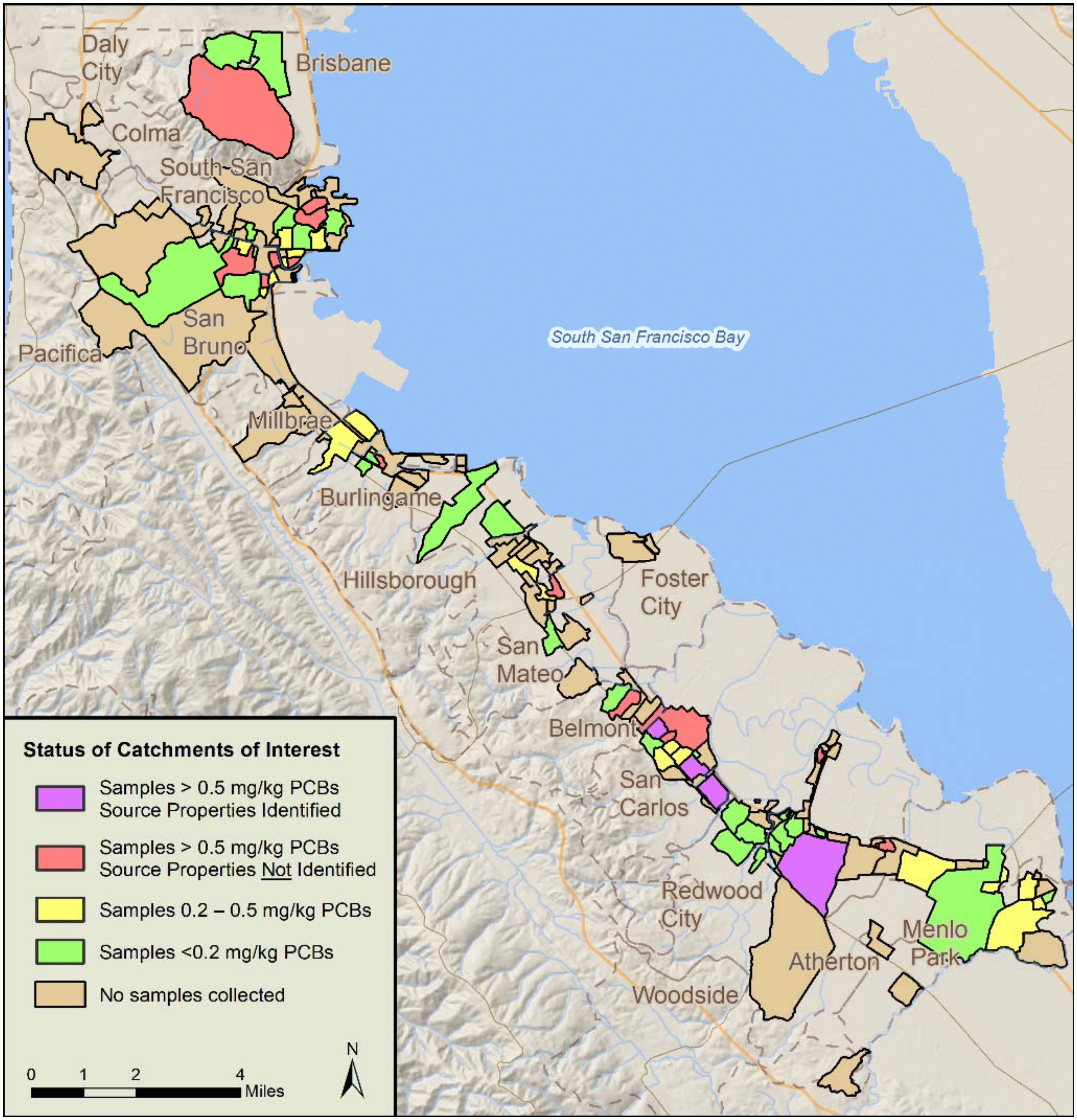


**Figure 6. San Mateo County WMA Status Based upon Total PCBs Concentration in Sediment and/or PCBs Particle Ratio in Stormwater Runoff Samples Collected through WY 2019.**

### 5.5.1. City of Brisbane

WMAs in the City of Brisbane with PCBs particle ratios over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 7 and briefly described below. It should be noted that the industrial area in the northeast corner of Figure 7 drains to San Francisco's combined sewer and is therefore considered non-jurisdictional.

**WMA 17**

WMA 17 is a large catchment that corresponds to the watershed of the now underground Guadalupe Creek. It contains a large industrial area developed mostly in the 1960s and buildings of the type that would be expected to potentially have PCBs in building materials. Several old railroad lines used to support the industries. A sediment sample collected during WY 2015 in one of the two main lines under Valley Drive had elevated levels of PCBs (1.22 mg/kg) despite potential dilution due to the large size of the watershed. A stormwater runoff sample collected by the RMP in WY 2016 (SM-BRI-17A or Valley Dr SD) had a relatively low PCBs particle ratio of 0.11 mg/kg. Six additional sediment samples were collected in WY 2018, with one of the samples having elevated PCBs (1.02 mg/kg), and the remaining samples all under 0.2 mg/kg. The elevated sample was collected from an inlet that drains a portion of one of the old railroad lines. Another four sediment samples were collected in WY 2019 along the old railroad line with one of the samples having an elevated PCBs concentration (0.56 mg/kg), and the other three being below 0.2 mg/kg PCBs. Despite the above attempts to iteratively hone in on a source area in this WMA, none of the sediment samples collected to-date with elevated PCBs appears appear to be associated with a specific parcel. However, it is possible that additional sediment sampling could lead to identifying specific source property(ies) (e.g., within the railroad ROW).

**WMA 1004**

WMA 1004 is located along Tunnel Avenue in the Brisbane Baylands area. Stormwater runoff sample SM-BRI-1004A (Tunnel Avenue Ditch) was collected by the RMP in WY 2016 and had a relatively low PCBs particle ratio of 0.11 mg/kg. The catchment has a high proportion of high interest properties, including containing all of the Brisbane Baylands old railyard and a large PG&E property on Geneva Avenue. The Baylands area is an active cleanup site (although not for PCBs) and will eventually be redeveloped. Several sediment samples collected in past years in the vicinity of the PG&E property and historical railroad lines had relatively low PCBs concentrations (<0.2 mg/kg PCBs).

**WMA 350**

WMA 350 is upstream of WMA 1004, and contains a PCBs cleanup site (Bayshore Elementary) that was redeveloped in 2017. The PCBs were associated with the original building materials and it therefore appears unlikely that there is an ongoing source of PCBs to the MS4. One sediment sample collected downstream of the school in WY 2018 had a relatively low concentration of PCBs.

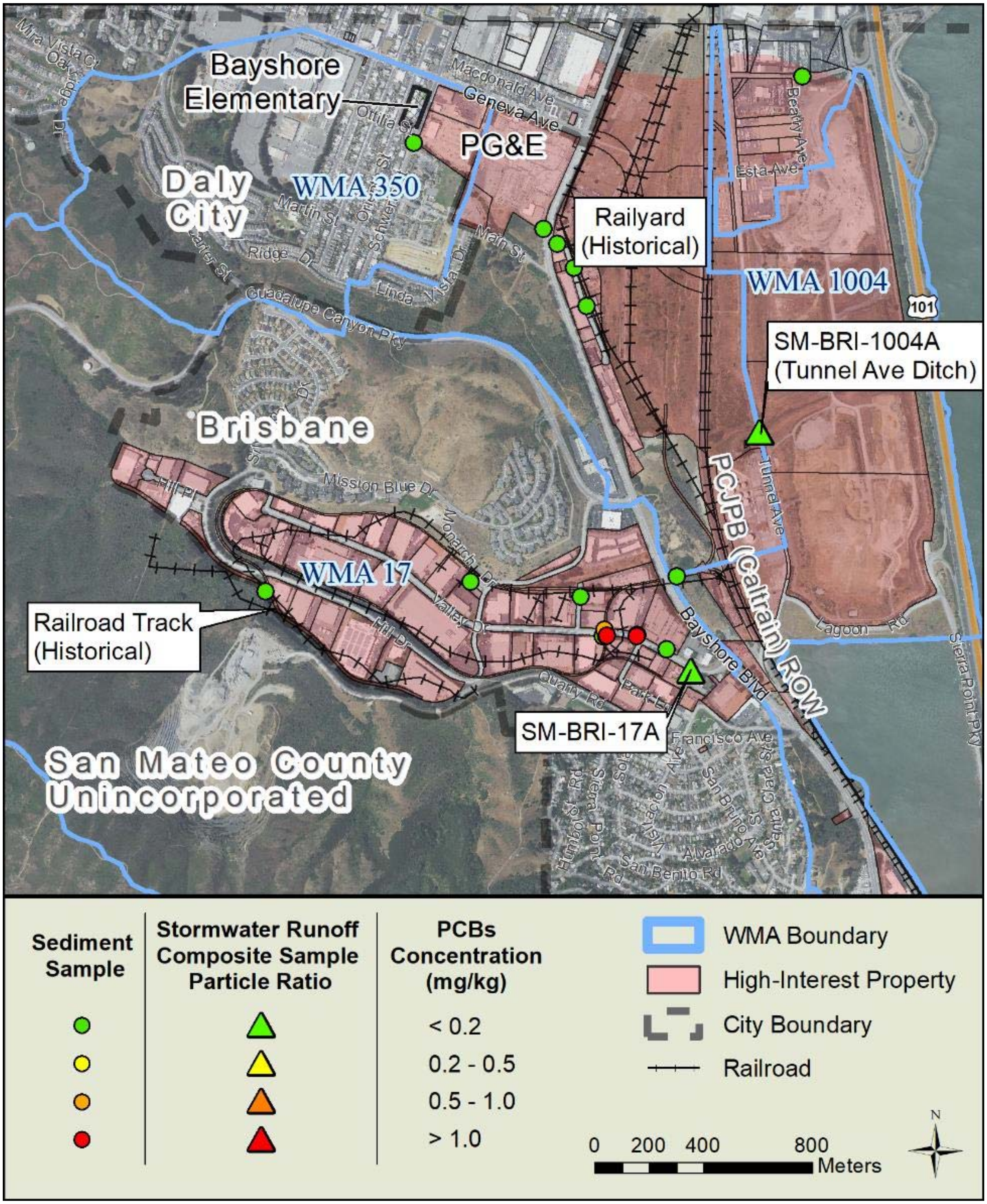


**Figure 7. WMAs 17, 350, and 1004.**

### 5.5.2. City of South San Francisco

WMAs in the City of South San Francisco with PCBs particle ratios over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figures 8 through 12 and briefly described below.

**WMA 291**

WMA 291 is a relatively large catchment that is comprised almost entirely of old industrial land uses. A stormwater runoff sample collected by the RMP in WY 2017 had an elevated PCB particle ratio (0.74 mg/kg). A 2002 sediment sample at 245 S. Spruce Avenue had an elevated PCBs concentration of 2.72 mg/kg and this property was referred to the Regional Water Board in June 2003. However, since that time, investigations have not shown further evidence that this property is a source of PCBs to the MS4. Sediment samples in WY 2015 and WY 2017 on Linden Avenue near Dollar Avenue were also moderately elevated for PCBs (0.48 and 0.44 mg/kg). Two sediment samples were collected near 245 S. Spruce Avenue in WY 2018, one of which was moderately elevated for PCBs (0.21 mg/kg). The moderately elevated sample was collected from the boundary of the property and a historical railroad, which now is part of the current BART right-of-way. Investigations in this WMA have iteratively collected a total of 19 sediment samples, but except for the tentative identification of 245 S. Spruce Avenue, source properties have not been identified.

**WMA 294**

WMA 294 is a 67-acre catchment that drains into Colma Creek at Mitchell Avenue. Within the WMA is 166 Harbor Way, designated in the Department of Toxic Substances Control (DTSC) Envirostor database as "Caltrans/SSF Maintenance Station." This property was purchased by Caltrans which tested the soil and found several contaminants including PCBs. The contaminated soil has been capped since at least 2005 and the property is currently mostly vacant with a small portion devoted to k-rail storage. A sediment sample was collected in the driveway of this property in WY 2017 had a moderately elevated PCBs concentration of 0.28 mg/kg. A stormwater runoff sample collected in WY 2017 also had a moderately elevated PCBs particle ratio (0.37 mg/kg).

**WMA 314**

WMA 314 is a 66-acre catchment located near Oyster Point that is comprised of light industrial land uses along with an old railroad right-of-way. Site SM-SSF-314A (Gull Dr. SD) was sampled by the RMP STLS in WY 2015 and resampled in WY 2018 and had an elevated PCBs particle ratio in both samples (0.95 and 0.86 mg/kg, respectively). The WY 2018 sample had a total PCBs concentration (71 ng/L) that was about an order of magnitude higher than the WY 2015 sample (8.6 ng/L). Two sediment samples collected in WY 2017 both had relatively low (urban background) concentrations of PCBs, with the highest concentration being 0.15 mg/kg. Another sediment sample taken in WY 2019 also had a low PCBs concentration of 0.02 mg/kg. Thus, the efforts to-date have not identified any source area(s) associated with the elevated PCBs particle ratios in the stormwater runoff samples. However, it is possible that additional sediment sampling could lead to identifying specific source property(ies) (i.e., within the railroad ROW).

**WMA 315**

WMA 315 is a 108-acre catchment with an outfall very close to the outfall for WMA 314. WMA 315 is comprised almost entirely of light industrial land uses. The RMP STLS collected a stormwater runoff sample at the bottom of this catchment in WY 2016 and then resampled the same station in WY 2018 (Gull Drive station). Total PCBs (5.8 ng/L) and PCBs particle ratio (0.18 mg/kg) were relatively low in the WY 2016 sample, but roughly an order of magnitude higher in the WY 2018 sample (total PCBs = 93.2 ng/L and PCBs particle ratio = 1.02 mg/kg). Five sediment samples were collected in this catchment in WY 2019, with two of the samples having moderately elevated PCBs concentration (0.27 and 0.43 mg/kg). Both samples were along railroads, one active and one historic. Thus, the efforts to-date have not identified any source area(s) associated with the elevated PCBs particle ratios in the stormwater runoff sample. However, it is possible that additional sediment sampling could lead to identifying specific source property(ies) (e.g., within the railroad ROW).

**WMA 319**

WMA 319 is also located near Oyster Point. Sample SM-SSF-319A (Forbes Blvd Outfall) was collected by the RMP STLS in WY 2016 and had a relatively low PCBs particle ratio of 0.08 mg/kg. Although the catchment was historically industrial, it is now mostly redeveloped and composed of biotechnology corporations. A sediment sample in WY 2017 also had a relatively low (0.06 mg/kg) PCBs concentration.

**WMA 358**

WMA 358 is a small 32 acre catchment that drains into Colma Creek at Utah Avenue. A sediment sample collected in WY 2015 had an elevated PCBs concentration (1.46 mg/kg). Three follow-up sediment samples collected in WY 2017 all had relatively low (urban background) levels of PCBs, with the highest concentration being 0.09 mg/kg. Another follow-up sediment sample collected in WY 2019 also had a low concentration ( 0.03 mg/kg). Stormwater runoff samples have not been collected from this catchment and would be challenging to collect because of tidal inundation. The attempts to-date to identify a source area in this WMA have not succeeded. However, it is possible that additional sediment sampling could be more fruitful.

**WMA 359**

WMA 359 is a small 23 acre catchment that drains into Colma Creek behind 222 Littlefield Avenue. In WY 2017 the RMP STLS collected a stormwater runoff sample with a somewhat elevated PCBs particle ratio of 0.79 mg/kg. The catchment is composed of all old industrial land uses including old railroad tracks. In WY 2018, three follow-up sediment samples collected in the catchment all had relatively low PCBs concentrations (less than 0.2 mg/kg). Another follow-up sediment sample collected in WY 2019 also had a low PCBs concentration (0.13 mg/kg). Based on the work conducted to-date, it appears that identifying any source areas via additional sediment sampling in this WMA's public ROW would be challenging.

**WMA 1001**

WMA 1001 is a large 345-acre catchment that is composed of all the non-contiguous small catchments along Colma Creek that have outfall diameters of 18-inches and smaller. In WY 2018, a stormwater runoff sample collected from this catchment had a relatively low total PCBs concentration of 1,100 ng/L, but a moderately elevated PCBs particle ratio of 0.35 mg/kg. Six sediment samples collected in 2015 and 2018 had relatively low concentrations ( ≤ 0.09 mg/kg).

**WMA 1001B**

In WY 2017, a stormwater runoff sample (SM-SSF-1001B) collected on Shaw Road near this catchment's outall to Colma Creek had an elevated PCBs particle ratio (1.7 mg/kg). This catchment is very small and only drains about five light industrial properties along Shaw Road including historical rail lines. A sediment sample collected in this catchment in WY 2015 had a concentration of 0.46 mg/kg. Five additional sediment samples were collected in this catchment in WY 2018, with one having a moderately elevated PCBs concentration of 0.35 mg/kg, and the other five all having relatively low concentrations ( ≤ 0.06 mg/kg). During WY 2019, two sediment samples were also collected along Shaw Road in WMA 362 (just south of WMA 1001) to investigate an electrical property and another property that straddles both WMAs. Both had low concentrations of PCBs ( ≤ 0.07 mg/kg).

**WMA 1001D**

Between 2000 and 2015, seven samples were collected in this catchment with two of the samples (from 2000 and 2007) having a moderately elevated PCBs concentration (0.23 and 0.43 mg/kg). The remaining five samples all had low concentrations of PCBs (< 0.04 mg/kg). During an attempt in WY 2017 to sample stormwater runoff near the outfall of this catchment, field workers observed that this catchment likey drains to the south to WMA 291.

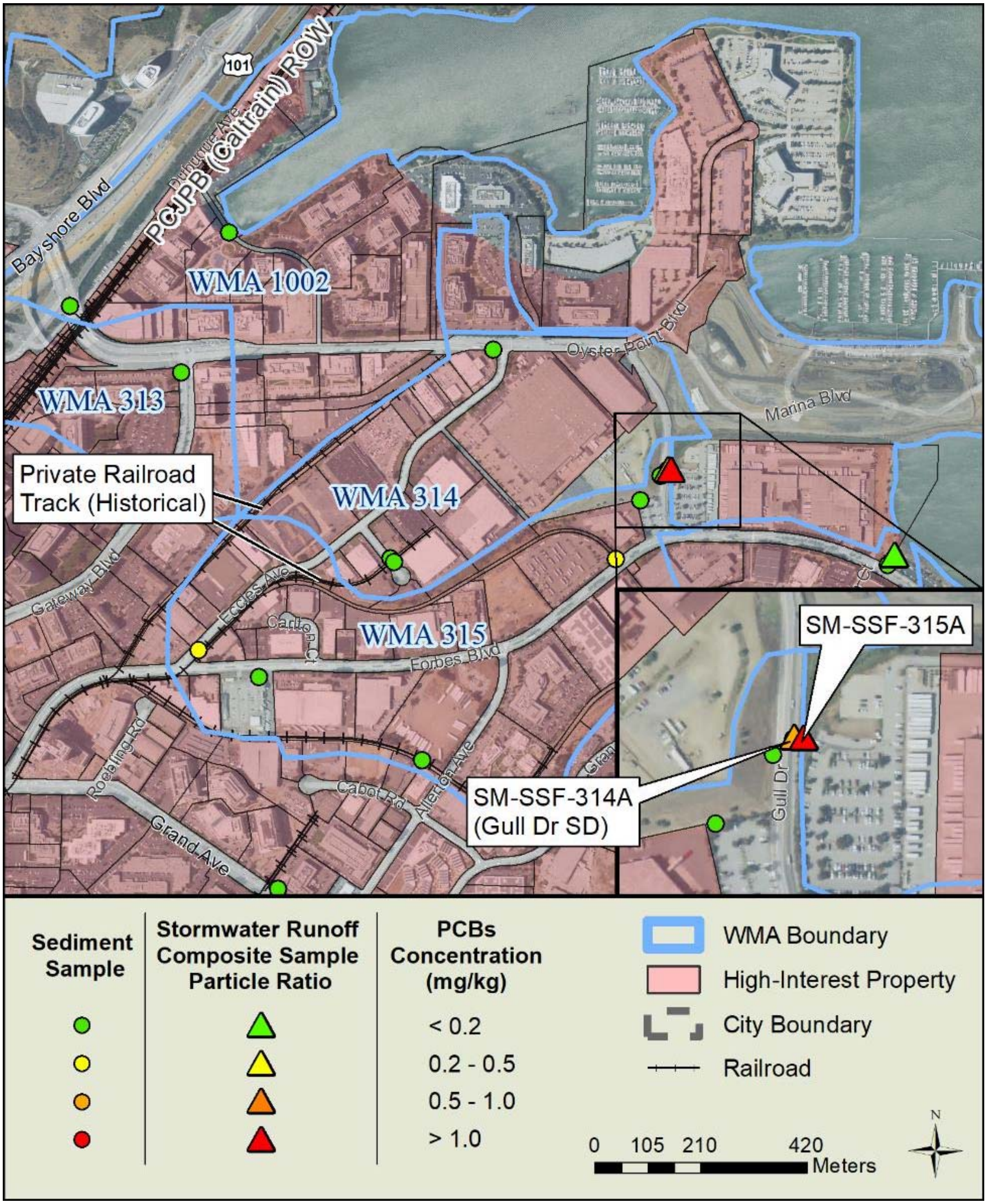


**Figure 8. WMAs 313, 314, 315, and 1002**

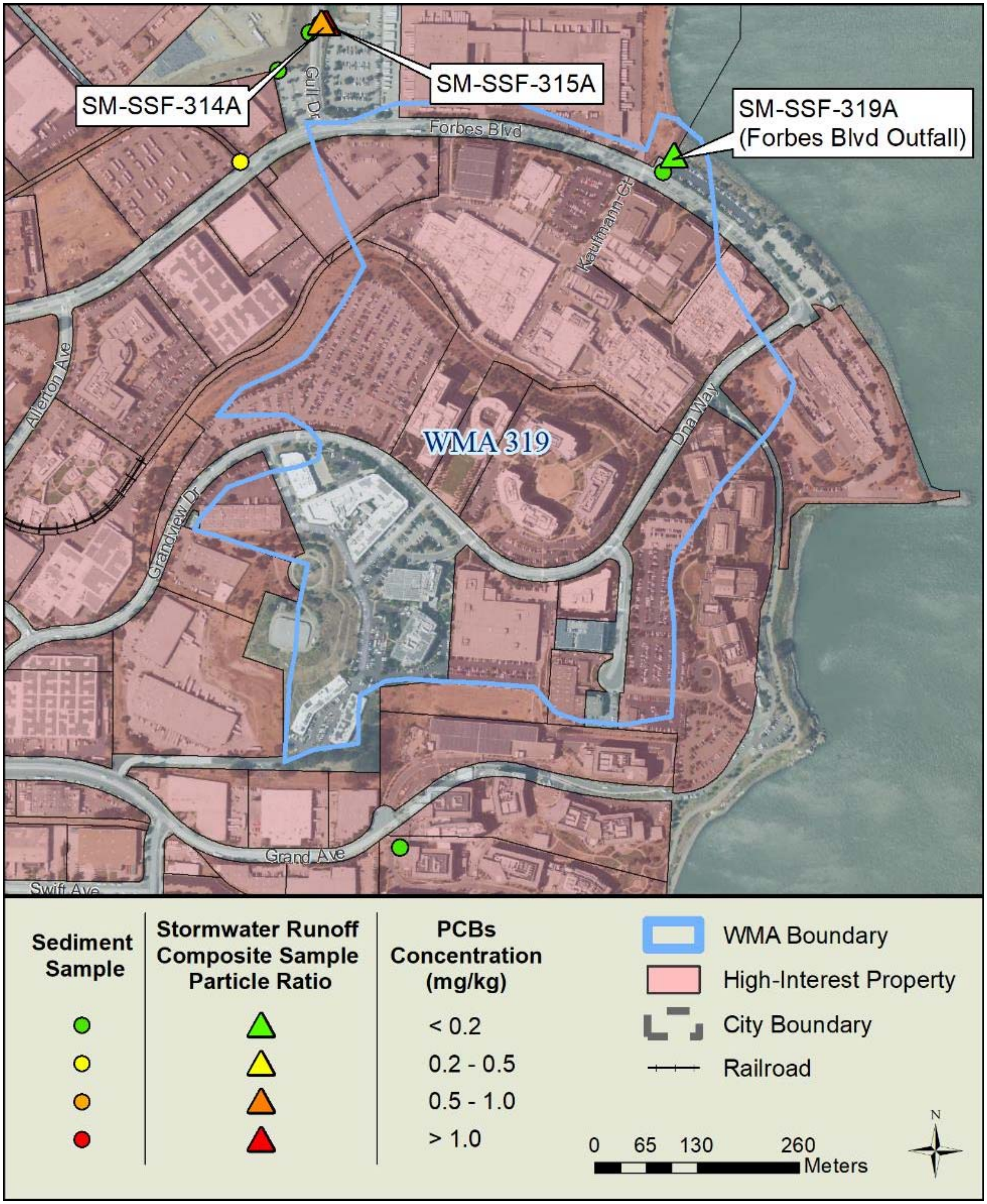


**Figure 9. WMA 319**

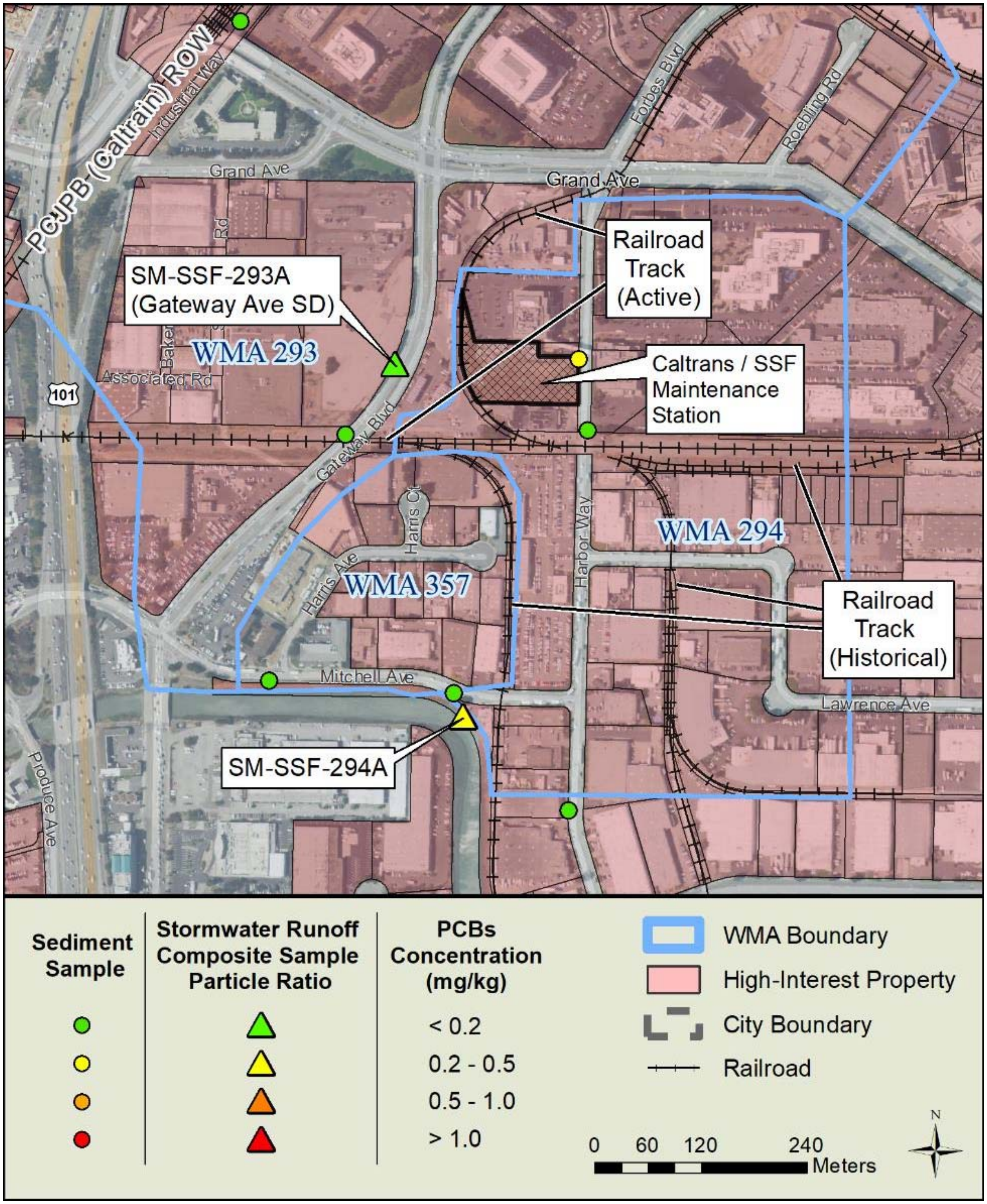


**Figure 10. WMAs 293, 294, and 357**

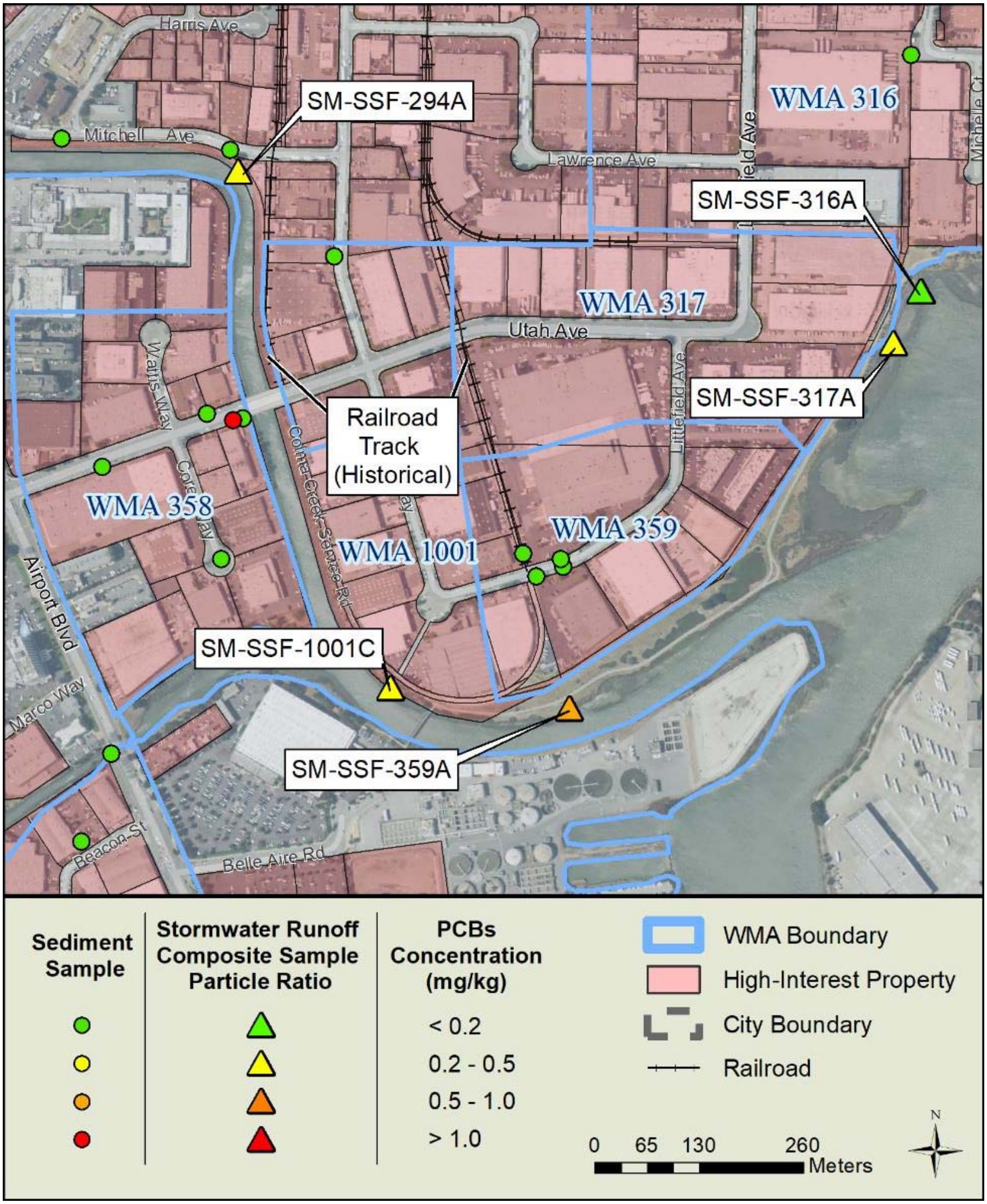


**Figure 11. WMAs 316, 317, 358, 359, and 1001**

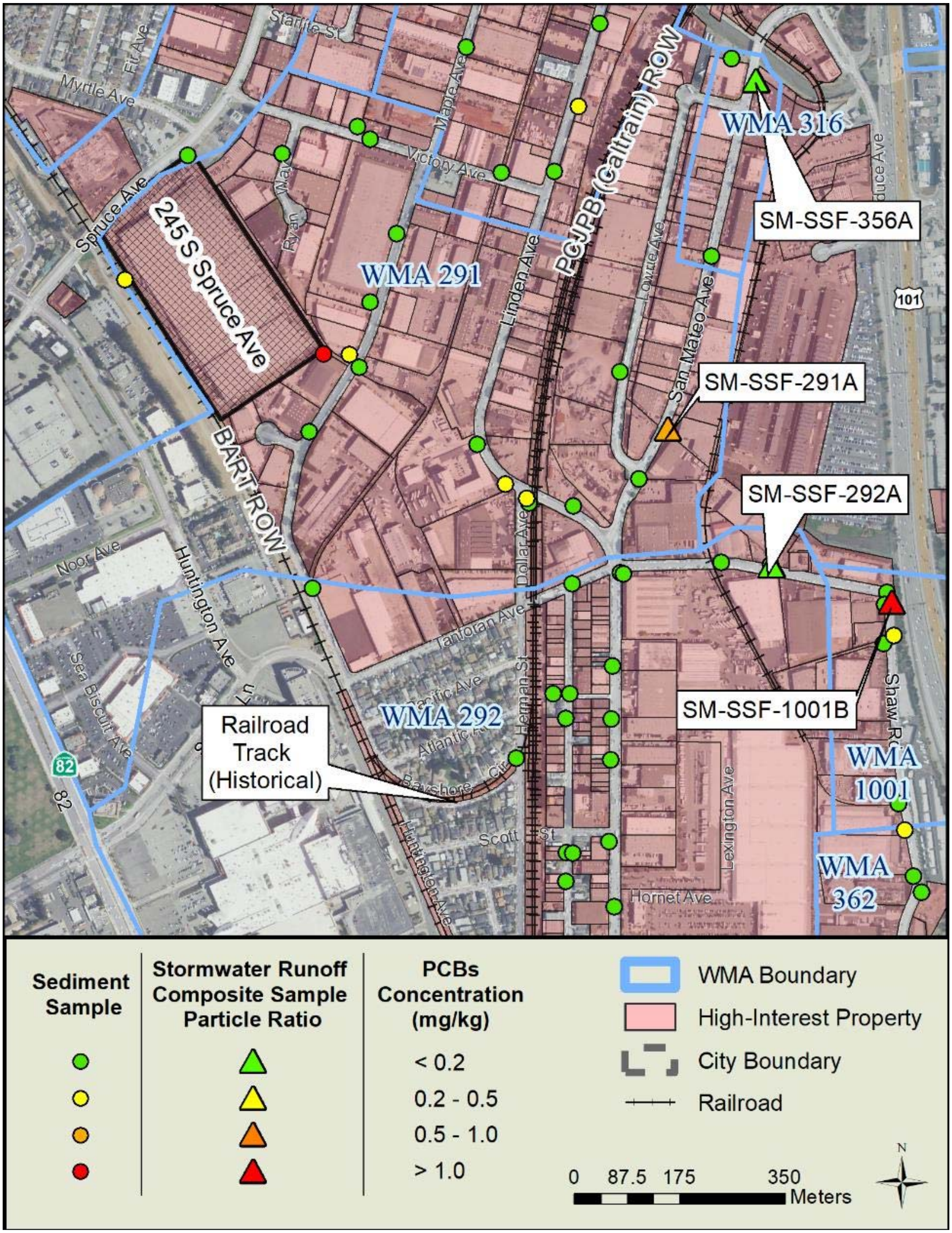


**Figure 12. WMAs 291, 292, 316, and 1001**

### 5.5.3. City of Burlingame

WMAs in the City of Burlingame with PCBs particle ratio over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figures 13 and 14 and briefly described below.

**WMA 85**

WMA 85 is a 121-acre catchment northwest of Highway 101 in Burlingame that is comprised mostly of light industrial land uses. A stormwater sample collected in WY 2018 had a slightly elevated PCBs particle ratio of 0.24 mg/kg, and a repeat sample of the same location by the RMP in WY 2019 had a PCBs particle ratio of 0.33 mg/kg and a relatively high total PCBs concentration of 31.1 ng/l. Two previous sediment samples collected in this WMA had relatively low concentrations (less than 0.2 mg/kg), including one at a pump station.

**WMA 142**

WMA 142 is a small 20-acre catchment that is comprised mostly of industrial land uses. Sample SM-BUR-142A was part of a trio of stormwater runoff samples collected at the forebay of the Marsten Road pump station. It had an elevated PCBs particle ratio (0.67 mg/kg). SM-BUR-1006A, which was collected at the same location but drains adjacent WMA 1006, had a moderately elevated PCBs particle ratio (0.37 mg/kg). Seven sediment samples collected in or very close to WMA 142 in WY 2018 all had low PCBs concentrations (less than 0.2 mg/kg).

**WMA 164**

WMA 164 is a 241-acre catchment. The lower half of this catchment has mostly light industrial land uses and the upper half has mostly residential and commercial land uses. A stormwater runoff sample collected in WY 2018 had a moderately elevated PCBs particle ratio of 0.45 mg/kg, although another sample collected by the RMP in WY 2019 had a low PCBs particle ratio of 0.05 mg/kg. This site is downstream of a pump station where sediments may settle out of the stormwater runoff flows. Four sediment samples collected in this catchment in WYs 2002 and 2015 had relatively low PCBs concentrations (less than 0.2 mg/kg).

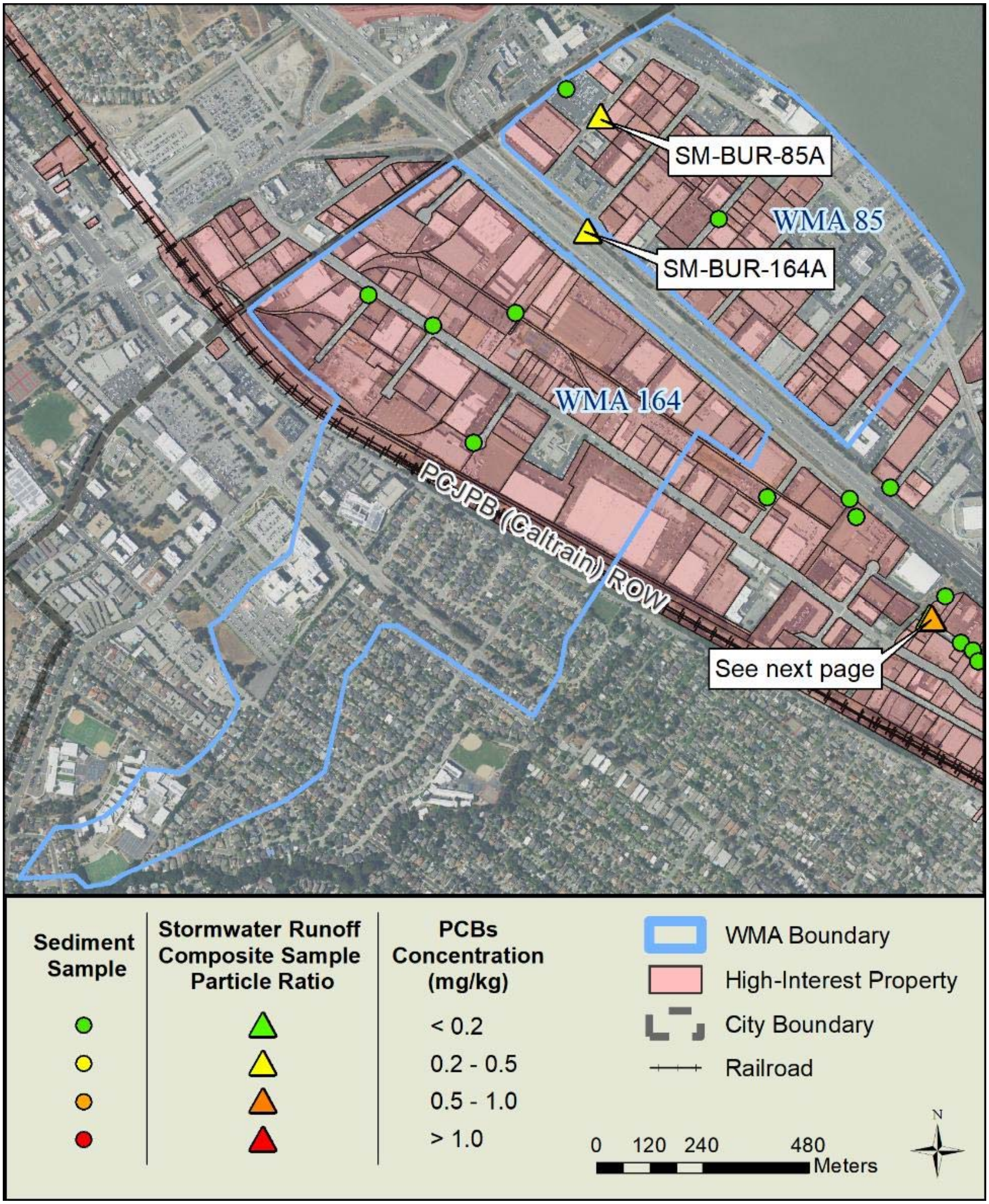


**Figure 13. WMAs 85 and 164**

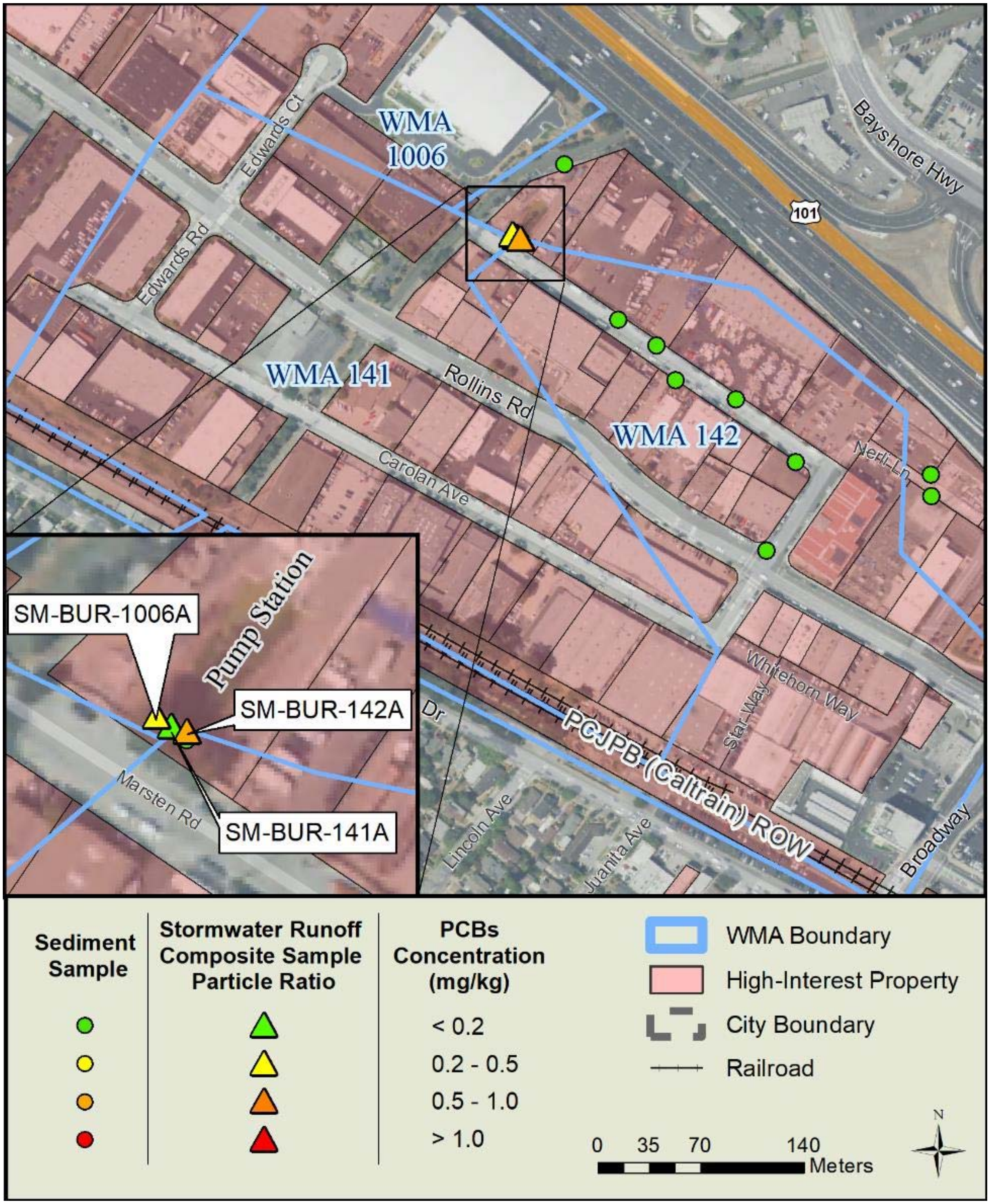


**Figure 14. WMAs 141, 142, and 1006**

## 5.5.4. City of San Mateo

WMAs in the City of San Mateo with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 15 and briefly described below.

**WMA 156**

WMA 156 is a 40-acre catchment that flows north into the 16$^{th}$ Street Channel at Delaware Street. Historically it contained old industrial land uses. It drains Caltrain property including the Hayward Park Station. There is a major retail redevelopment project currently underway in this WMA. A stormwater runoff sample collected in WY 2017 near the catchment outfall had a slightly elevated PCB particle ratio (0.2 mg/kg) but a sediment sample collected upstream did not have an elevated PCBs concentration.

**WMA 408**

WMA 408 is a 43-acre catchment next to WMA 156. It is comprised of a mix of retail, commercial and residential land uses, with a relatively low proportion (16%) of high interest parcels (see Attachment 5). A stormwater runoff sample collected in WY 2017 had a relatively high PCBs particle ratio (1.9 mg/kg). This result was notable given the lack of industrial land uses and low percentage of high interest parcels. Seven follow-up sediment samples collected from this WMA in WY 2018 all had relatively low PCBs concentrations (less than 0.2 mg/kg). Given the high previous result and low concentrations in multiple sediment samples, it may be advisable to resample the stormwater runoff station.

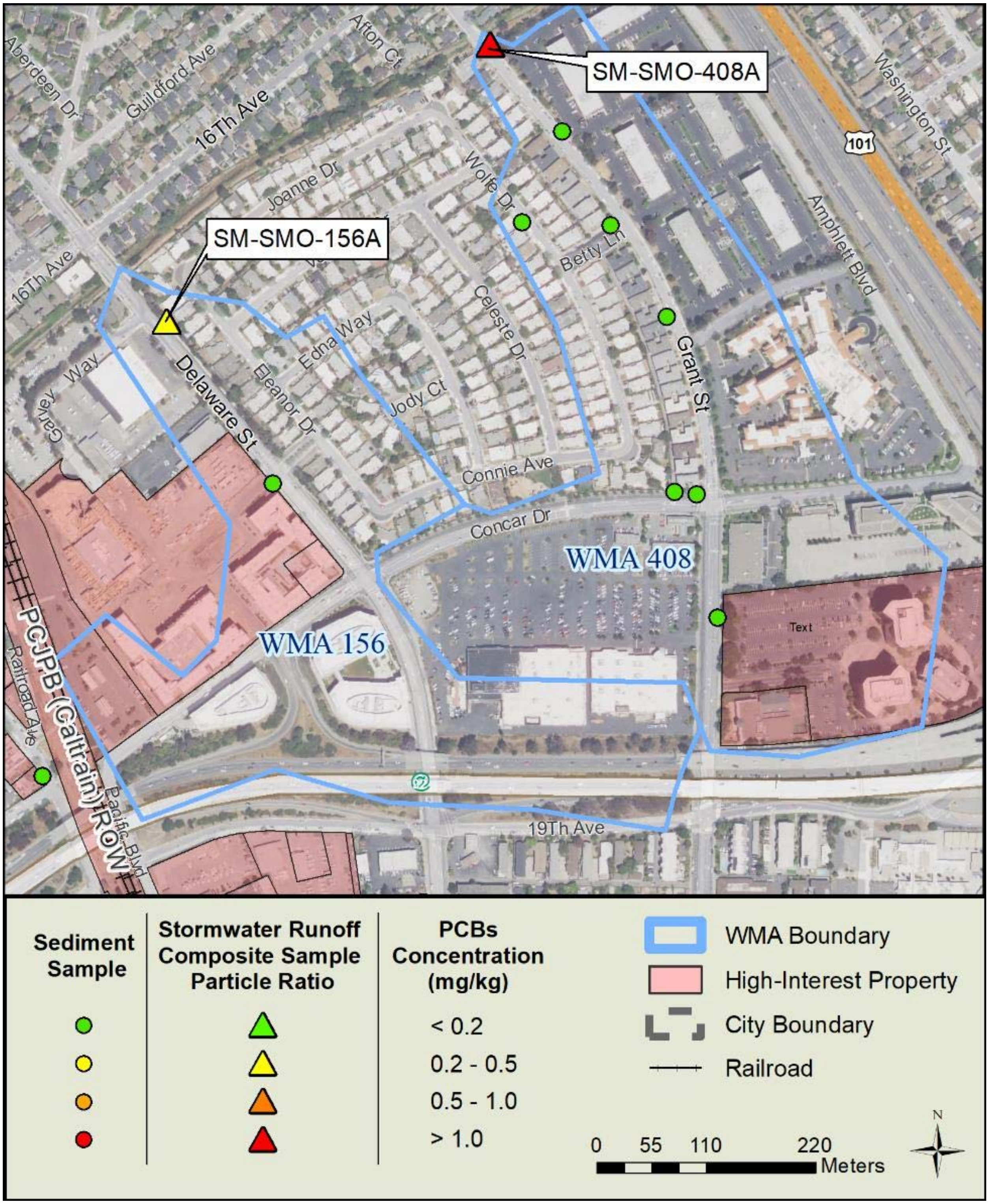


Figure 15. WMAs 156 and 408

### 5.5.5. City of Belmont

WMAs in the City of Belmont with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 16 and briefly described below.

**WMA 60**

WMA 60 is a 298-acre catchment that drains north into Laurel Creek. Two stormwater runoff samples were collected in the catchment in WY 2017 (SM-BEL-60A and SM-BEL-60B). Sample SM-BEL-60A was not elevated but SM-BEL-60B had a relatively high PCBs particle ratio (1.0 mg/kg). This result was noteworthy since the sample catchment is mostly residential with few high interest parcels. In WY 2018, seven sediment samples were collected in this catchment, all of which had relatively low PCBs concentrations (less than 0.2 mg/kg). In WY 2019 an additional sediment sample was collected that also had a very low PCBs concentration (0.002 mg/kg). Given the previous elevated stormwater runoff sample result and the low concentrations in the sediment samples, it may be advisable to resample the stormwater runoff station.

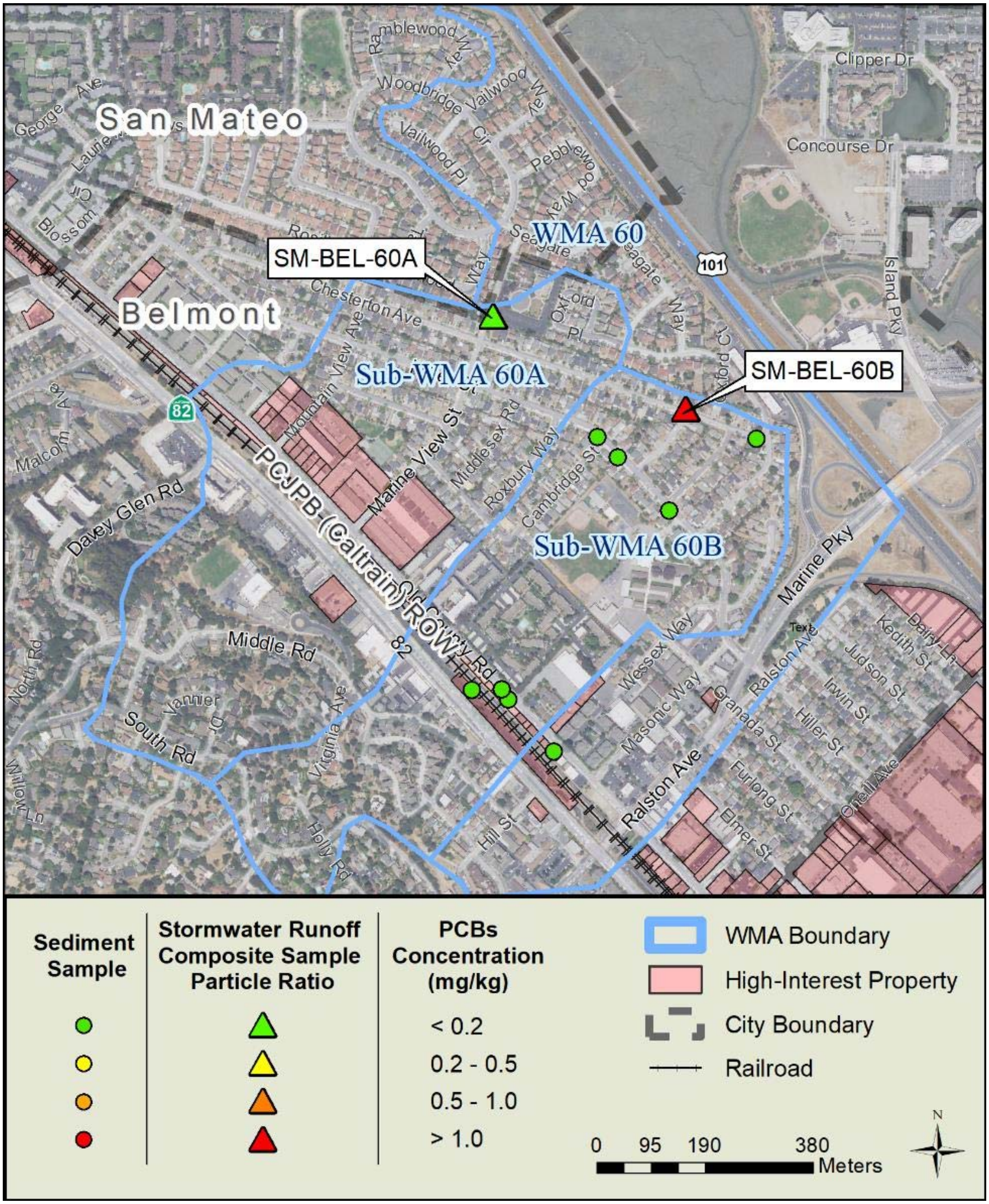


Figure 16. WMA 60

## 5.5.6. City of San Carlos

WMAs in the City of San Carlos with PCBs particle ratios greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 17 – 20 and briefly described below.

**WMA 75**

WMA 75 is a 66-acre catchment comprised entirely of old industrial land uses. Sample SM-SCS-75A (Industrial Rd Ditch) was collected by the RMP in WY 2016 and had a PCBs particle ratio of 6,140 ng/g, which is among the highest levels found in Bay Area stormwater samples collected to-date. The sample station is located where the MS4 daylights into a ditch on the east side of Industrial Road downstream of the adjacent Delta Star and Tiegel Manufacturing properties. The Countywide Program collected seven sediment samples in WY 2017 in the area. Two of these samples were collected near the Delta Star and Tiegel properties. One was collected in the storm drain line directly downstream of both properties and had a very elevated PCBs concentration (49.4 mg/kg). The other was also elevated, with a PCBs concentration of 1.20 mg/kg, and was collected from surface sediments at the location where the Tiegel property drains into the public right-of-way. In WY 2018, SMCWPPP collected a sample across the street from Delta Star in front of the PG&E property. The sample had a PCBs concentration of 0.76 mg/kg. It is not believed that the PCBs in this sample originated from the PG&E property given that the sample only drained a portion of the front parking lot. Rather, the PCBs were more likely present at this location due to a halo effect around Delta Star. For example, groundwater has been observed in the MS4 in this area due to a high-water table, tidal effects, and infiltration. PCBs-containing sediments potentially could have been conveyed upstream in the storm drain line by groundwater that infiltrated into the pipe. The remainder of the PG&E property drains toward the east. The remaining samples were not elevated, suggesting that there are no other sources of PCBs in this WMA other than Delta Star and Tiegel properties (Figure 17).

Delta Star manufactures transformers, including transformers with PCBs historically (from 1961 to 1974). This is a cleanup site with elevated PCBs found in on-site soil and groundwater samples. PCBs migrated to the adjacent Tiegel property at 495 Bragato Road, a roughly three-acre site that is largely unpaved. A “Removal Action” under DTSC oversight was implemented between June 1989 and January 1991 to remove soil impacted with PCBs exceeding 25 ppm. The Delta Star and Tiegel properties currently meet public health, safety, and the environmental cleanup goals based on human exposure at the site. However, based on the PCBs concentrations in the sediment and stormwater runoff samples, the site appears to be a source of PCBs to the MS4 and San Francisco Bay at levels that are a concern from the standpoint of the Bay PCBs TMDL (i.e., contribute to bioaccumulation in Bay fish and other wildlife). The Countywide Program recently worked with the City of San Carlos to refer these properties to the Regional Water Board for potential additional investigation and abatement.

**WMA 31 (Pulgas Creek Pump Station North)**

WMA 31 is a 99-acre catchment that drains to the Pulgas Creek pump station from the north. In addition to elevated sediment samples collected by SMCWPPP from the pump station sump, the RMP collected four stormwater runoff samples from the bottom of catchment (i.e., where flows enter the pump station from the north) during two storms in WY 2011. The samples were all elevated, with an average PCBs particle ratio of 893 ng/g. In addition, street dirt and sediment samples with elevated PCBs have been collected in front of and in the vicinity of 977 Bransten Road, a property within WMA 31 (Figure 18). The current occupant of this property is GC Lubricants. 977 Bransten Road is a DTSC cleanup site due to soil and groundwater contamination with PCBs and other pollutants associated with activities at GC Lubricants and California Oil Recyclers, Inc., a previous tenant at the site. 1007/1011 Bransten Road is the property located adjacent to and immediately north of 977 Bransten Road and designated the “Estate of Robert E. Frank.” A DTSC “Site Screening Form” describes PCBs in the subsurface on both sides of border between the two properties and states there may have been a historic source on both sides of the property line. Abatement measures have been implemented to reduce movement of contaminated soils from the properties, including a concrete cap over contaminated areas. However, the available information suggests that soils/sediments with PCBs are migrating from these properties into the public ROW, including the street and the MS4. The Countywide Program recently worked with the City of San Carlos to refer these properties to the Regional Water Board for potential additional investigation and abatement.

**WMA 210 (Pulgas Creek Pump Station South)**

WMA 210 is a 141-acre catchment that drains to the Pulgas Creek pump station from the south (Figures 19 and 20). In addition to elevated sediment samples collected by SMCWPPP from the pump station sump, the RMP’s STLS has collected 33 storm samples at the bottom of this catchment (i.e., where flows enter the pump station from the south):

- WY 2011 – four samples collected in February and March 2011.
- WY 2013 – four samples collected in March 2013.
- WY 2014 – 25 samples collected from November 2013 through March 2014.

The 33 samples had an average PCBs particle ratio of 8,220 ng/g, the highest of any stormwater runoff sampling location in the Bay Area. There appear to be several sources of PCBs within this WMA.

The best documented of these sites is the property at 1411 Industrial Road. A sediment sample with a very elevated PCBs concentration (193 mg/kg) was previously collected from a storm drain inlet located in the parking lot of this about 1.3-acre property. The property drains to the MS4 at a sidewalk manhole where other elevated sediment samples have been collected. Since 2012 the occupant of this property has been a Habitat for Humanity Re-Store. Based upon records from the San Mateo County Department of Environmental Health, before that the property was occupied by an auto body shop and an automotive paint company. Between 1958 and 1994, Adhesive Engineering / Master Builders, Inc. was the occupant and conducted manufacturing, research and development of construction grade epoxy resin and products. Adhesive Engineering / Master Builders, Inc. had a history of violations for leaky wastewater drums and improper storage of hazardous wastes in the late 1980s and early 1990s, and PCBs were reportedly used on the site in the past. An environmental assessment report conducted as part of a business closure in 1994 revealed that 93 mg/kg PCBs was found in a soil sample collected in 1987. The soil sample was collected beneath an aboveground tank that was heated by oil-containing PCBs circulating in coils around the tank. The report also described the removal in 1987 of 44 cubic yards of contaminated soil from the area where the tank was located. As part of the 1994 environmental assessment, a soil sample was collected from the same area and PCBs were not detected at that time, but soil samples from other areas on the property were not collected and tested for PCBs. The above information suggests that the 1411 Industrial Road property is a source of PCBs to the MS4. Regional Water Board staff is currently working with the property owner to investigate and cleanup the site. The Countywide Program is currently working with the City of San Carlos to explore the possibility of referring this property to the Regional Water Board for potential additional investigation and abatement.

In WY 2017, the Countywide Program collected ten sediment samples from the WMA 210 to better delineate the sources of PCBs in this catchment. Three samples were collected in the vicinity of 1411 Industrial Road to help rule out that neighboring properties are PCBs sources. All three of these samples had relatively low PCBs concentrations, with the highest having a PCBs concentration of 0.07 mg/kg, which helps to verify that the properties to the east and south are not also sources. Multiple sediment samples previously collected around the PG&E substation across the street also had relatively low levels of PCBs, suggesting that this property is not a source. PCBs from unknown sources were previously found in inlets and manholes in the vicinity of Center, Washington and Varian Streets and Bayport Avenue (Figure 20). The PCBs in these samples could have originated from any of about 20 small industries on these streets. During WY 2017, seven additional samples were collected in this area. The results suggest that three small properties may be PCBs sources. Two samples collected from the driveways of 1030 Washington Street, a construction business, had elevated PCBs (1.29 and 3.73 mg/kg). A sample from the driveway of 1029 Washington Street was also elevated with a concentration of 5.64 mg/kg. In addition, samples from the driveway of 1030 Varian Street, an unpaved lot used for storage, had an elevated PCBs concentration of 1.84 mg/kg. It should be noted that all the buildings in this area appear to be of the type and age that could potentially have PCBs in building materials.

In WY 2018, the Countywide Program collected two sediment samples along Washington Street. The first sample was from the gutter upstream of 1030 Washington Street and had a PCBs concentration of 0.25 mg/kg. The second sample was from the gutter upstream of 1029 Washington Street and had a PCBs concentration of 0.06 mg/kg. These relatively low concentrations suggest that the sources of PCBs are not upstream of the two properties of interest along Washington Street. The Countywide Program is currently working with the City of San Carlos to determine next steps for these properties.

When a previously unknown potential source property is revealed via the PCBs and mercury monitoring program, SMCWPPP conducts a follow-up review of current and historical records regarding site occupants and uses, hazardous material/waste use, storage, and/or release, violation notices, and any remediation activities. Apart from databases such as EPA's Toxic Release Inventory (TRI) and Envirofacts, and the State of California's Geotracker and Envirostor, the most useful records were often kept by San Mateo County Department of Environmental Health. In contrast to 1411 Industrial Road (see above), the review of records for 1030 Washington Street, 1029 Washington Street, and 1030 Varian Street did not reveal any obvious use or release of PCBs in the past.

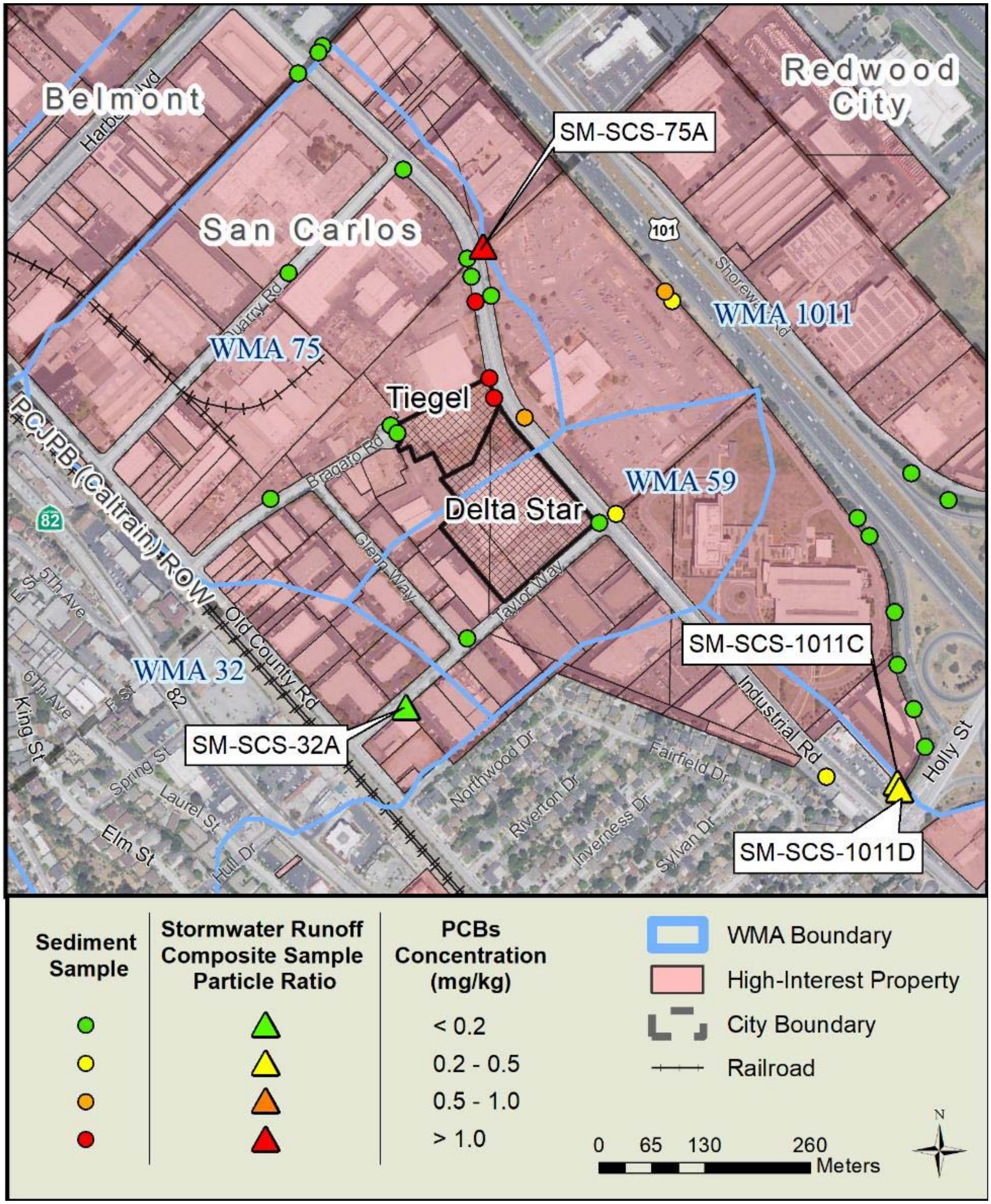


Figure 17. WMAs 59, 75, and 1011

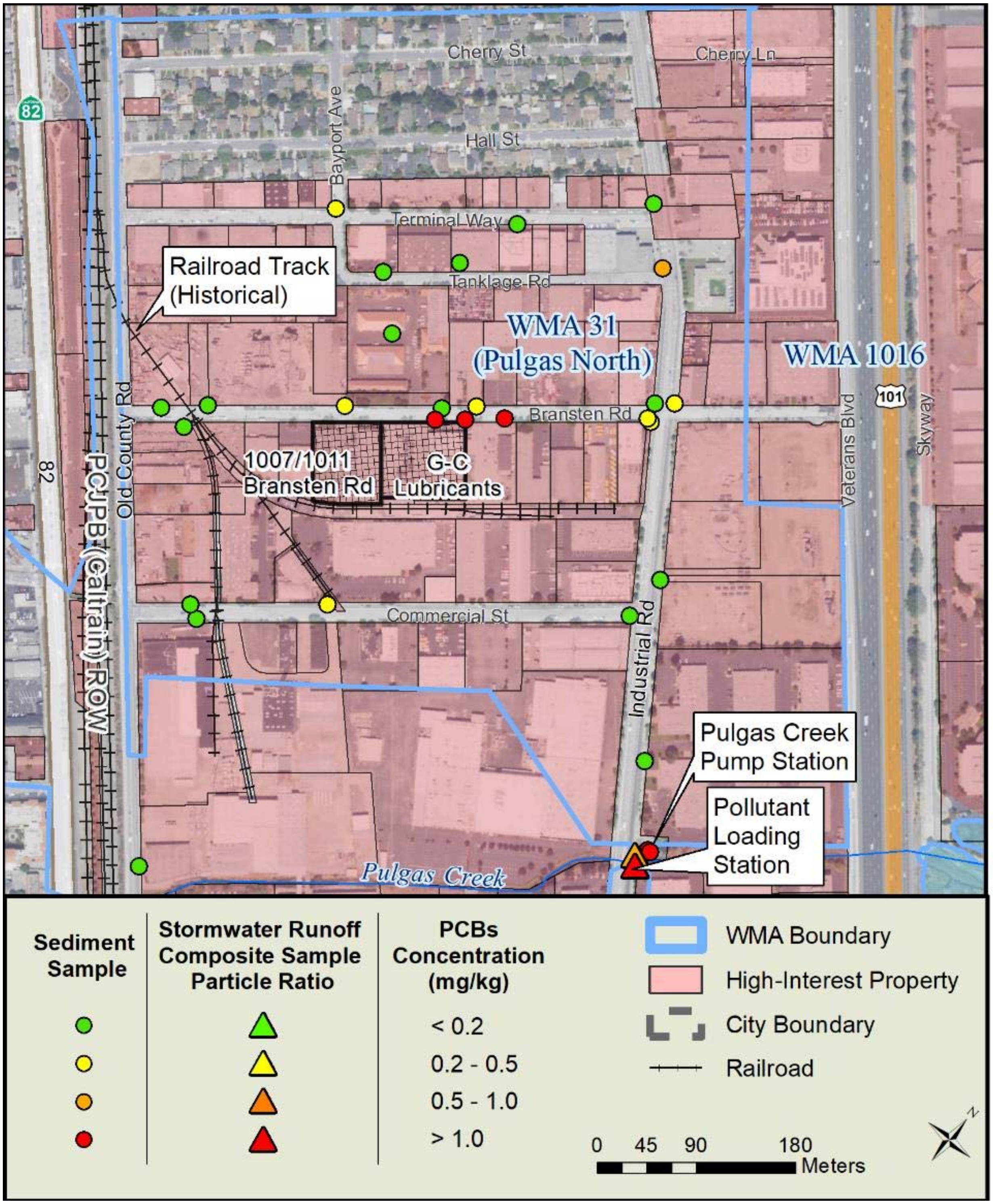


**Figure 18. WMA 31**

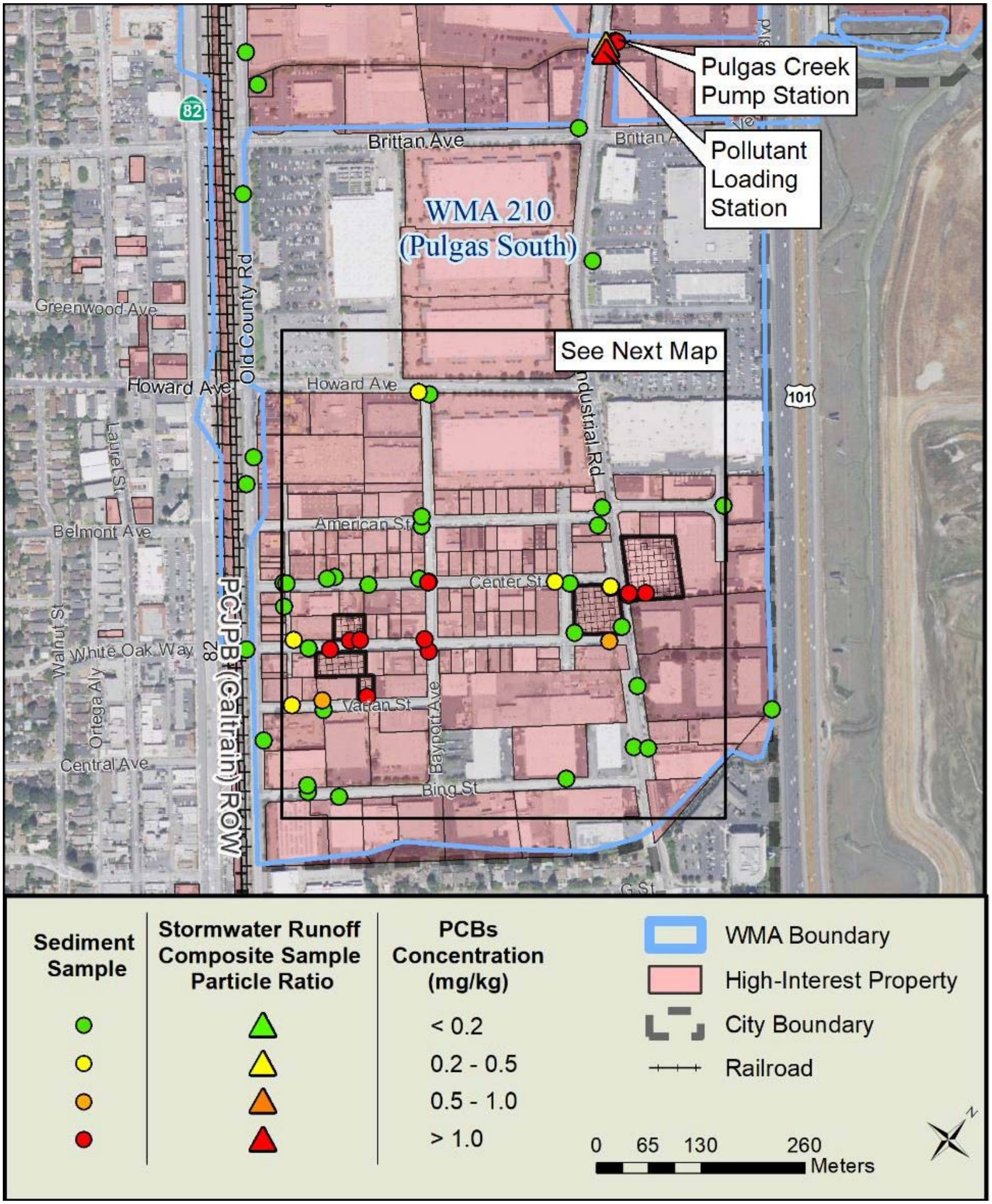


Figure 19. WMA 210

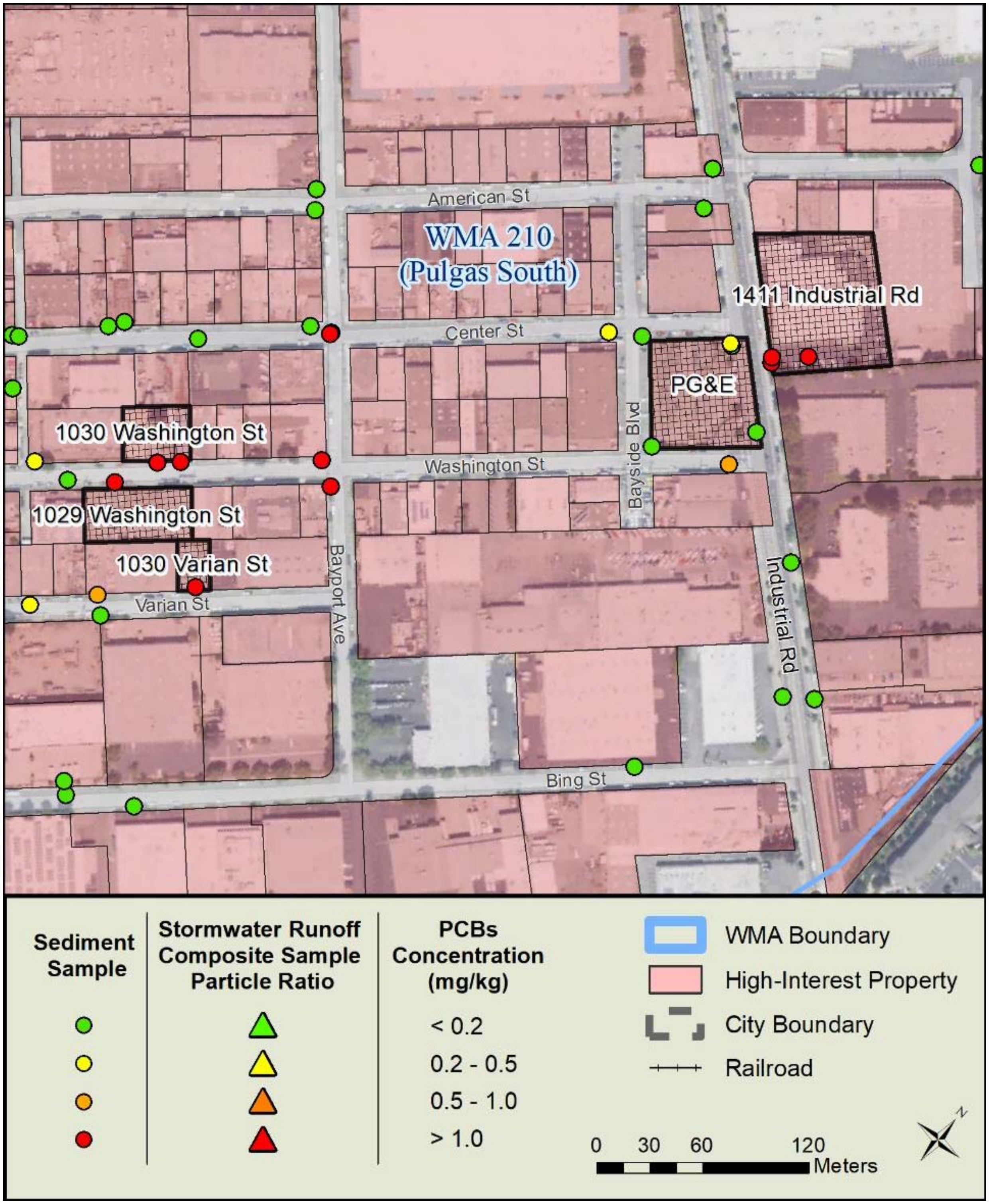


Figure 20. WMA 210 – Enlargement of Sampled Area

### 5.5.7. City of Redwood City

WMAs in the City of Redwood City with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 21 – 24 and briefly described below.

**WMA 379**

WMA 379 (Figures 21 and 22) is an 802-acre catchment located in Redwood City and the unincorporated North Fair Oaks census-designated place (CDP). The catchment is divided into a northerly half (A) and a southerly half (B), each with a distinct MS4 outfall. Both outfalls were sampled by the Countywide Program in WY 2016. Sample SM-RCY-379A had a relatively low PCBs particle ratio (105 ng/g). Sample SM-RCY-379B also had a relatively low PCBs particle ratio (182 ng/g). In WY 2017, the Countywide Program collected fifteen samples in WMA 379 in an attempt to identify PCBs source along Bay Road and Spring Street, in follow-up to elevated sediment samples collected during previous years, including a sediment sample with an elevated PCBs concentration (6.93 mg/kg) collected in 2014 from a storm drain inlet on Spring Street (Amec 2015). None of nine samples collected in the Bay Road near Hurlingame Avenue area was elevated, with the highest PCBs concentration being 0.14 mg/kg. A single sample collected by SMCWPPP from an inlet at the back of the sidewalk in front of 2201 Bay Road had an elevated PCBs concentration of 1.97 mg/kg. This area includes two properties listed for PCBs on GeoTracker[13]: Tyco Engineering Products and an adjacent railroad spur. The Tyco site was remediated and redeveloped (MRP Provision C.3 compliant) and is currently a parking lot for Stanford Hospital. Four sediment samples were collected on Spring Street in WY 2017. None was elevated, with the highest PCBs concentration being 0.08 mg/kg. In WY 2018, two additional samples were collected to further verify the lower results along Spring Street, and to test for the presence of any PCBs sources along Charter Street on the south side of the old Tyco property. Both samples had low concentrations of PCBs (less than 0.2 mg/kg).

A total of 43 sediment samples and 2 composite stormwater runoff samples have been collected to-date in WMA 379 by SMCWPPP and others, but the only potential PCBs source area that has been identified is the former Tyco site and adjacent historical railroad spur. In April 2019, Regional Water Board staff informed SMCWPPP that they plan to include a conditional requirement to clean out the storm drain as part of the proposed cap modification and redevelopment of the property, and may have the opportunity to request additional post-cleanout monitoring. SMCWPPP will continue to track these efforts and will request PCBs load reduction credit as appropriate.

**WMA 405/1000**

WMA 405 (Figure 23) consists almost entirely of SIMS Metal Management at the Port of Redwood City. Samples collected in WYs 2015 and 2017 from the driveway of SIMS and in close proximity to the site but another catchement (WMA 1000) had elevated PCBs concentrations of 0.57 and 0.75 mg/kg, respectively. Sims has implemented practices to prevent metal fluff potentially containing a variety of contaminants (including PCBs) from entering the Bay.

[13] GeoTracker is the State Water Resources Control Board's Internet-accessible database system used to track and archive compliance data from authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from underground storage tanks.

**WMA 239**

WMA 239 (Figure 24) is a 36-acre mostly industrial catchment that is half in Redwood City and half in Menlo Park. In WY 2015, SMCWPPP collected a sediment sample in this catchment that had an elevated PCBs concentration of 0.57 mg/kg. Four additional sediment samples were collected in WY 2017, all of which had relatively low (urban background) PCBs concentrations, with the highest concentration being 0.16 mg/kg. Currently in this WMA there is a large housing redevelopment that is almost complete. One of the areas that was redeveloped (Haven Avenue Industrial Condominiums) at 3633 Haven Avenue was remediated for PCBs contamination in 2006. Stormwater runoff sampling has not been conducted in this catchment due to a lack of public access to the catchment outfall (which discharges to the Bay).

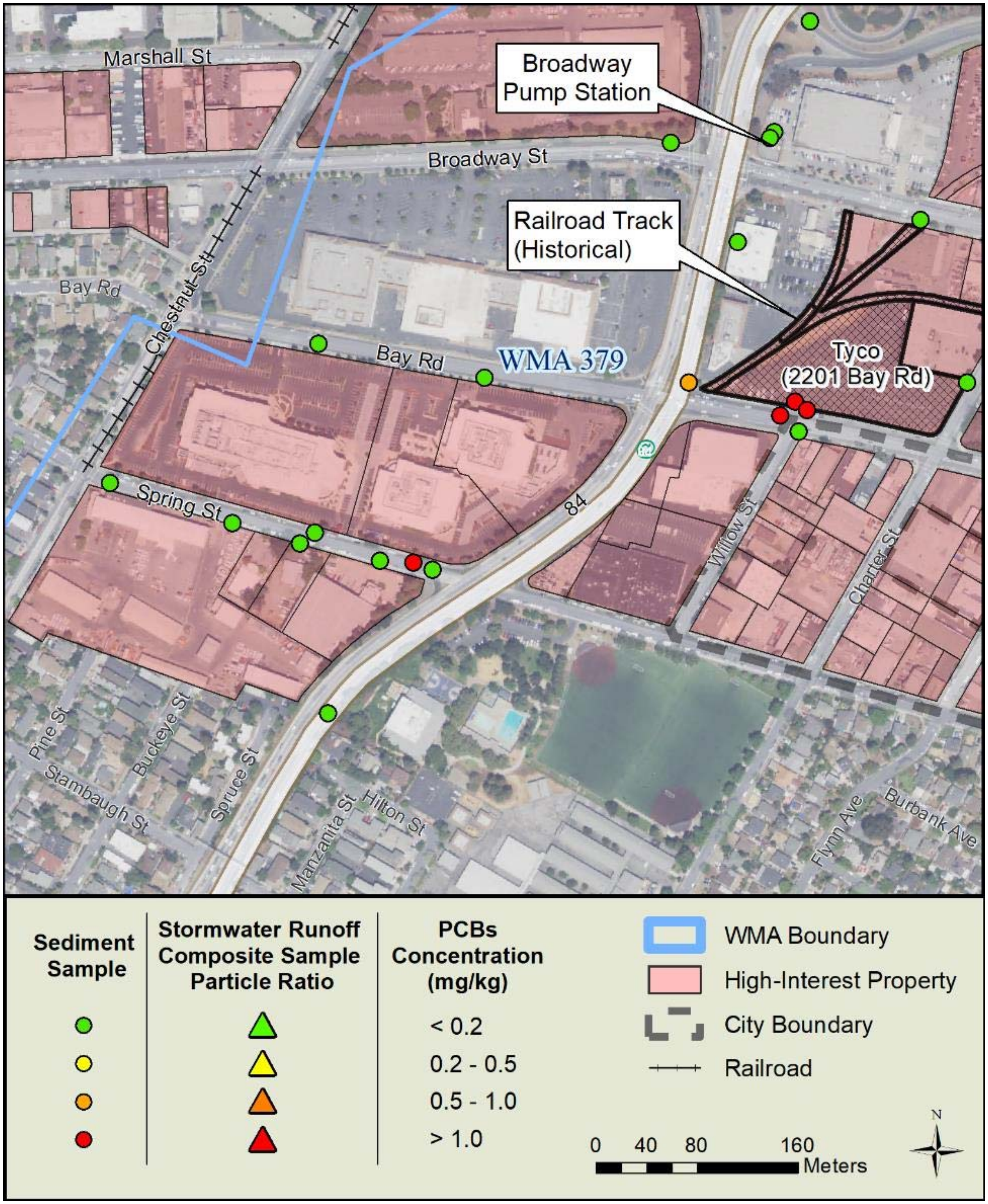


**Figure 21. WMA 379 (northwest portion)**

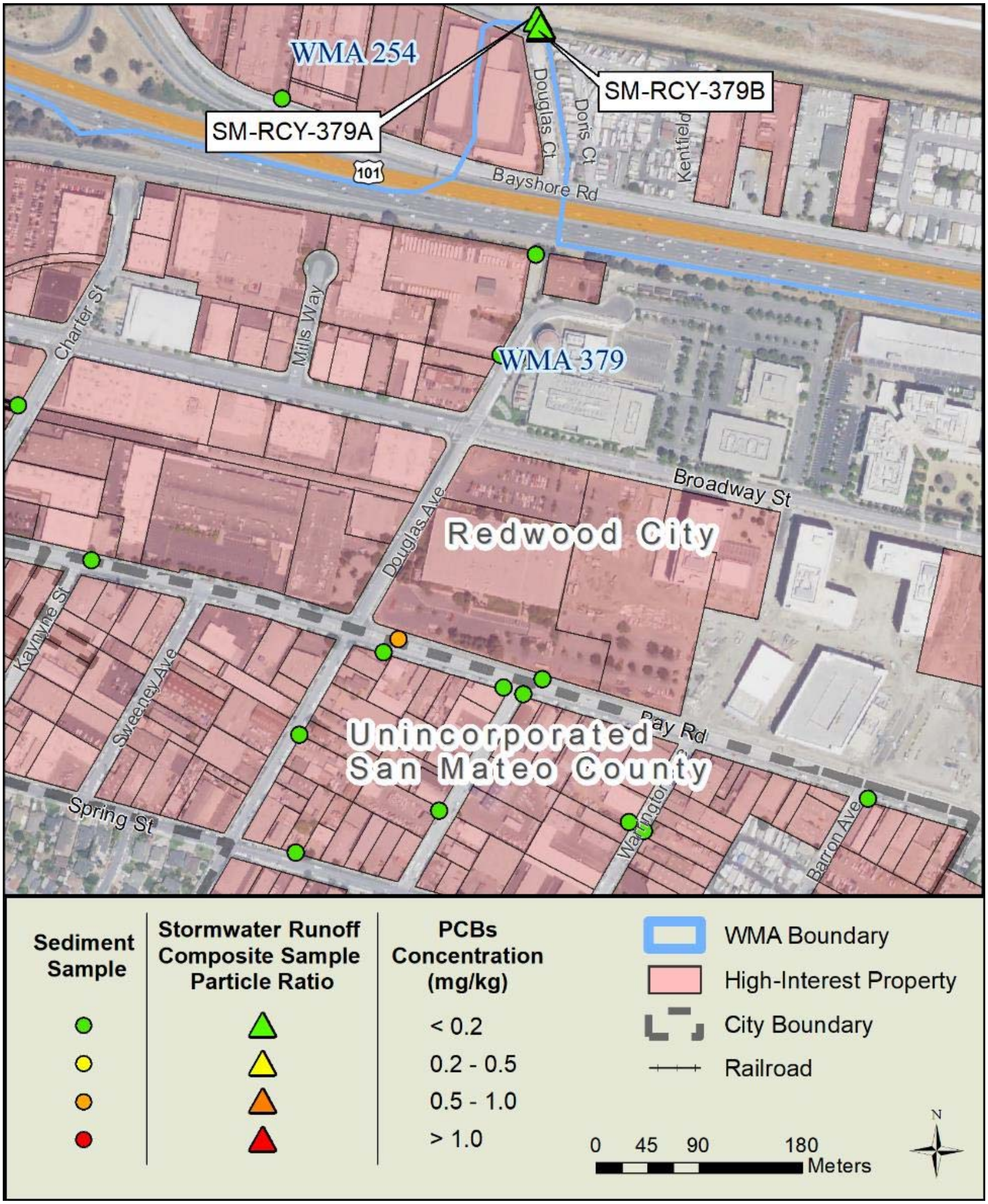


**Figure 22. WMAs 254 and 379 (southeast portion)**

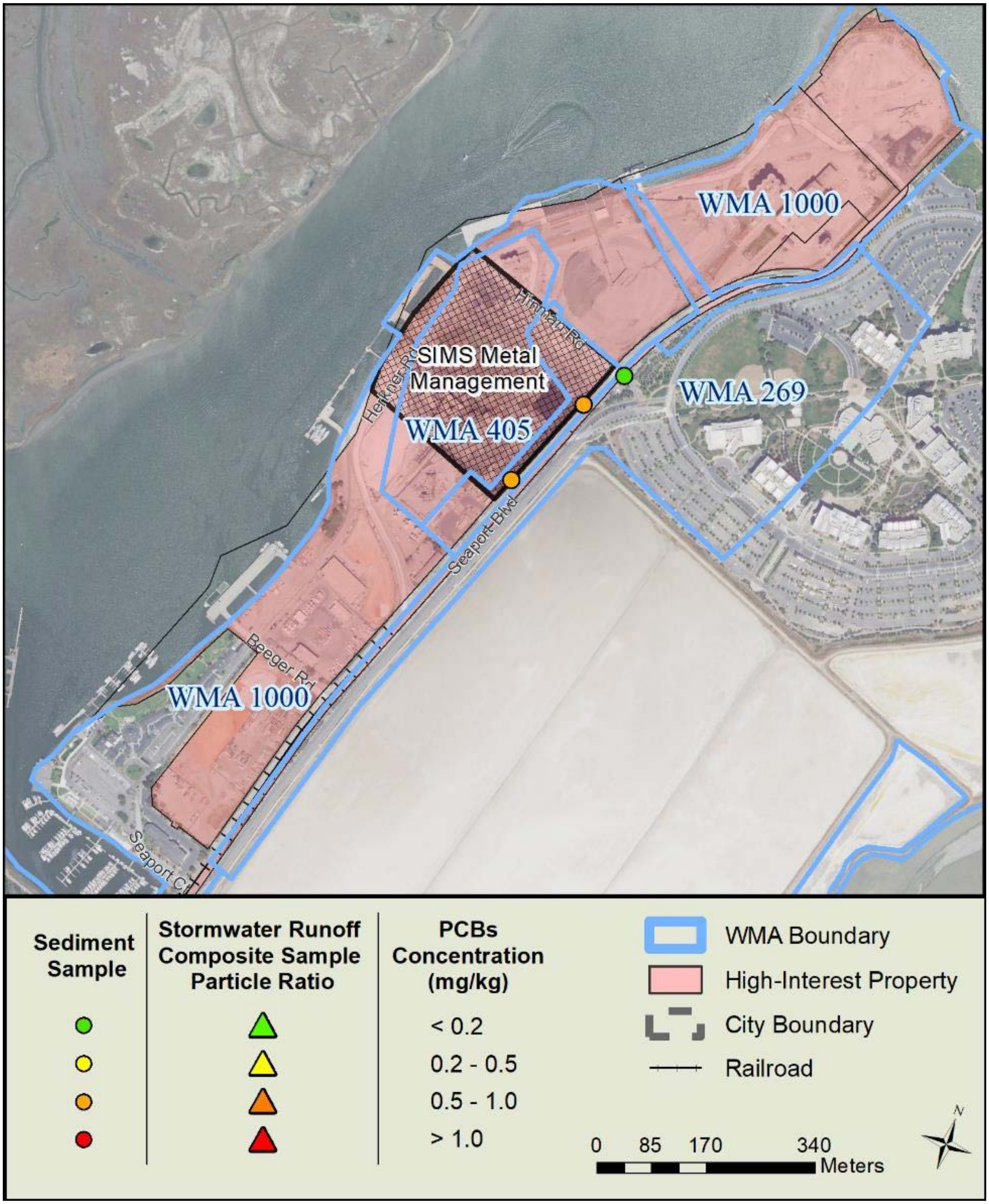


**Figure 23. WMAs 269, 405, 1000**

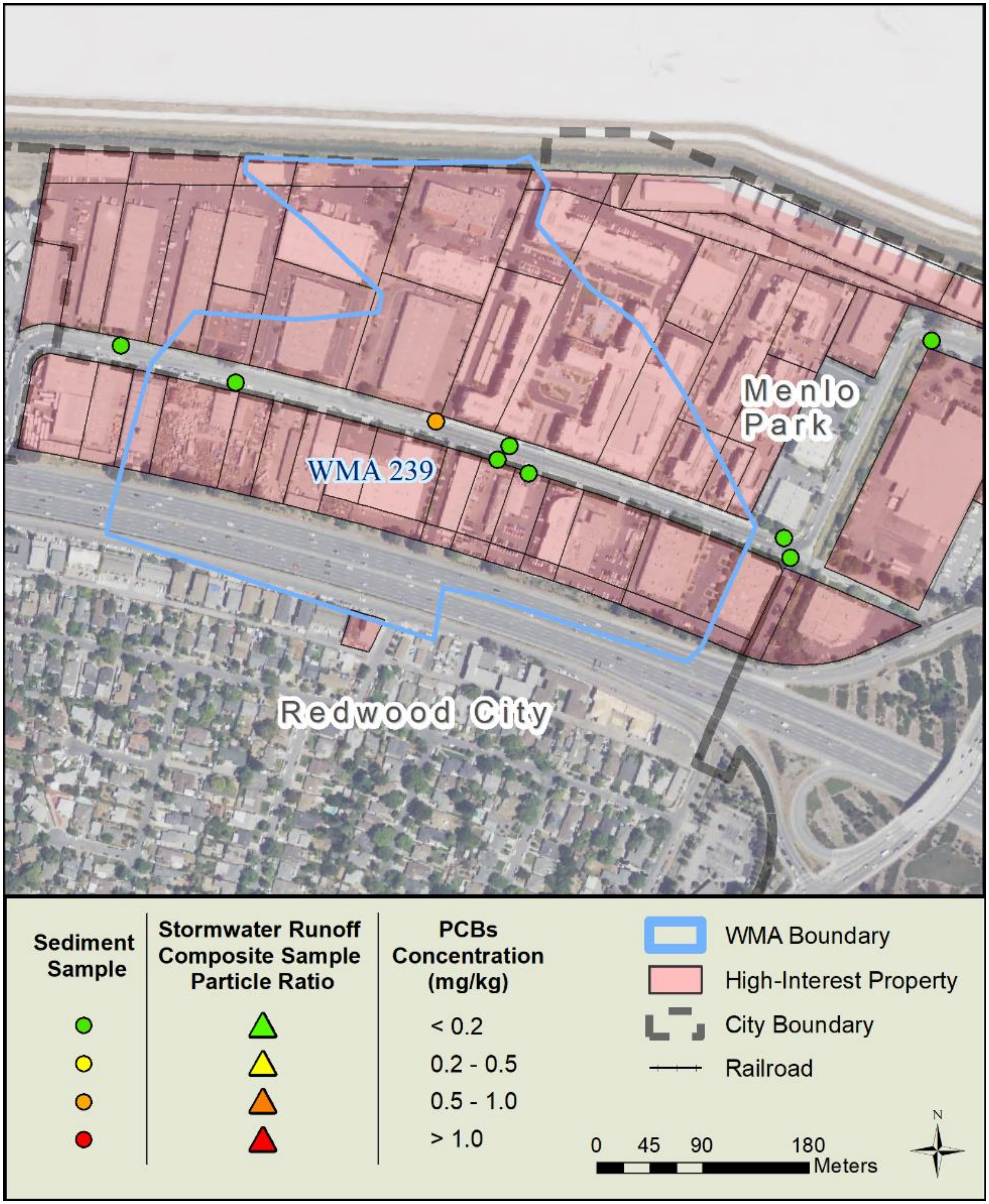


**Figure 24. WMA 239**

### 5.5.8. City of East Palo Alto

WMAs in the City of East Palo Alto with PCBs particle ratios greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 25 and briefly described below.

**WMA 70**

WMA 70 is a 490-acre catchment. A stormwater runoff sample collected by the RMP in WY 2015 had an elevated total PCBs concentration (28.5 ng/L) but a relatively low PCBs particle ratio (108 ng/g). Three sediment samples collected by SMCWPPP in the area in WY 2017 had relatively low PCBs concentrations, with the highest having a concentration of 0.03 mg/kg.

**WMA 1015/72**

WMA 1015 consists of multiple catchments in the City of East Palo Alto. This WMA contains Romic Environmental Technologies Corporation, a property that is known to be contaminated with PCBs and has been vacant for many years. A stormwater runoff sample and two sediment samples in close proximity to the Romic driveway but in another catchement (WMA 72) all had relatively low concentrations of PCBs. WMA 1015 also contains 391 Demeter, a property that formerly was used to stockpile soils with PCBs that were removed from a separate remediation site. The site is expected to be redeveloped. This property drains directly to the Bay, and is all private property and inaccessible. A sediment sample from an inlet at the north end of Demeter Street (WMA 67) was moderately elevated in PCBs with a concentration of 0.21 mg/kg.

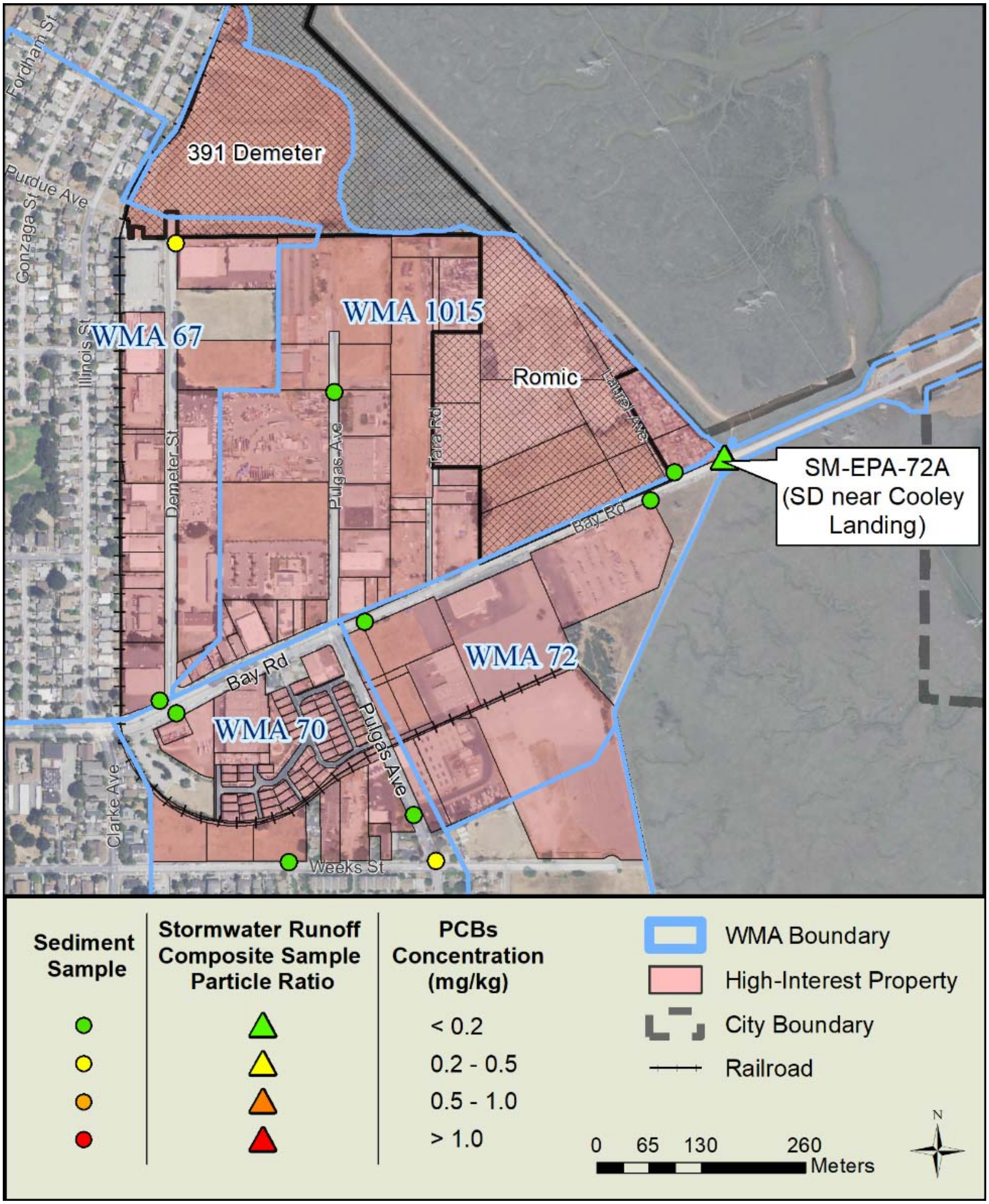


**Figure 25. WMAs 70, 72, 1015**

# 6.0 COPPER, NUTRIENTS, AND EMERGING CONTAMINANTS (WYs 2016 – 2019)

The below sections on copper, nutrients, and emerging contaminants focus on summarizing compliance with MRP 2.0 requirements and thus focus on the POC monitoring and related activities conducted during WY 2016 – WY 2019. Copper and nutrient monitoring stations are shown in Figure 26.

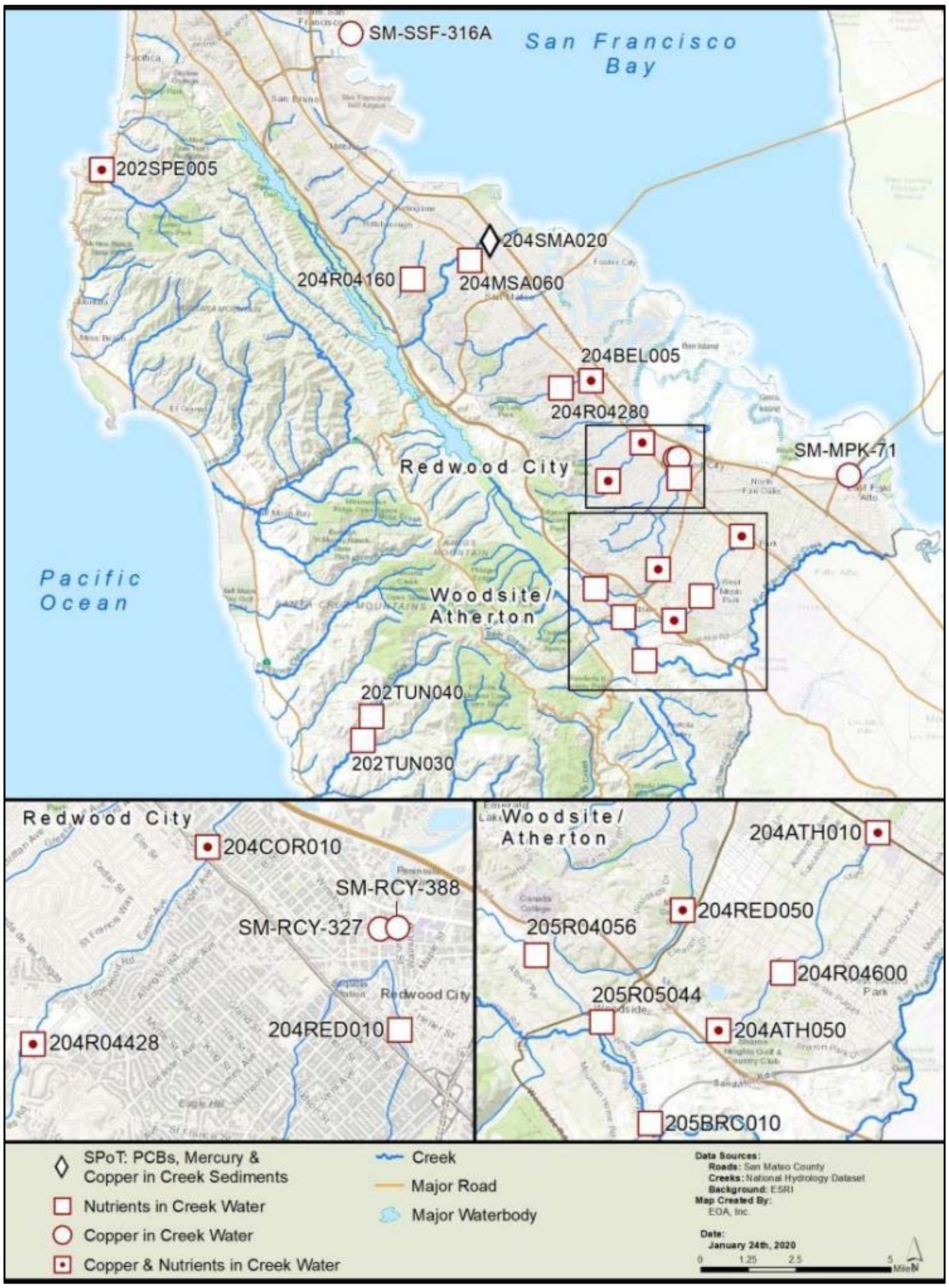


**Figure 26. Copper and nutrient monitoring stations, San Mateo County, WY 2016 – WY 2019.**

## 6.1. Copper

The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) includes a Water Quality Attainment Strategy (WQAS) to support copper site-specific objectives for San Francisco Bay (SFBRWQCB 2017). The WQAS for copper states that NPDES permits for urban runoff management agencies must require implementation of best management practices (BMPs) and control measures designed to prevent urban runoff discharges from causing or contributing to exceedances of copper water quality objectives. These measures are included in Provision C.13 of MRP 2.0. Additionally, the WQAS requires that NPDES permits contain requirements to conduct or cause to be conducted monitoring of copper loading to the Bay. The RMP Status and Trends Monitoring Program currently collects water and sediment samples from San Francisco Bay every two or three years for analysis of a large suite of toxic contaminants, including copper. In addition to the RMP studies, copper monitoring is required by Provision C.8.f of MRP 2.0.

From WY 2016 through WY 2019, in compliance with Provision C.8.f of MRP 2.0, the Countywide Program collected at least two samples per year for copper analysis (Table 4). The goal of the monitoring was to address Management Question No. 4 (Loads and Status) and/or No. 5 (Trends). A different copper monitoring approach was followed each year, often with the objective of opportunistically conducting copper analyses on samples collected for other purposes. In addition, trends samples collected in San Mateo Creek by the SPoT program were used to supplement SMCWPPP monitoring efforts (see Section 1.3.2. for a description of the SPoT program and SPoT data results). As shown in Table 4, a total of 17 San Mateo County samples were analyzed for copper from WY 2016 through WY 2019. Fifteen of these samples address Management Question No. 4 (Loads and Status) and eight address Management Question No. 5 (Trends).

The bullets below describe SMCWPPP approaches to copper monitoring in WY 2016 through WY 2019 and findings based on the laboratory results. Monitoring stations are mapped in Figure 26. All SMCWPPP samples were analyzed for total and dissolved copper[14] (method EPA 200.8) and hardness (method SM 2340C). Results are summarized in Table 9. Comparisons to Water Quality Objectives are included in Section 7.0.

- **WY 2016 and WY 2017: Storm Samples from High Interest WMAs.** In WY 2016, SMCWPPP conducted copper analyses on a subset (three) of the 13 composite samples of stormwater runoff from outfalls at the bottom of WMAs containing parcels of high interest with respect to PCBs (i.e., generally old industrial land uses). In WY 2017, one of 17 stormwater composite samples from WMA outfalls was analyzed for copper. See Section 5.0 (Progress To-date Identifying PCBs and Mercury Sources) for a discussion of WMAs and high interest parcels.
    - Results summarized in Table 9 suggest that copper concentrations in stormwater runoff composite samples collected at outfalls draining WMAs with old industrial land uses are generally higher than those collected in creeks with a greater mix of land uses.

[14] In order to simplify the field effort and reduce the risk of sample contamination, SMCWPPP requested that the analytical laboratory conduct the sample filtration required for dissolved copper analysis.

- **WY 2017: Wet Weather Upstream/Downstream Comparison.** SMCWPPP sampled two locations (upstream and downstream) on two creeks (Atherton Creek and Redwood Creek) during a storm event to compare copper concentrations above and below dense urban land uses. One of the downstream stations (Redwood Creek) was also sampled in the spring to compare seasonal differences. The downstream location on Atherton Creek could not be sampled in the spring due to dry conditions.
  - Copper concentrations measured during the January storm event were higher at the bottom-of-the-watershed stations (204ATH010 and 204RED010) compared to the upstream stations (204ATH050 and 204RED050). This suggests that stormwater runoff from the urban land uses between the two stations was contributing copper to the creeks.
  - At the bottom-of-the-watershed station on Redwood Creek (204RED010), copper concentrations in the January storm event were similar to concentrations measured during spring baseflow; however, the higher water hardness during spring baseflow reduces the bioavailability of the copper.
- **WY 2018: Wet Weather/Spring Baseflow Comparison.** SMCWPPP sampled two bottom-of-the-watershed locations (San Pedro Creek and Cordilleras Creek) during a storm event and during spring baseflow to compare seasonal differences in copper concentrations. Mobilization for storm samples collection in WY 2018 was driven by Provision C.8.g (Pesticides & Toxicity) monitoring requirements.
  - Copper concentrations at both stations (202SPE005 and 204COR010) were higher during the January storm event compared to the spring base flow event, suggesting an influence by stormwater runoff. In addition, the dissolved portion of the total copper concentration was higher in the spring baseflow samples compared to the storm samples. This finding illustrates coppers affinity to suspended sediment which is higher during storm events.
- **WY 2019: Dry Season Concentrations.** SMCWPPP conducted copper analyses on a subset (two) of the nine dry season (June 31, 2019) samples that were collected for nutrient analysis.
  - Copper concentrations in these dry season baseflow samples were generally lower than all other samples analyzed from WY 2014 through WY 2018.

## 6.2. Nutrients

Nutrients were included in the MRP 2.0 POC monitoring requirements to support Regional Water Board efforts to develop nutrient numeric endpoints (NNE) for the San Francisco Bay Estuary. The "San Francisco Bay Nutrient Management Strategy" (NMS) is part of a statewide initiative to address nutrient over-enrichment in State waters (Regional Water Board 2012). Its goal is to lay out a well-reasoned and cost-effective program to generate the scientific understanding needed to fully support major management decisions such as establishing/revising WQOs for nutrients and dissolved oxygen, developing/implementing a nutrient monitoring program, and specifying nutrient limits in NPDES permits. The NMS monitoring program currently focuses on stations located within San Francisco Bay rather than freshwater tributaries.

**Table 9. Total and Dissolved Copper Concentrations in SMCWPPP Water Samples, WYs 2016 – 2019.**

| Station Code | Creek/Location | Sample Date | Total Copper (µg/L) | Dissolved Copper (µg/L) | Hardness as $CaCO_3$ (mg/L) |
|---|---|---|---|---|---|
| **WY 2016 & WY 2017 Stormwater Runoff Composite Samples from WMA Stormwater Outfalls with High-interest Parcels** | | | | | |
| SM-MPK-71 | Stormwater outfall in Menlo Park | 2/17/2016 | 23.1 | 14.8 | 450 |
| SM-RCY-327 | Stormwater outfall in Redwood City | 2/17/2016 | 19.7 | 9.3 | 38 |
| SM-RCY-388 | Stormwater outfall in Redwood City | 2/17/2016 | 27.0 | 9.2 | 28 |
| SM-SSF-316A | Stormwater outfall in South San Francisco | 12/10/2016 | 12.7 | 6.5 | 345 |
| **WY 2017 Wet Weather Upstream/Downstream Comparison** | | | | | |
| 204ATH050 | Atherton – upstream (wet weather) | 1/9/2017 | 8.4 | 6.2 | 200 |
| 204ATH010 | Atherton – downstream (wet weather) | 1/9/2017 | 12 | 9.8 | 260 |
| 204RED050 | Redwood – upstream (wet weather) | 1/9/2017 | 8.1 | 6.4 | 260 |
| 204RED010 | Redwood – downstream (wet weather) | 1/9/2017 | 13 | 11 | 260 |
| 204RED010 | Redwood – downstream (spring baseflow) | 5/22/2017 | 14 | 12 | 380 |
| **WY 2018 Wet Weather/Spring Baseflow Comparison** | | | | | |
| 202SPE005 | San Pedro – wet weather flow | 1/8/2018 | 9.5 | 2.7 | 50 |
| 202SPE005 | San Pedro – spring baseflow | 5/17/2018 | 0.84 | 0.41 J | 190 |
| 204COR010 | Cordilleras – wet weather flow | 1/8/2018 | 8.4 | 4.3 | 76 |
| 204COR010 | Cordilleras – spring baseflow | 5/21/2018 | 1.7 | 1.2 | 380 |
| **WY 2019 Dry Season Concentrations** | | | | | |
| 204BEL005 | Belmont | 7/31/2019 | 0.72 | 0.93 [a] | 270 |
| 204R04428 | Cordilleras | 7/31/2019 | 0.48 J | 0.75 [a] | 400 |

**Notes:**

J-flagged data are above the detection limit but less than the reporting limit and are therefore considered estimated.

[a] The total and dissolved copper concentration from July 31, 2019 samples were flagged as questionable. Dissolved copper, by definition, must be ≤ total copper, which was not the case for these samples. The data validation process did not find any other concerns with the copper results. It is possible that contamination was introduced during the laboratory filtration process for this sample. Furthermore, all results from this sampling event were close to the reporting limit and therefore subject to higher uncertainty.

Provision C.8.f of MRP 2.0 requires monitoring for a suite of nutrients (i.e., ammonium, nitrate, nitrite, total Kjeldahl nitrogen (TKN), orthophosphate, and total phosphorus). This list is similar to the list of analytes measured by the RMP and BASMAA partners at the six regional loading stations (including a San Mateo County station at the Pulgas Creek Pump Station in the City of San Carlos) monitored in WY 2012 - WY 2014. The prior data collected in freshwater tributaries to San Francisco Bay were used by the Nutrient Strategy Technical Team to develop and calibrate nutrient loading models.

In WY 2016 through WY 2019, in compliance with Provision C.8.f of MRP 2.0, the Countywide Program collected at least two samples per year for nutrient analysis. The goal of the monitoring was to address

Management Question No. 4 (Loads and Status) for which at least 20 samples needed to be collected by year four of the permit (i.e., WY 2019). The analytes and chemical analysis methods were ammonia (SM 4500 C), nitrate (EPA 300.0), nitrite (SM 4500 B), TKN (SM 4500 C), orthophosphate (SM 4500 E), and total phosphorus (SM 4500 E).

The bullets below describe SMCWPPP approaches to nutrient monitoring in WY 2016 through WY 2019. Monitoring stations are mapped in Figure 26. Results are summarized in Table 10. Comparisons to applicable WQOs are described in Section 7.0.

- **WY 2016.** Monitoring for nutrients was conducted at two bottom-of-the-watershed stations with mixed land uses (San Mateo Creek and Bear Creek) during the dry season when eutrophication, if present, would be most likely to result in impacts to beneficial uses.
- **WY 2017.** SMCWPPP sampled two locations (upstream and downstream) on two creeks (Atherton Creek and Redwood Creek) during a storm event to compare nutrient concentrations above and below dense urban land uses. Follow-up monitoring at all four stations was attempted during spring baseflows (concurrent with bioassessment monitoring); however, the downstream Atherton Creek station was dry when the field crew returned in the spring. Although data are included in this report (Table 10), 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. These were stations 204ATH050 (bioassessment station 204R03240) and 204RED050 (bioassessment station 20403496).
- **WY 2018.** SMCWPPP sampled two bottom-of-the-watershed locations (San Pedro Creek and Cordilleras Creek) during a storm event and during spring baseflow to compare seasonal differences in nutrient concentrations. Mobilization for storm samples collection in WY 2018 was driven by Provision C.8.g (Pesticides & Toxicity) monitoring requirements.
- **WY 2019.** SMCWPPP conducted POC monitoring for nutrients at nine creek stations on July 31, 2019. These stations were also sampled for nutrients as part of the bioassessment survey protocol that was conducted in May 2019. The stations were selected using a probabilistic monitoring design established for creek status monitoring. Comparison of nutrient concentrations for the two WY 2019 time periods is provided in Table 10.

Based on the laboratory results summarized in Table 10, the following findings were noted:

- Concentrations of total nitrogen and phosphorus are generally higher at downstream stations compared to upstream stations during storm events and baseflow conditions.
- Nutrient concentrations are higher during storm runoff sampling events than spring and summer baseflow events. This finding is consistent with the draft conceptual model developed by the NMS which suggests that nutrient loads to San Francisco Bay from creeks are highest during the wet season, although considerably less than loads from publicly owned wastewater treatment works (POTWs) (Senn and Novick 2014).
- The highest concentration of total nitrogen was measured in Atherton Creek (3.91 mg/L at 204ATH010) during the January 9, 2017 storm runoff sampling event. The highest concentration of phosphorus was measured in Redwood Creek (0.36 mg/L at 204RED010) during the January 9, 2017 storm runoff sampling event.

- Under baseflow conditions sampled in May, June, and July, the highest total nitrogen concentration was measured in Atherton Creek (1.95 mg/L at 204R04600) on July 31, 2019. The highest baseflow phosphorus concentrations were measured in Atherton Creek (0.17 mg/L at 20404600 on June 10, 2019) and Burlingame Creek (0.17 mg/L at 204R04160 on July 31, 2019).

**Table 10. Nutrient Concentrations in SMCWPPP Water Samples, WYs 2016 – 2019.**

| Station Code | Creek/ Location | Date | Nitrate as N | Nitrite as N | Total Kjeldahl Nitrogen (TKN) | Ammonia as N | Un-ionized Ammonia as N[1] | Ammonium[2] | Total Nitrogen[3] | Dissolved Orthophosphate as P | Phosphorus as P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **WY 2016** | | | | | | | | | | | |
| 204SMA060 | San Mateo | 6/23/16 | 0.063 | 0.002 | 0.48 | 0.024 | 0.0004 | 0.024 | 0.545 | 0.014 | 0.011 |
| 205BRC010 | Bear Creek | 6/23/16 | ND | 0.001 | 0.26 | 0.048 | 0.001 | 0.047 | 0.271 | 0.034 | 0.042 |
| **WY 2017** | | | | | | | | | | | |
| 204ATH010 | Atherton | 1/9/2017 | 2.2 | 0.006 | 1.7 | 0.057 | 0.0013 | 0.06 | 3.91 | 0.19 | 0.29 |
| 204ATH050 | Atherton | 1/9/2017 | 1.5 | 0.006 | 1.8 | 0.064 | 0.0007 | 0.06 | 3.31 | 0.1 | 0.24 |
| 204ATH050 [4] | Atherton | 5/23/2017 | ND | 0.002 | 1.2 | 0.034 | 0.0005 | 0.03 | 1.21 | 0.05 | 0.06 |
| 204RED010 | Redwood | 1/9/2017 | 1.5 | 0.005 | 1.6 | 0.046 | 0.0017 | 0.04 | 3.11 | 0.27 | 0.36 |
| 204RED010 | Redwood | 5/22/2017 | 0.57 | 0.028 | 1.3 | 0.069 | 0.0122 | 0.06 | 1.9 | 0.11 | 0.16 |
| 204RED050 | Redwood | 1/9/2017 | 1.2 | 0.004 | 1.4 | 0.038 | 0.0011 | 0.04 | 2.6 | 0.2 | 0.27 |
| 204RED050 [4] | Redwood | 5/22/2017 | 0.37 | 0.034 | 0.83 | 0.093 | 0.0027 | 0.09 | 1.23 | 0.14 | 0.16 |
| **WY 2018** | | | | | | | | | | | |
| 202SPE005 | San Pedro | 1/8/2018 | 0.81 | 0.009 | 0.88 | 0.077 J | 0.0008 | 0.076 | 1.70 | 0.062 | 0.22 |
| 202SPE005 | San Pedro | 5/17/2018 | 0.47 | 0.004 J | 0.18 | 0.05 | 0.0013 | 0.049 | 0.65 | 0.033 | 0.025 |
| 204COR010 | Cordilleras | 1/8/2018 | 0.54 | 0.012 | 0.88 | 0.077 J | 0.001 | 0.076 | 1.43 | 0.13 | 0.21 |
| 204COR010 | Cordilleras | 5/21/2018 | 0.11 J | ND | 0.70 | 0.055 | 0.0008 | 0.054 | 0.81 | 0.089 | 0.11 |
| **WY 2019** | | | | | | | | | | | |
| 202TUN030 [4] | Tunitas | 5/14/2019 | 0.066 | 0.002 J | 0.083 J | 0.28 | 0.0102 | 0.27 | 0.15 | 0.044 | 0.047 |
| 202TUN030 | Tunitas | 7/31/2019 | 0.066 J | 0.001 J | 0.17 | 0.11 | 0.0038 | 0.106 | 0.24 | 0.05 | 0.045 |
| 202TUN040 [4] | Tunitas | 5/14/2019 | ND | 0.001 J | 0.14 | 0.22 | 0.0076 | 0.21 | 0.15 | 0.044 | 0.039 |
| 202TUN040 | Tunitas | 7/31/2019 | ND | ND | ND | 0.056 | 0.0024 | 0.054 | 0.05 | 0.041 | 0.036 |
| 204BEL005 [4] | Belmont | 5/13/2019 | 0.33 | 0.004 J | 0.52 | 0.24 | 0.0128 | 0.227 | 0.85 | 0.058 | 0.067 |
| 204BEL005 | Belmont | 7/31/2019 | 0.066 J | 0.001 J | 0.41 | 0.062 | 0.0034 | 0.059 | 0.48 | 0.062 | 0.064 |
| 204R04160 [4] | Burlingame | 5/15/2019 | 0.15 | ND | 0.69 | 0.15 | 0.0054 | 0.145 | 0.84 | 0.13 | 0.16 |
| 204R04160 | Burlingame | 7/31/2019 | 0.097 J | 0.001 J | 0.44 | 0.08 | 0.0015 | 0.078 | 0.54 | 0.17 | 0.17 |
| 204R04280 [4] | Belmont | 5/13/2019 | 0.33 | 0.002 J | 0.52 | 0.39 | 0.0088 | 0.381 | 0.85 | 0.044 | 0.053 |
| 204R04280 | Belmont | 7/31/2019 | 0.14 | 0.003 J | 0.28 | ND | 0.0002 | 0.007 | 0.42 | 0.051 | 0.058 |
| 204R04428 [4] | Cordilleras | 5/15/2019 | 0.18 | 0.004 J | 0.44 | 0.077 | 0.0025 | 0.075 | 0.62 | 0.038 | 0.052 |
| 204R04428 | Cordilleras | 7/31/2019 | 0.099 J | 0.001 J | 0.19 | 0.059 | 0.0018 | 0.057 | 0.29 | 0.052 | 0.05 |
| 204R04600 [4] | Atherton | 6/10/2019 | 0.53 | 0.004 J | 0.63 | 0.13 | 0.0044 | 0.126 | 1.16 | 0.15 | 0.17 |
| 204R04600 | Atherton | 7/31/2019 | 0.94 | 0.005 | 1.0 | 0.065 | 0.0097 | 0.055 | 1.95 | 0.12 | 0.15 |
| 205R04056 [4] | Dry Creek | 6/11/2019 | 0.23 | 0.004 J | 0.30 | 0.11 | 0.0025 | 0.108 | 0.53 | 0.068 | 0.076 |
| 205R04056 | Dry Creek | 7/31/2019 | 0.074 J | 0.003 J | 0.58 | 0.079 | 0.0043 | 0.075 | 0.66 | 0.089 | 0.11 |
| 205R05044 [4] | Dry Creek | 6/11/2019 | 0.16 | 0.013 | 0.47 | 0.082 | 0.0025 | 0.080 | 0.64 | 0.093 | 0.11 |
| 205R05044 | Dry Creek | 7/31/2019 | 0.14 | 0.005 | 0.28 | 0.052 | 0.0010 | 0.051 | 0.43 | 0.064 | 0.071 |

**Notes:**

All constituents reported as mg/L.

J-flagged data are above the detection limit but less than the reporting limit and are therefore considered estimated.

ND = Not Detected

[1] Un-ionized ammonia calculated using formula provided by the American Fisheries Society Online Resources. Formula requires field measurements of temperature, pH, and specific conductance, which were not recorded for the Jan. 8, 2018 event. Specific conductance and pH values for Jan. 8, 2018 samples were estimated based on laboratory intake measurements reported for the concurrent toxicity samples. Temperature was estimated to be 12°C. Un-ionized ammonia calculated using ½ method detection limit for non-detect ammonia measurements.

[2] Ammonium = ammonia – un-ionized ammonia.

[3] Total nitrogen = TKN + nitrate + nitrite. Non-detects valued at ½ method detection limit in calculation.

[4] Some samples were analyzed in compliance with Provision C.8.d Creek Status Monitoring requirements. They do not count towards Provision C.8.f POC Monitoring requirements but are included for comparison purposes.

## 6.3. Emerging Contaminants

Emerging contaminant monitoring is being addressed through SMCWPPP's participation in the RMP. The RMP has investigated 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 might impact beneficial uses in the Bay and to develop cost-effective strategies to identify, monitor, and minimize impacts. The RMP published a CEC Strategy "living" document in 2013, completed a full revision in 2017 (Sutton et al. 2013, Sutton and Sedlak 2015, Sutton et al. 2017), and made minor updates in 2018 (Lin et al. 2018). The CEC Strategy document guides RMP special studies on CECs using a tiered risk and management action framework.

Provision C.8.f of MRP 2.0 identifies three emerging contaminants that at a minimum must be addressed through POC monitoring: Perfluorooctane Sulfonate Substances (PFOS), Perfluoroalkyl and Polyfluoroalkyl Sulfonate Substances (PFAS), and Alternative Flame Retardants (AFRs). PFAS is a broad class of chemicals used in industrial applications and consumer goods primarily for their ability to repel oil and water. PFOS are a subgroup within the PFAS umbrella and are identified in the CEC Strategy as "moderate" concern due to Bay occurrence data suggesting a high probability of a low-level effect on Bay wildlife. Other PFAS and AFRs are mostly identified as "possible" concern due to uncertainties in measured or predicted Bay concentrations or in toxicity thresholds. RMP staff recently published reports summarizing PFOS and PFAS monitoring results in the Bay (Houtz et al. 2016, Sedlak et al. 2017, Sedlak et al. 2018). Organophosphate esters (OPEs), which are a class of AFRs widely used in plastic and polymer additives for their flame retardant properties, have recently been elevated to "moderate" concern by the ECWG due to their presence in the Bay at levels comparable or exceeding protective thresholds, the potential for cumulative endocrine disrupting effects, lack of understanding of fate and transport, and likelihood of increased use as replacement compounds (Shimabuku et al. 2019 draft). Bisphenols (another class of plastic additives with endocrine-disrupting properties) have also been elevated to "moderate" concern based on recent Bay monitoring results, and in 2019, the ECWG recommended further monitoring of OPEs and bisphenols, including stormwater runoff monitoring.

AFRs came into use following state bans and nationwide phase-outs of polybrominated diphenyl ether (PBDE) flame retardants in the early 2000s. They include many categories of compounds, including OPEs. In 2018 the RMP STLS and ECWG worked together to conduct a special study to inform ECWG's planning activities related to AFRs. The special study compiled and reviewed available data and previously developed conceptual models for PBDE to support a stormwater related AFR conceptual model being developed by the ECWG. Organophosphate esters were prioritized for further investigation due to their increasing use, persistent character, and ubiquitous detections at concentrations exceeding PBDE concentrations in the Bay. Limited stormwater data from two watersheds in Richmond and Sunnyvale suggest that urban runoff may be an important source of these compounds. Additional monitoring and modeling were recommended in the special study (Lin and Sutton 2018). In 2019, based on recent results from the 2017 RMP Status and Trends Water Cruise on OPE detections, and with the opportunity to advance monitoring of OPEs and other CECs via the multi-year non-targeted analysis of stormwater-related CECs initiated in 2018, the ECWG agreed to prioritize monitoring AFRs for RMP special studies. Additional funds were recommended to supplement the Emerging Contaminants Strategy in support of developing CECs conceptual models more broadly as part of the longer-term CECs Modeling Strategy.

In 2018, the RMP's ECWG initiated a multi-year special study to analyze stormwater samples collected from urban watersheds for a large suite of CECs. The list of CECs to be analyzed is based on recent work conducted in Puget Sound streams and is intended to target urban runoff constituents rather than those found in wastewater (e.g., pharmaceuticals). In addition to vehicle tire chemicals and imidacloprid (a neonicotinoid insecticide), the list includes the CECs specifically identified in Provision C.8.f of MRP 2.0 (PFOSs, PFASs, and AFRs). Pilot sampling began in 2019 in close coordination with the STLS and preliminary results were shared with the ECWG. Year-two of this three-year study was approved in 2019, with the inclusion of additional CECs, including OPEs and bisphenol A and S. The final reports and manuscripts for this study are anticipated in fall 2021.

# 7.0 COMPLIANCE WITH APPLICABLE WATER QUALITY OBJECTIVES

Provision C.8.h.i of MRP 2.0 requires RMC participants to assess all data collected pursuant to Provision C.8 for compliance with applicable water quality objectives (WQOs). In compliance with this requirement, POC monitoring water sampling data collected in WY 2016 through 2019 by the Countywide Program were compared to applicable numeric WQOs. There were no exceedances of applicable WQOs.

The comparison to applicable WQOs considered the following:

- **Discharge vs. Receiving Water** – WQOs apply to receiving waters, not discharges such as stormwater runoff. A WQO generally represents the maximum concentration of a pollutant that can be present in the water column without adversely affecting organisms using the aquatic system as habitat, people consuming those organisms or water, and/or other current or potential beneficial uses. During WY 2016 through WY 2019, nutrient and copper data were collected in receiving waters by SMCWPPP. PCBs and mercury samples were collected within the engineered storm drain network where WQOs do not apply. Dilution is likely to occur when the MS4 discharges urban stormwater (and non-stormwater) runoff into local receiving waters. Therefore, it is unknown whether discharges that exceed WQOs result in exceedances in the receiving water itself, the location where there is the potential for aquatic life to be exposed to a pollutant.
- **Freshwater vs. Saltwater** - POC monitoring samples were collected from freshwater (i.e., above tidal influence in creeks) and therefore comparisons were made to freshwater WQOs.
- **Aquatic Life vs. Human Health** - Comparisons were primarily made to WQOs for the protection of aquatic life, not WQOs for the protection of human health to support the consumption of water or organisms. The rationale is that water and organisms are not likely consumed by humans at the locations of the monitoring stations.
- **Acute vs. Chronic Objectives/Criteria** – All monitoring of stormwater runoff for PCBs and mercury and several of the copper/nutrient creek sampling events were conducted during episodic storm events. Storm episode monitoring results likely do not represent long-term concentrations of the monitored constituents in receiving waters. Therefore, storm monitoring data were compared to acute WQOs for aquatic life that represent the highest concentrations of a pollutant to which an aquatic community can be exposed for a short period of time (e.g., one hour) without resulting in an unacceptable effect. Spring and summer baseflow creek monitoring data were compared to chronic WQOs developed to assess longer-term exposure.

Of the WY 2016 through WY 2019 POC monitoring analytes, promulgated WQOs for the protection of aquatic life only exist for total mercury, dissolved copper, and unionized ammonia:

- **Total Mercury**. All water samples collected in San Mateo County watersheds by SMCWPPP from WY 2016 through WY 2019 for mercury analysis were stormwater runoff within the MS4, not receiving water. Stormwater runoff results are not directly comparable to WQOs, as described above. However, all WY 2016 through WY 2019 mercury concentrations in stormwater runoff (Attachment 3) were well below the freshwater acute objective for mercury of 2.4 µg/L (2,400 ng/L).
- **Dissolved Copper.** Acute (1-hour average) and chronic (4-day average) WQOs for copper are expressed in terms of the dissolved fraction of the metal in the water column and are hardness dependent[15]. The copper WQOs were calculated using the base e exponential functions described in the California Toxics Rule (40 CFR 131.38) which apply hardness values measured at the sample station. Dissolved copper concentrations were compared to the calculated WQOs. Per the above discussion, storm monitoring data was compared to acute WQOs and spring baseflow creek monitoring data were compared to chronic WQOs. Three of the 15 samples had dissolved copper concentrations that exceeded the calculated WQO (Table 11). However, as stated above, the samples were collected in the MS4, not the receiving water. Furthermore, it is unknown whether the receiving water had the same hardness as the discharge. If the hardness in the receiving water was higher, a higher WQO would have been applicable.
- **Nutrients**. The un-ionized ammonia concentrations calculated based on measured concentrations of ammonia in Countywide Program samples (Table 10) were all well below the annual median WQO for un-ionized ammonia of 0.025 mg/L.

# 8.0 SUMMARY AND DISCUSSION

This IMR fulfills the requirements of MRP 2.0 Provision C.8.h.iii for reporting a comprehensive analysis of Provision C.8.f. POC Monitoring data collected pursuant to Provision C.8. since the previous IMR. The previous SMCWPPP IMR addressed WYs 2011 – WY 2013 (SMCWPPP 2014) and the time period addressed by this report includes WY 2014 – WY 2019. However, please note that for PCBs, this report focuses on progress to-date towards identifying source areas and properties in San Mateo County. In this context, it evaluates all the relevant and readily available sediment and stormwater runoff PCBs chemistry data collected in San Mateo County, ranging back to the early 2000s. This includes POC monitoring data collected directly by the Countywide Program and appropriate data collected by third parties such as the RMP's STLS.

Yearly minimum sampling requirements specified in Provision C.8.f. were met for all POC monitoring parameters.

[15] The current copper standards for freshwater in California do not account for the effects of pH or natural organic matter and can be overly stringent or under-protective (or both, at different times). Therefore, the California Stormwater Quality Association (CASQA) has asked the USEPA to considering updating the California Toxics Rule standards for copper using the Biotic Ligand Model (BLM) which accounts for the effect of water chemistry in addition to hardness (i.e., temperature, pH, dissolved organic carbon, major cations and anions).

**Table 11. Comparison of SMCWPPP copper monitoring data to WQOs, WYs 2016 – 2019.**

| Station Code | Sample Date | Measured Dissolved Copper (µg/L) | Measured Hardness as $CaCO_3$ (mg/L) | Acute WQO for Dissolved Copper at Measured Hardness (µg/L) | Chronic WQO for Dissolved Copper at Measured Hardness (µg/L) |
|---|---|---|---|---|---|
| **WY 2016** | | | | | |
| SM-MPK-71 | 2/17/2016 | 14.8 | 450 | 55.4 | 32.4 (NA) |
| SM-RCY-327 | 2/17/2016 | **9.34** | 38.4 | 5.5 | 4.0 (NA) |
| SM-RCY-388 | 2/17/2016 | **9.24** | 28.0 | 4.1 | 3.0 (NA) |
| **WY 2017** | | | | | |
| SM-SSF-316A | 12/10/2016 | **6.5** | 34.8 | 5.0 | 3.6 (NA) |
| 204ATH010 | 1/9/2017 | 9.8 | 260 | 33.1 | 20.3 (NA) |
| 204ATH050 | 1/9/2017 | 6.2 | 200 | 25.8 | 16.2 (NA) |
| 204RED010 | 1/9/2017 | 11 | 260 | 33.1 | 20.3 (NA) |
| 204RED010 | 5/22/2017 | 12 | 380 | 47.3 | 28.0 |
| 204RED050 | 1/9/2017 | 6.4 | 260 | 33.1 | 20.3 (NA) |
| **WY 2018** | | | | | |
| 202SPE005 | 1/8/2018 | 2.7 | 50 | 7.0 | 5.0 (NA) |
| 202SPE005 | 5/17/2018 | 0.41 J | 190 | 24.6 | 15.5 |
| 204COR010 | 1/8/2018 | 4.3 | 76 | 10.4 | 7.1 (NA) |
| 204COR010 | 5/21/2018 | 1.2 | 380 | 47.3 | 28.0 |
| **WY 2019** | | | | | |
| 204BEL005 | 7/31/2019 | 0.93 | 270 | 34.3 | 20.9 |
| 204R04428 | 7/31/2019 | 0.75 | 400 | 49.6 | 29.3 |

J-flagged data are above the detection limit but less than the reporting limit and are therefore considered estimated.
NA = Not applicable. Chronic WQOs are not applicable to storm event grab samples.

## 8.1. PCBs and Mercury

This report focuses on progress to-date towards identifying PCBs source areas and properties in San Mateo County. Consistent with MRP requirements, the focus has been on PCBs, with ancillary and secondary benefits assumed to be realized for controlling mercury. Highlights from the PCBs and mercury monitoring conducted to-date included the following:

- The Countywide Program's PCBs and mercury monitoring commenced in the early 2000s and has generally focused on San Mateo County WMAs containing high interest parcels with land uses potentially associated with PCBs.
- In 2014, SMCWPPP worked with San Mateo County MRP Permittees to conduct a process to screen for "high interest parcels" for PCBs in the county. The screening covered all land areas in the county that drain to the Bay, focusing on about 160,000 urban parcels. Parcels were identified that were industrialized in 1980 or earlier (i.e., old industrial parcels) or have other land uses associated with PCBs (i.e., electrical, recycling, and military). SMCWPPP then worked with municipal staff to prioritize these parcels based on the evaluation of existing information on current land uses and practices (e.g., redevelopment status, extent and quality of pavement, level of current housekeeping, any history of stormwater violations, and presence of electrical or heavy equipment, storage tanks, or stormwater treatment), local institutional/historical knowledge, and surveys of site conditions (windshield, Google Street View, and/or aerial photograph). The prioritization resulted in a list of about 1,600 high interest parcels for PCBs in San Mateo County (SMCWPPP 2015).
- The above 1,600 high interest parcels are almost entirely located within 105 "catchments of interest" with high interest parcels comprising at least 1% of their area (and usually with existing pollutant controls). In FY 2016, SMCWPPP implemented a process to identify Watershed Management Areas (WMAs) and prioritize them based on the potential for controls (especially source property referrals) to reduce PCBs loads. WMAs were defined as the sum of the 105 catchments of interest and an additional 25 catchments with existing or planned stormwater pollutant controls (e.g., GI implemented on parcels per Provision C.3 requirements, built on public lands such as parks, or retrofitted into the public ROW), for a total of about 130 catchments designated as WMAs (SMCWPPP 2016a and b). WMA catchments are stormwater runoff hydrologic catchments in San Mateo County that drain to 24-inch or larger diameter outfalls.
- Each water year, SMCWPPP designed and implemented a PCBs and mercury monitoring plan based on the 2014 desktop screening (which was revisited and refined each year as needed) and all sampling results available at that time. Stormwater runoff monitoring was coordinated with RMP STLS reconnaissance monitoring, with SMCWPPP providing sample station locations to SFEI staff.

- To-date, about 60 composite samples of stormwater runoff[16] have been collected from the bottom of San Mateo County WMAs and about 400 individual and composite grab samples of sediment have been collected within priority WMAs to help characterize the catchments and identify source areas and properties. Most samples were collected in the public ROW. The grab sediment samples were collected from a variety of types of locations, including manholes, storm drain inlets, driveways, streets, and sidewalks, often adjacent to or nearby high interest parcels with land uses associated with PCBs and/or other characteristics potentially associated with pollutant discharge (e.g., poor housekeeping, unpaved areas).
- SMCWPPP's PCBs and mercury monitoring program included collecting sediment samples in the public ROW (e.g., from streets and the MS4) by every known PCBs remediation site in San Mateo County, to the extent applicable and feasible.
- When a previously unknown potential source property was revealed via the PCBs and mercury monitoring program, SMCWPPP conducted a follow-up review of current and historical records regarding site occupants and uses, hazardous material/waste use, storage, and/or release, violation notices, and any remediation activities. Apart from databases such as EPA's Toxic Release Inventory (TRI) and Envirofacts, and the State of California's Geotracker and Envirostor, the most useful records were often kept by San Mateo County Department of Environmental Health. Four previously unknown potential source properties have been identified in San Mateo County, all in WMA 210 (Pulgas Creek Pump Station South) in the City of San Carlos. SMCWPPP is working with the City of San Carlos to determine next steps for these properties, including potential referral to the Regional Water Board. The four properties are located at the following San Carlos addresses (see Section 5.5.6 for more details):
    1. 1411 Industrial Road
    2. 1030 Washington Street
    3. 1029 Washington Street
    4. 1030 Varian Street
- SMCWPPP's PCBs and mercury monitoring program has resulted in SMCWPPP referring four properties (two sets of two adjacent properties, all in San Carlos) to the Regional Water Board for potential further PCBs investigation and abatement (see Section 5.5.6):
    - 270 Industrial Road (Delta Star) / 495 Bragato Road (Tiegel)
    - 977 and 1007/1011 Bransten Road

[16] Not including about 30 additional stormwater runoff samples collected at the Pulgas Creek pump station stormwater loading station.

- Sediment monitoring in the Redwood City MS4 (WMA 379) conducted in 2014 and 2017 in the vicinity of 2201 Bay Road identified an additional source area (see Section 5.5.7). This area includes two properties listed for PCBs on GeoTracker: Tyco Engineering Products and an adjacent railroad spur. The Tyco site was remediated and redeveloped (MRP Provision C.3 compliant) and is currently a parking lot for Stanford Hospital. A total of 43 sediment samples and 2 composite stormwater runoff samples have been collected to-date in WMA 379 by SMCWPPP and others, but the only potential PCBs source area that has been identified is the former Tyco site and adjacent historical railroad spur. In April 2019, Regional Water Board staff informed SMCWPPP that they plan to require a clean out the storm drain as part of approving a proposed cap modification and redevelopment of the property and may have the opportunity to request additional post-cleanout monitoring. SMCWPPP will continue to track these efforts and will request PCBs load reduction credit as appropriate.
- Low PCBs concentrations in composite stormwater runoff samples from the bottom of WMA catchments have suggested that either PCBs sources are not prevalent in the catchment or the samples are "false negatives." False negatives could be the result of low rainfall/runoff rates failing to mobilize sediments from source areas and/or other factors. Only a few stormwater runoff sampling stations in San Mateo County have been resampled, but the results from two such stations in South San Francisco, as described by SMCWPPP (2018), suggested small storm sizes may have resulted in false negatives. SMCWPPP, in collaboration with the SCVURPPP, has recently preliminarily developed a method to normalize results from this type of stormwater runoff monitoring based upon storm intensity. However, the high variability in many of the parameters involved led to a high degree of uncertainty in the evaluation results. SMCWPPP and the SCVURPPP will continue to evaluate normalization methods and results as more data become available in future years, in coordination with related efforts by the RMP (referred to as the RMP's "Advanced Data Analysis").
- Figure 6 is a map illustrating the current status of WMAs in San Mateo County, based upon the monitoring data collected through WY 2019. Based upon total PCBs concentration in sediment and/or PCBs particle ratio in stormwater runoff samples, each WMA is placed in one of the following categories:
    1. Samples > 0.5 mg/kg PCBs, source properties identified.
    2. Samples > 0.5 mg/kg PCBs, source properties not identified.
    3. Samples 0.2 – 0.5 mg/kg PCBs.
    4. Samples <0.2 mg/kg PCBs.
    5. No samples collected.
- The most recent two years of POC monitoring data, WY 2018 (n = 50) and WY 2019 (n = 25), suggest that the PCBs monitoring program in the public ROW in San Mateo County may be approaching diminishing returns in terms of finding PCBs and potentially identifying new source areas, based upon the following:
    - The sediment sampling design continued to target locations thought to have the greatest possibility of having elevated PCBs, with an overall goal of attempting to locate source properties.
    - The mean PCBs concentrations in WY 2018 and WY 2019 sediment samples were about an order of magnitude lower than the entire PCBs data set.

    - The median PCBs concentrations in WY 2018 and WY 2019 sediment samples were about 50% lower than the entire data set.
    - In WY 2018, only 1 of the 50 sediment samples collected had a PCBs concentration that exceeded 1.0 mg/kg. One other sample had a PCBs concentration between 0.5 and 1.0 mg/kg. All of the remaining samples had a PCBs concentration below 0.5 mg/kg.
    - In WY 2019, none of the 25 sediment samples collected had a PCBs concentration that exceeded 1.0 mg/kg. One sample had a PCBs concentration between 0.5 and 1.0 mg/kg. All of the remaining samples had a PCBs concentration below 0.5 mg/kg.

- Of the WY 2016 through WY 2019 POC monitoring analytes, promulgated WQOs for the protection of aquatic life only exist for total mercury, dissolved copper, and unionized ammonia. None of the SMCWPPP or third-party water samples collected in San Mateo County over this time period exceeded applicable water quality objectives (WQOs).
- SMCWPPP participated in a BASMAA monitoring study that satisfied the MRP Provision C.12.e requirement to collect 20 composite caulk/sealant samples throughout the MRP permit area. The final project report was included with the Countywide Program's FY 2017/18 Annual Report, submitted to the Regional Water Board on September 30, 2018 (BASMAA 2018).
- SMCWPPP participated in a BASMAA regional study that was developed to satisfy MRP Provision C.8.f requirements to collect at least eight PCBs and mercury samples that address Management Question No. 3 (Management Action Effectiveness). The study investigated the effectiveness of hydrodynamic separator (HDS) units and various types of biochar-amended bioretention soil media (BSM) at removing PCBs and mercury from stormwater. Results of the study are summarized by BASMAA (2019a and b), reports that are appended to SMCWPPP's WY 2018 UCMR.
- MRP Provision C.12.g requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. The provision states: "the specific information needs include understanding the in-Bay transport of PCBs discharged in urban runoff, the sediment and food web PCBs concentrations in margin areas receiving urban runoff, the influence of urban runoff on the patterns of food web PCBs accumulation, especially in Bay margins, and the identification of drainages where urban runoff PCBs are particularly important in food web accumulation." C.12.g requires Permittees to report in this IMR "the findings and results of the studies completed, planned, or in progress as well as implications of studies on potential control measures to be investigated, piloted or implemented in future permit cycles." Attachment 1 provides a summary of a multi-year project by the San Francisco Bay (Bay) Regional Monitoring Program (RMP) that is addressing the requirements of Provision C.12.g. The project:
    - Identified four PMUs for initial study that are located downstream of urban watersheds where PCBs management actions are ongoing and/or planned;
    - Is developing conceptual and PCBs mass budget models for each of the four PMUs; and
    - Is conducting monitoring in the PMUs to evaluate trends in pollutant levels and track responses to pollutant load reductions.

- In WY 2020, the Program will continue to collect samples for PCBs and mercury analysis in compliance with provision C.8.f of MRP 2.0.
- SMCWPPP will develop a control measures plan, including a schedule and corresponding RAA, which demonstrates quantitatively that sufficient control measures will be implemented to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations by 2028 and 2030, respectively. Per the requirements in MRP Provisions C.11/12.d., this control measures plan is due in September 2020. As part of this effort, SMCWPPP and San Mateo County Permittees will continue planning scenarios for control measure implementation in priority WMAs in San Mateo County. The plan will be informed by the PCBs and mercury monitoring data summarized in this report. High priority will continue to be given to the Pulgas Creek pump station north and south drainages (WMA 31 and WMA 210), which are the two WMAs in San Mateo County with the greatest number of samples with elevated concentrations of PCBs in sediment and stormwater runoff samples to-date.

## 8.2. Copper

In WY 2019, the Countywide Program continued to collect and analyze copper samples in compliance with Provision C.8.f of MRP 2.0. The yearly minimum of two samples was satisfied and the requirement to have a cumulative total of four samples addressing Management Question No. 4 (Loads and Status) and No. 5 (Trends) by year four of the Permit (i.e., WY 2019) was also satisfied. A review of the WY 2016 through WY 2019 copper dataset suggests that relatively low levels of copper are being conveyed to receiving waters from urban areas during stormwater runoff events and there have not been any exceedances of an applicable WQO for copper in a receiving water sample. However, although WQOs do not apply to stormwater runoff samples collected from the MS4, these data were also compared to the hardness dependent acute WQOs and three samples from the MS4 exceeded the WQO. It is uncertain what the copper concentration would have been after mixing with the receiving water. Furthermore, if the hardness of the receiving water was higher, a higher WQO would have been calculated.

The Program will continue to collect samples for copper analysis in compliance with Provision C.8.f of MRP 2.0 with a goal of at least three samples in WY 2020 to meet the requirement of 20 samples by year five of the Permit (i.e., WY 2020).

Copper data collected under MRP 2.0 have been of limited value to the Program. Copper data collected in San Francisco Bay through the RMP Status and Trends Program are more useful in tracking the effectiveness of the copper control measures required by Provision C.13 of MRP 2.0 and, more importantly, the success of the Brake Pad Partnership and Senate Bill (SB) 346 which addresses the largest source of copper by requiring brake pad manufacturers to reduce the use of copper in brake pads sold in California. However, the copper data collected in compliance with Provision C.8.f of MRP 2.0 can provide a relatively cost-effective check on copper discharges to tributaries to the Bay. The Program recommends maintaining the same overall copper monitoring requirements (i.e., 20 total samples) in MRP 3.0, but an elimination of the yearly minimums could result in a more effective monitoring design.

## 8.3. Nutrients

In WY 2019, the Countywide Program continued to collect and analyze nutrient samples in compliance with Provision C.8.f of MRP 2.0. The yearly minimum of two samples was satisfied and the requirement to have a cumulative total of 20 samples addressing Management Question No. 4 (Loads and Status) by year four of the Permit (i.e., WY 2019) was also satisfied. A review of the WY 2016 through WY 2019 nutrient dataset suggests that nutrient concentrations are highest during storm events and generally higher at stations lower in the watershed. In addition, the highest nitrogen concentrations were found in Atherton Creek and the highest phosphorus concentrations were found in Redwood Creek.

In WY 2020, the Program will continue to collect samples for nutrient analysis in compliance with Provision C.8.f of MRP 2.0.

Although nutrient data can be useful in supporting some types of Stressor/Source Identification projects initiated in compliance with Provision C.8.e of MRP 2.0, the Program recommends that the requirement for nutrient monitoring be removed from the POC Monitoring provision under MRP 3.0. The original need for nutrient sampling in tributaries to the Bay to support Regional Water Board efforts to develop nutrient numeric endpoints for the San Francisco Bay Estuary no longer exists. This effort has now been captured and superseded by the State Water Board Biostimulatory Substances and Biological Integrity Project[17] which is proposing to adopt a statewide water quality objective for biostimulatory substances (such as nitrogen and phosphorus) along with a program of implementation as an amendment to the Water Quality Control Plan for Inland Surface Water, Enclosed Bays and Estuaries of California (ISWEBE Plan).

## 8.4. Emerging Contaminants

During MRP 2.0, SMCWPPP has leveraged its participation in these RMP special studies to satisfy the POC monitoring requirement for CECs within Provision C.8.f. SMCWPPP recommends that MRP 3.0 provisions continue to support special studies that address data gaps and the scientific understanding of fate and transport of stormwater-related CECs in the Bay. In particular, SMCWPPP is supportive of continued coordination through the STLS to identify the appropriate watersheds and sampling sites for monitoring CECs through RMP special studies. SMCWPPP is also supportive of further developing conceptual and empirical models to better evaluate the distribution and sources of CECs of interest within a stormwater and watershed context. SMCWPPP further recommends including requirements to "conduct or cause to be conducted a special study that addresses relevant management information needs for emerging contaminants;" however, these requirements should allow more flexibility with respect to the classes of compounds identified in the permit, allowing easier alignment with RMP special studies that may address a variety of stormwater-related CECs as the science is advanced over the coming years.

[17] https://www.waterboards.ca.gov/water_issues/programs/biostimulatory_substances_biointegrity/

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## Attachment 1

# Fate and Transport Study of PCBs: Urban Runoff Impact On San Francisco Bay Margins

**MRP PROVISION C.12.g. FATE AND TRANSPORT STUDY OF PCBS: URBAN RUNOFF IMPACT ON SAN FRANCISCO BAY MARGINS**

## Background

MRP Provision C.12.g requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. The provision states: "the specific information needs include understanding the in-Bay transport of PCBs discharged in urban runoff, the sediment and food web PCBs concentrations in margin areas receiving urban runoff, the influence of urban runoff on the patterns of food web PCBs accumulation, especially in Bay margins, and the identification of drainages where urban runoff PCBs are particularly important in food web accumulation." Conceptually, advances in this type of knowledge could allow the Regional Water Board to explore revising the PCBs TMDL to incentivize implementing PCBs management actions in such drainages that drain to sensitive Bay margin areas. Prioritizing actions in these drainages could possibly facilitate reaching TMDL goals more efficiently, though establishing this type of prioritization process would involve many challenges.

Provision C.12.g. is being addressed through a multi-year project by the San Francisco Bay (Bay) Regional Monitoring Program (RMP) to identify, model, and investigate embayments along the Bay shoreline designated "Priority Margin Units" (PMUs). The project:

- Identified four PMUs for initial study that are located downstream of urban watersheds where PCBs management actions are ongoing and/or planned;
- Is developing conceptual and PCBs mass budget models for each of the four PMUs; and
- Is conducting monitoring in the PMUs to evaluate trends in pollutant levels and track responses to pollutant load reductions.

The objectives of this effort to model and investigate Bay PMUs include:

- Characterizing concentrations and the spatial distribution of PCBs in sediment and food web biota in PMUs, including establishing baseline data on PCBs concentration and loading;
- Evaluating the response of PMU receiving waters over time to load reduction efforts in the watershed, such as remediation of PCBs-contaminated properties, including tracking PCBs in sport fish as the ultimate indicator of progress in reduction of impairment; and
- Informing the review and possible revision of the PCBs TMDL and the reissuance of the MRP, both of which were initially tentatively scheduled to occur in 2020 (while the MRP reissuance process in underway and is anticipated to be completed in 2021, the status of evaluating and possibly revising the Bay PCBs TMDL remains uncertain at this time).

A general description and multi-year budget for this project is in the "PCBs" section of the RMP Multi-Year Plan, 2020 Annual Update, dated January 2020 (sfei.org/documents/2020-rmp-multi-year-plan).

The RMP PCBs Workgroup, which includes representative from BASMAA, the Regional Water Board, and other RMP stakeholders, provides oversight over the project, including reviewing and commenting on draft conceptual model reports and plans for PMU-related RMP Special Studies (e.g., PMU monitoring plans).

In accordance with MRP Provision C.12.g., Permittees submitted in their FY 2016/17 Annual Reports a workplan for meeting the above information needs, which included descriptions of studies proposed or underway and a preliminary schedule. Permittees then reported on the status of the studies in their FY 2017/18 Annual Reports. In their Integrated Monitoring Reports (IMRs), due by March 30, 2020, Permittees are required to report the findings and results of the studies completed, planned, or in progress as well as implications of the studies on potential control measures to be investigated, piloted, or implemented in future permit cycles.

The four PMUs initially selected were:

- Emeryville Crescent (Alameda County)
- San Leandro Bay (Alameda County)
- Steinberger Slough (San Mateo County)
- Richmond Harbor (Contra Costa County)

The PMU conceptual models are intended to provide a foundation for future monitoring to track responses to load reductions and may eventually help guide planning of management actions. Three of the selected embayments (all except San Leandro Bay) receive drainage from pilot watersheds that were included in BASMAA's Clean Watersheds for a Clean Bay project (basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project).

**Status of PMU Conceptual Models**

The following sections summarize the status of conceptual model development in each of the four PMUs.

*Emeryville Crescent*

A final conceptual model report (dated April 2017) is available on the San Francisco Estuary Institute (SFEI) website:

sfei.org/sites/default/files/biblio_files/Emeryville%20Crescent%20Draft%20Final%20Report%2005-02-17%20Final%20Clean_0.pdf.

The report's key finding, which was based on a simple one-box pollutant fate model and dependent on assumptions made for the model's input parameters, was that PCBs concentrations in sediment and the food web could potentially decline fairly quickly (within 10 years) in response to load reductions from the watershed.

*San Leandro Bay*

A conceptual model for San Leandro Bay was developed in three phases, with reports available on the SFEI website. The Phase 1 report (dated June 2017) presented analyses of watershed loading, initial retention, and long-term fate, including results of sediment sampling in 2016:

sfei.org/sites/default/files/biblio_files/Yee%20et%20al%202017%20Conceptual%20Model%20Report%20San%20Leandro%20Bay%20Phase%201.pdf.

The Phase 2 report (dated December 2017) is designated a data report and documented the methods, quality assurance, and all of the results of the 2016 field study:

sfei.org/sites/default/files/biblio_files/San%20Leandro%20Bay%20PCB%20Study%20Data%20Report%20Final.pdf

The Phase 3 report (dated November 2019) was recently completed and is available here:

sfei.org/sites/default/files/biblio_files/San%20Leandro%20Bay%20PCBs%20Phase%203%20Final%20Report%20_0.pdf

This final report incorporates all of the results of the 2016 field study, and includes additional discussion of the potential influence of contaminated sites in the watershed and the results of passive sampling by Stanford researchers. It also includes a comparative analysis of long-term fate in San Leandro Bay and the Emeryville Crescent, a section on bioaccumulation, and a concluding section with answers to the management questions that were the impetus for the work.

The report included a discussion of the results of mass budget modeling that illustrated one type of challenge encountered during the PMU conceptual modeling effort. A wetland sediment core profile at Damon Slough indicated a substantial reduction in PCBs between the 1970s and the early 2000s. The simple mass budget model developed during this study suggested continued reductions in PCBs. However, a comparison of the results of extensive sampling of San Leandro Bay surface sediment in 1998 and in 2016 suggested minimal decline in PCBs over this more recent 18 year period. This finding may suggest that continuing PCBs inputs from the watershed are greater than estimated as part of the mass budget modeling and are slowing the recovery of San Leandro Bay. It is important to note that numerous uncertainties associated with the model and its parameters influence projected system response time.

*Steinberger Slough / Redwood Creek*

A conceptual model for Steinberger Slough / Redwood Creek is currently under development. SFEI staff released a draft report in February 2020. Like the other conceptual models, it includes results of existing monitoring efforts in the PMU and watershed, analyses of watershed loading, development of a mass budget, and long-term fate modeling, including projected PCBs concentrations in sediment and the food web in response to load reductions from the watershed.

*Richmond Harbor*

Due to budget limitations and because other RMP efforts were deemed higher priority, a conceptual model for the Richmond Harbor PMU is not yet under development.

**RMP Special Studies Related to PMUs**

In addition to ongoing conceptual model development (as described above), and continuing technical and logistical support for the RMP PCBs Workgroup, various types of RMP Special Studies[18] related to PMUs are ongoing, including the following:

- Shiner Surfperch PCBs Monitoring in PMUs – shiner surfperch is a crucial indicator of impairment, due to its explicit inclusion as an indicator species in the TMDL, importance as a sport fish species, tendency to accumulate high concentrations, site fidelity, and other factors. The conceptual site models recommend periodic monitoring of shiner surfperch to track trends in the PMUs, and as the ultimate indicator of progress in reduction of impairment. A coordinated sampling of PCBs in shiner surfperch in PMUs is being conducted as an add-on to RMP Status and Trends (S&T) sport fish sampling. A dataset for shiner surfperch will be developed that is directly comparable across the PMUs and the five locations that are sampled in S&T monitoring.
- Stormwater Runoff PCBs Monitoring in PMUs – this study is collecting information on PCBs concentrations and particle ratios in stormwater in watersheds draining to the PMUs to better estimate current PCBs loads into the PMUs (a critical component of the PMU mass budgets) and to help track the effectiveness of PCBs controls such as remediation of PCBs-contaminated properties.
- Assess Loading and Spatial Distribution of PCBs in Steinberger Slough / Redwood Creek PMU – this study will address information gaps in the conceptual model for this area and establish baseline data for evaluating the response of these receiving waters to load reduction efforts in the watershed. Passive sampling devices (PSDs) will be deployed to assess spatial patterns in dissolved PCBs in pore water and surface water, providing information on spatial patterns in an index of current biotic exposure. In addition, analysis of depth profiles of pore water with PSDs, accompanied by bulk sediment chemistry in cores, will provide information on the chronology of loading and exposure over the past 50 years. This study is being conducted in collaboration with Stanford researchers.

**Discussion**

As of the end of calendar year 2019, the PMU conceptual modeling and associated special studies are continuing to progress. Four PMUs for initial study, characterization, and tracking have been identified, and conceptual models have been completed for two of the PMUs, the Emeryville Crescent and San Leandro Bay. A draft conceptual model for a third PMU, Steinberger Slough / Redwood Creek, is under development. In conjunction with the modeling, RMP Special Studies are characterizing concentrations and the spatial distribution of PCBs in sediment and food web biota in PMUs and establishing baseline data on PCBs concentration and loading, and will help evaluate the response of the PMUs to load reduction efforts in their watersheds.

The efforts to model and investigate the PMUs are generating valuable new data and knowledge that will inform future revisions of the PCBs TMDL. However, it would be premature to propose major changes to the TMDL at this time, such as revising the stormwater allocation (e.g., assigning allocations to watershed areas that vary depending upon the sensitivity of the Bay margin area to which they drain). Similarly, additional work should be completed before attempting to project any implications of the modeling and studies on potential control measures to be investigated, piloted, or implemented in

[18] These efforts are partly funded by Supplemental Environmental Projects (SEPs).

future stormwater permit cycles. BASMAA representatives will continue to participate in the RMP PCBs Workgroup to help oversee this work and guide it towards developing information that will inform implementing controls for PCBs in stormwater runoff and reducing the Bay's PCBs impairment.

# Attachment 2

WY 2019 Quality Assurance / Quality Control Report

# Pollutants of Concern Monitoring - Quality Assurance/Quality Control Report, WY 2019

## 1.0 INTRODUCTION

The San Mateo Countywide Pollution Prevention Program (SMCWPPP) conducted Pollutants of Concern (POC) Monitoring in Water Year (WY) 2019 to comply with Provision C.8.f (Pollutants of Concern Monitoring) of the National Pollutant Discharge Elimination Program (NPDES) Municipal Regional Permit for the San Francisco Bay Area (i.e., MRP). Monitoring included analysis for polychlorinated biphenyls (PCBs), total mercury, total and dissolved copper, suspended sediment concentration (SSC), and nutrients (i.e., ammonia, nitrate, nitrite, total Kjeldahl nitrogen, orthophosphate, and total phosphorus).

This project utilized the Clean Watersheds for Clean Bay Project (CW4CB) Quality Assurance Project Plan (QAPP; BASMAA 2013) as a basis for Quality Assurance and Quality Control (QA/QC) procedures. Missing components were supplemented by the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition (RMC) QAPP (BASMAA 2016) and the QAPP for the California Surface Water Ambient Monitoring Program (SWAMP), specifically for nutrient and copper samples, respectively. Data were assessed for seven data quality attributes, which include (1) Representativeness, (2) Comparability, (3) Completeness, (4) Sensitivity, (5) Contamination, (6) Accuracy, and (7) Precision. These seven attributes were compared to Data Quality Objectives (DQOs), which were established to ensure that data collected are of adequate quality and sufficient for the intended uses. DQOs address both quantitative and qualitative assessment of the acceptability of data – representativeness and comparability are qualitative while completeness, sensitivity, precision, accuracy, and contamination are quantitative assessments. Specific DQOs are based on Measurement Quality Objectives (MQOs) for each analyte.

The MQOs for each of the POC analytes are summarized in Table 1 for water and Table 2 for sediment. As there was no reporting limit listed in the QAPP for copper, results were compared to the SWAMP recommended reporting limits for inorganic analytes in freshwater. Overall, the results of the QA/QC review suggest that the data generated during this study were of sufficient quality for the purposes of the project. While some data were flagged based on the MQOs and DQOs identified in the QAPPs, none of the data was rejected. Further details regarding the QA/QC review are provided in the sections below.

**Table 1. Measurement quality objectives for analytes in water from the Clean Watersheds for a Clean Bay (CW4CB) Quality Assurance Project Plan (BASMAA 2013) and BASMAA RMC Quality Assurance Project Plan (BASMAA 2016).**

| Sample | Nutrients[1] | Hardness[1] | SSC[2] | Copper[2] | Mercury[2] | PCBs[2] |
|---|---|---|---|---|---|---|
| Laboratory Blank | < RL | <RL | < RL | < RL | < RL | < RL |
| Reference Material (Laboratory Control Sample) Recovery | 90-110% | 80-120% | NA | 75-125% | 75-125% | 50-150% |
| Matrix Spike Recovery | 80-120% | 80-120% | NA | 75-125% | 75-125% | 50-150% |
| Duplicates (Matrix Spike, Field, and Laboratory)[3] | RPD < 25% | RPD < 25% | RPD < 25% | RPD < 25% | RPD < 25% | RPD < 25% |
| Reporting Limit | 0.01mg/L except for: Ammonia (0.02mg/L) TKN[4] (0.5mg/L) | 1 mg/L[5] | 0.5 mg/L | 0.10 µg/L[6] | 0.0002 µg/L (0.2 ng/L) | 0.002 µg/L (2000 pg/L) |

RL = Reporting Limit; RPD = Relative Percent Difference

[1] From the BASMAA QAPP

[2] From the CW4CB QAPP

[3] NA if native concentration for either sample is less than the reporting limit

[4] TKN = Total Kjeldahl Nitrogen

[5] No hardness RL listed in either QAPP. Value is from SWAMP-recommended reporting limits for conventional analytes in freshwater. (https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/tools/19_tables_fr_water/1_conv_fr_water.pdf)

[6] No copper RL listed in either QAPP. Value is from SWAMP-recommended reporting limits for inorganic analytes in freshwater. (http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/tools/19_tables_fr_water/4_inorg_fr_water.pdf)

**Table 2. Measurement quality objectives for analytes in sediment from the Clean Watersheds for a Clean Bay (CW4CB) Quality Assurance Project Plan (BASMAA 2013).**

| Sample | Total Solids | Mercury | PCBs |
|---|---|---|---|
| Laboratory Blank | < RL | < RL | < RL |
| Reference Material (Laboratory Control Sample) Recovery | N/A | 75-125% | 50-150% |
| Matrix Spike Recovery | N/A | 75-125% | 50-150% |
| Duplicates [1] (Matrix Spike, Field, and Laboratory) | RPD < 25% | RPD < 25% | RPD < 25%[2] |
| Reporting Limit | 0.1%[3] | 30 µg/kg<br>0.03 mg/kg<br>30,000 ng/kg | 0.2 µg/kg<br>0.0002 mg/kg<br>200 ng/kg |

RL = Reporting Limit; RPD = Relative Percent Difference

[1] NA if native concentration for either sample is less than the reporting limit

[2] Only applicable for matrix spike duplicates. Method specific for field and laboratory duplicates

[3] RL for total solids in water

# 2.0 REPRESENTATIVENESS

Data representativeness assesses whether the data were collected so as to represent actual conditions at each monitoring location. For this project, all samples were assumed to be representative if they were collected and analyzed according to protocols specified in the CW4CB QAPP and RMC QAPP. All field and laboratory personnel received and reviewed the QAPPs, and followed prescribed protocols including laboratory methods.

# 3.0 COMPARABILITY

The QA/QC officer ensures that the data may be reasonably compared to data from other programs producing similar types of data. For POC monitoring, individual stormwater programs try to maintain comparability within the RMC. The key measure of comparability for all RMC data is the California Surface Water Ambient Monitoring Program.

Electronic data deliverables (EDDs) were submitted to the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) in Microsoft Excel templates developed by SWAMP, to ensure data comparability with SWAMP. In addition, data entry followed SWAMP documentation specific to each data type, including the exclusion of qualitative values that do not appear on SWAMP's look up lists[19]. Completed templates were reviewed using SWAMP's online data checker[20], further ensuring SWAMP-comparability.

All WY 2019 data were considered comparable to SWAMP data and other RMC data.

# 4.0 COMPLETENESS

Completeness is the degree to which all data were produced as planned; this covers both sample collection and analysis. An overall completeness of greater than 90% is considered acceptable for RMC chemical data and field measurements.

During WY 2019, SMCWPPP collected 100% of planned samples. Nine aqueous samples were collected and analyzed for nutrients (ammonia, nitrate, nitrite, total Kjeldahl nitrogen, phosphorus, and orthophosphate). Two aqueous samples were collected and analyzed for copper and hardness. Twenty-five sediment samples were collected and analyzed for PCBs and mercury.

# 5.0 SENSITIVITY

## 5.1. Water

Sensitivity analysis determines whether the methods can identify and/or quantify results at low enough levels. For the aqueous chemical analyses in this project, sensitivity is considered to be adequate if the reporting limits (RLs) comply with the specifications in RMC QAPP Appendix E (RMC Target Method Reporting Limits) and the CW4CB QAPP Appendix B (CW4CB Target Method Reporting Limits).

A summary of the target and actual reporting limits for each analyte is shown in Table 3. The reporting limits for hardness, nitrate, ammonia, and copper samples exceeded their respective target reporting limits. While the hardness concentrations were well above the reporting limit, several of the nitrate concentrations that were reported as "detected, not quantified" would have been quantified had the target reporting limit been met. The analytical laboratory has conveyed that it is not currently possible to lower the nitrate reporting limit due to the analytical protocol used to measure the constituent. One of the ammonia samples was non-detect and one copper sample was "detected, not quantified, but these concentrations were much lower than the target reporting limit. As a result, a lower reporting limit would not have an impact on these results.

[19] Look up lists available online at http://swamp.waterboards.ca.gov/swamp_checker/LookUpLists.php
[20] Checker available online at http://swamp.waterboards.ca.gov/swamp_checker/SWAMPUpload.php

**Table 3. Target and actual reporting limits for SMCWPPP pollutants of concern monitoring in water in WY 2019.**

| Analyte | Unit | Target | Actual | Exceeds Target RL? |
|---|---|---|---|---|
| Ammonia | mg/L | 0.02 | 0.05 | Yes |
| Nitrate | mg/L | 0.01 | 0.1 | Yes |
| Nitrite | mg/L | 0.01 | 0.005 | No |
| Total Kjeldahl Nitrogen | mg/L | 0.5 | 0.1 | No |
| Phosphorus | mg/L | 0.01 | 0.01 | No |
| Orthophosphate | mg/L | 0.01 | 0.01 | No |
| Copper | µg/L | 0.1 | 0.1-0.5 | Yes |
| Hardness | mg/L | 1 | 5-10 | Yes |

## 5.2. Sediment Analysis

The reporting limits for all sediment PCB samples exceeded the CW4CB reporting limit requirement of 200 ng/kg. The target reporting limit for mercury (0.03 mg/kg) was also exceeded for most samples. SMCWPPP will inquire with the analytical laboratory if lower reporting limits are possible for future analysis.

# 6.0 CONTAMINATION

For chemical data, contamination is assessed as the presence of analytical constituents in blank samples.

## 6.1. Water Analysis

Several laboratory and equipment (filter) blanks were run during the nutrient, copper, and hardness analyses. All associated blanks were non-detect.

## 6.2. Sediment Analysis

Several laboratory blanks were analyzed during sediment analysis for mercury and PCBs. All of the laboratory blanks for mercury non-detect, but one PCB blank (PCB 118) was detected in a laboratory blank at a concentration above the reporting limit. As a result, all PCB 118 results have been flagged, but not rejected. No other PCBs were detected in the laboratory blanks.

# 7.0 ACCURACY

Accuracy is assessed as the percent recovery of samples spiked with a known amount of a specific chemical constituent. The analytical laboratory evaluated and reported the Percent Recovery (PR) of Laboratory Control Samples (LCS; in lieu of reference materials) and Matrix Spikes (MS)/Matrix Spike Duplicates (MSD), which were recalculated and compared to the target ranges in the RMC and CW4CB QAPPs. If a QA sample did not meet MQOs, all samples in that batch for that analyte were flagged.

## 7.1. Water Analysis

All laboratory LCS and MS/MSD samples for nutrients, copper, and hardness were within their respective MQOs.

## 7.2. Sediment Analysis

All laboratory control and matrix spike samples for sediment mercury and PCBs met their corresponding MQOs.

# 8.0 PRECISION

Precision is the repeatability of a measurement and is quantified by the Relative Percent Difference (RPD) of two duplicate samples. Three measures of precision were used for this project – matrix spike duplicates, laboratory duplicates, and field duplicates. The MQO for RPD specified by both the CW4CB QAPP and the BASMAA QAPP is <25%.

## 8.1. Water Analysis

### 8.1.1. Laboratory Duplicates

Matrix spike duplicates and laboratory control sample duplicates for nutrients, copper, and hardness were well below the targeted range of < 25%.

### 8.1.2. Field Duplicates

One nutrient field duplicate was collected during WY 2019 POC monitoring. The field duplicate sample met the RPD MQO for all analytes.

## 8.2. Sediment Analysis

### 8.2.1. Laboratory Duplicates

The majority of matrix spike duplicates analyzed for mercury and PCBs were well below the RPD MQO (< 25%). However, the following PCBs did exceed the MQO during a matrix spike duplicate:

- PCB 44
- PCB 52
- PCB 66
- PCB 77
- PCB 101
- PCB 105
- PCB 118
- PCB 126
- PCB 128
- PCB 180
- PCB 187

### 8.2.2. Field Duplicates

Three sediment field blind duplicates were collected in WY 2019. The field duplicates exceeded the RPD MQO for mercury and nine PCB congeners. The sample taken at SM-BEL-01-A had the fewest number of analytes exceeding the MQO with one total exceedance. The sample taken at SM-BRI-02-J had the highest number of analytes exceeding the MQO with nine total exceedances. The analytes that exceeded the MQO include the following (the number of samples that exceeded the MQO for that analyte are included in parentheses):

- Mercury (1)
- PCB 95 (1)
- PCB 118 (1)
- PCB 123 (1)
- PCB 132/153 (1)
- PCB 138/158 (1)
- PCB 141 (1)
- PCB 149 (1)
- PCB 151 (1)
- PCB 180 (1)

# 9.0 REFERENCES

Bay Area Stormwater Management Agency Association (BASMAA). 2013. Quality Assurance Project Plan. Clean Watersheds for a Clean Bay – Implementing the San Francisco Bay's PCB and Mercury TMDL with a Focus on Urban Runoff. Revision Number 1. EPA San Francisco Bay Water Quality Improvement Fund Grant # CFDA 66.202. Prepared for Bay Area Stormwater Management Agencies Association (BASMAA) by Applied Marine Sciences (AMS). August 2013.

Bay Area Stormwater Management Agency Association (BASMAA) Regional Monitoring Coalition. 2016. Creek Status Monitoring Program Quality Assurance Project Plan, Final Draft Version 3. Prepared for BASMAA by EOA, Inc. on behalf of the Santa Clara Urban Runoff Pollution Prevention Program and the San Mateo Countywide Water Pollution Prevention Program, Applied Marine Sciences on behalf of the Alameda Countywide Clean Water Program and the Contra Costa Clean Water Program. 128 pp.

Surface Water Ambient Monitoring Program (SWAMP). 2018. Quality Assurance Program Plan. May 2018. 140 pp.

## Attachment 3

Results of Monitoring San Mateo County Stormwater Runoff for PCBs and Mercury

| Site Name (RMP Site Name in Parentheses) | Permittee | Sample Type | Latitude | Longitude | Water Year | Sample Date | SSC (mg/L) | Total PCBs (ng/L) | Total PCBs (ng/g) | Total Hg (ng/L) | Total Hg (ng/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **RMP STLS Stormwater Runoff Samples** | | | | | | | | | | | |
| Borel Creek | | Receiving Water | | | WY 2011 | 2/16/2011 | 239 | 3.41 | 14.3 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2011 | 2/17/2011 | 49.7 | 19.1 | 384 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2011 | 2/17/2011 | 42.3 | 53.9 | 1,273 | -- | -- |
| SM-SCS-31A (Pulgas Creek PS N) | San Carlos | MS4 | 37.50462 | -122.24905 | WY 2011 | 2/17/2011 | 105 | 43.3 | 411 | -- | -- |
| SM-SCS-31A (Pulgas Creek PS N) | San Carlos | MS4 | 37.50462 | -122.24905 | WY 2011 | 2/17/2011 | 83.6 | 46.9 | 561 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2011 | 3/18/2011 | 24.7 | 21.9 | 884 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2011 | 3/18/2011 | 17.4 | 31.0 | 1,782 | -- | -- |
| SM-SCS-31A (Pulgas Creek PS N) | San Carlos | MS4 | 37.50462 | -122.24905 | WY 2011 | 3/18/2011 | 31.0 | 66.6 | 2,148 | -- | -- |
| SM-SCS-31A (Pulgas Creek PS N) | San Carlos | MS4 | 37.50462 | -122.24905 | WY 2011 | 3/18/2011 | 50.3 | 84.5 | 1,681 | -- | -- |
| Belmont Creek | | Receiving Water | | | WY 2011 | 3/18/2011 | 148 | 2.83 | 19.1 | -- | -- |
| Belmont Creek | | Receiving Water | | | WY 2011 | 3/18/2011 | 209 | 3.06 | 14.6 | -- | -- |
| Belmont Creek | | Receiving Water | | | WY 2011 | 3/18/2011 | 448 | 4.91 | 10.9 | -- | -- |
| Borel Creek | | Receiving Water | | | WY 2011 | 3/18/2011 | 372 | 6.30 | 16.9 | -- | -- |
| Borel Creek | | Receiving Water | | | WY 2011 | 3/18/2011 | 628 | 8.67 | 13.8 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2013 | 3/6/2013 | 7.09 | 15.1 | 2,125 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2013 | 3/6/2013 | 30.8 | 28.5 | 925 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2013 | 3/6/2013 | 40.1 | 32.5 | 809 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2013 | 3/6/2013 | 61.2 | 62.7 | 1,025 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 11/19/2013 | 22.5 | 467 | 20,733 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 11/19/2013 | 47.3 | 731 | 15,447 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 11/19/2013 | 277 | 4,084 | 14,744 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 11/19/2013 | 179 | 6,669 | 37,363 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/6/2014 | 10.1 | 35.3 | 3,493 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/6/2014 | 33.0 | 50.1 | 1,519 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/6/2014 | 65.0 | 64.1 | 987 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/6/2014 | 32.0 | 143 | 4,481 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/6/2014 | 50.9 | 211 | 4,153 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/8/2014 | 27.0 | 25.1 | 931 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/8/2014 | 42.0 | 29.1 | 692 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/8/2014 | 29.0 | 35.4 | 1,221 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/8/2014 | 14.0 | 37.4 | 2,672 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/26/2014 | 43.6 | 48.3 | 1,108 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/26/2014 | 27.0 | 69.5 | 2,574 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/26/2014 | 91.4 | 172 | 1,886 | -- | -- |

| Site Name (RMP Site Name in Parentheses) | Permittee | Sample Type | Latitude | Longitude | Water Year | Sample Date | SSC (mg/L) | Total PCBs (ng/L) | Total PCBs (ng/g) | Total Hg (ng/L) | Total Hg (ng/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 2/26/2014 | 131 | 660 | 5,057 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/26/2014 | 42.0 | 61.6 | 1,467 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/26/2014 | 38.2 | 63.0 | 1,648 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/26/2014 | 23.7 | 74.2 | 3,125 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/26/2014 | 120 | 505 | 4,196 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/31/2014 | 84.8 | 16.9 | 200 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/31/2014 | 21.6 | 28.5 | 1,318 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/31/2014 | 31.2 | 85.5 | 2,741 | -- | -- |
| SM-SCS-210A (Pulgas Creek PS S) | San Carlos | MS4 | 37.50456 | -122.24898 | WY 2014 | 3/31/2014 | 41.8 | 151 | 3,616 | -- | -- |
| SM-RCY-267A (Oddstad PS) | Redwood City | MS4 | 37.49172 | -122.21886 | WY 2015 | 12/2/2014 | 148 | 9.20 | 62.4 | 54.8 | 372 |
| SM-RCY-337A (Veterans PS) | Redwood City | MS4 | 37.49723 | -122.23693 | WY 2015 | 12/15/2014 | 29.2 | 3.52 | 121 | 13.7 | 469 |
| SM-EPA-70A (Runnymede Ditch) | East Palo Alto | MS4 | 37.46883 | -122.12701 | WY 2015 | 2/6/2015 | 265 | 28.55 | 108 | 51.5 | 194 |
| SM-EPA-72A (SD near Cooley Landing) | East Palo Alto | MS4 | 37.47492 | -122.12640 | WY 2015 | 2/6/2015 | 82.0 | 6.47 | 78.9 | 35.0 | 427 |
| SM-SSF-306A (South Linden PS) | South San Francisco | MS4 | 37.65017 | -122.41127 | WY 2015 | 2/6/2015 | 43.0 | 7.81 | 182 | 29.2 | 679 |
| SM-SSF-293A (Gateway Blvd SD) | South San Francisco | MS4 | 37.65244 | -122.40257 | WY 2015 | 2/6/2015 | 45.0 | 5.24 | 117 | 19.6 | 436 |
| SM-SSF-319A (Forbes Blvd Outfall) | South San Francisco | MS4 | 37.65889 | -122.37996 | WY 2016 | 3/5/2016 | 23.0 | 1.84 | 80.0 | 14.7 | 639 |
| SM-SSF-315A (Gull Dr Outfall) | South San Francisco | MS4 | 37.66033 | -122.38502 | WY 2016 | 3/5/2016 | 33.0 | 5.77 | 175 | 10.4 | 315 |
| SM-SSF-314A (Gull Dr SD) | South San Francisco | MS4 | 37.66033 | -122.38510 | WY 2016 | 3/5/2016 | 10.0 | 8.59 | 859 | 5.62 | 562 |
| SM-BRI-17A (Valley Dr SD) | Brisbane | MS4 | 37.68694 | -122.40215 | WY 2016 | 3/5/2016 | 96.0 | 10.4 | 109 | 26.5 | 276 |
| SM-BRI-1004A (Tunnel Ave Ditch) | Brisbane | MS4 | 37.69490 | -122.39946 | WY 2016 | 3/5/2016 | 96.0 | 10.5 | 109 | 71.1 | 741 |
| SM-SCS-32A (Taylor Way SD) | San Carlos | MS4 | 37.51320 | -122.26466 | WY 2016 | 3/11/2016 | 25.0 | 4.23 | 169 | 28.9 | 1156 |
| SM-SCS-75A (Industrial Rd Ditch) | San Carlos | MS4 | 37.51831 | -122.26371 | WY 2016 | 3/11/2016 | 26.0 | 160 | 6,139 | 13.9 | 535 |
| SM-SSF-291A (S Linden Ave SD (291)) | South San Francisco | MS4 | 37.64327 | -122.41066 | WY 2017 | 1/8/2017 | 16.0 | 11.8 | 736 | 12.4 | 775 |
| SM-SSF-296A (S Spruce Ave SD at Mayfair Ave (296)) | South San Francisco | MS4 | 37.65084 | -122.41811 | WY 2017 | 1/8/2017 | 111 | 3.36 | 30.3 | 38.9 | 350 |
| SM-SSF-359A (Outfall to Colma Ck on service road near Littlefield Ave. (359)) | South San Francisco | MS4 | 37.64290 | -122.39677 | WY 2017 | 2/7/2017 | 43.0 | 33.9 | 788 | 9.05 | 210 |
| Colma Ck at S. Linden Blvd (Colma Ck at S. Linden Blvd) | South San Francisco | Receiving Water | 37.65017 | -122.41189 | WY 2017 | 2/7/2017 | 71.0 | 2.65 | 37.3 | 15.3 | 215 |
| SM-SSF-315A (Gull Dr Outfall) | South San Francisco | MS4 | 37.66033 | -122.38502 | WY 2018 | 1/8/18 | 91.0 | 93 | 1,024 | 4.74 | 52.1 |
| SM-SSF-314A (Gull Dr SD) | South San Francisco | MS4 | 37.66033 | -122.38510 | WY 2018 | 1/9/18 | 75.0 | 71.0 | 946 | 5.10 | 68.0 |
| SM-BUR-164A | Burlingame | MS4 | 37.59960 | -122.37526 | WY 2019 | 11/28/2018 | 80.0 | 3.87 | 48.4 | 22.1 | 276 |
| SM-BUR-85A | Burlingame | MS4 | 37.60194 | -122.37499 | WY 2019 | 11/28/2019 | 93.0 | 31.1 | 334 | 40.9 | 440 |
| **SMCWPPP Stormwater Runoff Samples** | | | | | | | | | | | |
| SM-MPK-71A | Menlo Park | MS4 | 37.48361 | -122.14507 | WY 2016 | 2/17/2016 | 13.7 | 0.59 | 43.2 | 6.80 | 496 |

| Site Name (RMP Site Name in Parentheses) | Permittee | Sample Type | Latitude | Longitude | Water Year | Sample Date | SSC (mg/L) | Total PCBs (ng/L) | Total PCBs (ng/g) | Total Hg (ng/L) | Total Hg (ng/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SM-RCY-327A | Redwood City | MS4 | 37.48868 | -122.22823 | WY 2016 | 2/17/2016 | 43.7 | 5.70 | 130 | 14.9 | 341 |
| SM-RCY-388A | Redwood City | MS4 | 37.48877 | -122.22665 | WY 2016 | 2/17/2016 | 49.5 | 2.49 | 50.3 | 15.4 | 311 |
| SM-MPK-238A | Menlo Park | MS4 | 37.48480 | -122.17445 | WY 2016 | 3/5/2016 | 80.1 | 3.19 | 39.8 | 12.7 | 159 |
| SM-MPK-238B | Menlo Park | MS4 | 37.48489 | -122.17380 | WY 2016 | 3/5/2016 | 51.3 | 6.20 | 121 | 8.90 | 173 |
| SM-RCY-379A | Redwood City | MS4 | 37.48908 | -122.20648 | WY 2016 | 3/5/2016 | 123 | 13.0 | 106 | 18.3 | 149 |
| SM-RCY-379B | Redwood City | MS4 | 37.48910 | -122.20647 | WY 2016 | 3/5/2016 | 43.3 | 7.87 | 182 | 10.9 | 252 |
| SM-RCY-254A | Redwood City | MS4 | 37.48916 | -122.20651 | WY 2016 | 3/5/2016 | 13.9 | 1.57 | 113 | 9.90 | 712 |
| SM-SSF-317A | South San Francisco | MS4 | 37.64707 | -122.39230 | WY 2017 | 12/10/2016 | 5.80 | 2.61 | 450 | 0.82 | 141 |
| SM-SSF-316A | South San Francisco | MS4 | 37.64767 | -122.39192 | WY 2017 | 12/10/2016 | 44.1 | 4.25 | 96.4 | 1.80 | 40.8 |
| SM-SSF-318A | South San Francisco | MS4 | 37.64787 | -122.38723 | WY 2017 | 12/10/2016 | 8.50 | 2.26 | 266 | 5.42 | 638 |
| SM-BUR-142A | Burlingame | MS4 | 37.59183 | -122.36623 | WY 2017 | 12/15/2016 | 51.5 | 34.5 | 670 | 2.27 | 44.1 |
| SM-BUR-141A | Burlingame | MS4 | 37.59184 | -122.36626 | WY 2017 | 12/15/2016 | 51.3 | 8.48 | 165 | 7.79 | 152 |
| SM-BUR-1006A | Burlingame | MS4 | 37.59185 | -122.36629 | WY 2017 | 12/15/2016 | 51.8 | 18.9 | 365 | 6.44 | 124 |
| SM-SSF-1001B | South San Francisco | MS4 | 37.64076 | -122.40637 | WY 2017 | 12/15/2016 | 32.2 | 55.2 | 1,714 | 2.44 | 75.8 |
| SM-SSF-292A | South San Francisco | MS4 | 37.64126 | -122.40866 | WY 2017 | 12/15/2016 | 719 | 7.89 | 11.0 | 0.95 | 1.32 |
| SM-SSF-294A | South San Francisco | MS4 | 37.64886 | -122.40160 | WY 2017 | 12/15/2016 | 28.6 | 10.5 | 367 | 1.80 | 62.9 |
| SM-RCY-324A | Redwood City | MS4 | 37.48358 | -122.22763 | WY 2017 | 1/8/2017 | 44.0 | 7.43 | 169 | 26.3 | 598 |
| SM-RCY-323A | Redwood City | MS4 | 37.48500 | -122.23281 | WY 2017 | 1/8/2017 | 8.10 | 1.55 | 191 | 12.7 | 1568 |
| SM-SMO-89A | San Mateo | MS4 | 37.54877 | -122.30450 | WY 2017 | 1/10/2017 | 27.8 | 4.03 | 145 | 2.32 | 83.5 |
| SM-BEL-60B | Belmont | MS4 | 37.52746 | -122.27434 | WY 2017 | 2/9/2017 | 36.4 | 37.2 | 1,022 | 3.98 | 109 |
| SM-BEL-60A | Belmont | MS4 | 37.52887 | -122.27821 | WY 2017 | 2/9/2017 | 34.3 | 6.11 | 178 | 4.83 | 141 |
| SM-SMO-156A | San Mateo | MS4 | 37.55661 | -122.30842 | WY 2017 | 2/20/2017 | 90.6 | 19 | 204 | 12.7 | 140 |
| SM-SMO-408A | San Mateo | MS4 | 37.55918 | -122.30479 | WY 2017 | 2/20/2017 | 29.1 | 55.3 | 1,900 | 5.5 | 189 |
| SM-MPK-66A | Menlo Park | MS4 | 37.48079 | -122.14498 | WY 2017 | 3/24/2017 | 21.4 | 8.35 | 390 | 3.55 | 166 |
| SM-SCS-1011B | San Carlos | MS4 | 37.51692 | -122.25373 | WY 2018 | 1/8/2018 | 15.0 | 2.50 | 167 | 6.12 | 408 |
| SM-SCS-1011A | San Carlos | MS4 | 37.51701 | -122.25379 | WY 2018 | 1/8/2018 | 59.7 | 10.8 | 181 | 3.94 | 66.0 |
| SM-SMO-25A | San Mateo | MS4 | 37.57970 | -122.31911 | WY 2018 | 1/8/2018 | 14.8 | 2.22 | 150 | 3.10 | 209 |
| SM-SMO-149A | San Mateo | MS4 | 37.58710 | -122.33222 | WY 2018 | 1/8/2018 | 17.0 | 1.79 | 105 | 5.24 | 308 |
| SM-BUR-164A | Burlingame | MS4 | 37.59960 | -122.37526 | WY 2018 | 1/8/2018 | 9.9 | 4.43 | 447 | 5.27 | 532 |
| SM-BUR-85A | Burlingame | MS4 | 37.60194 | -122.37499 | WY 2018 | 1/8/2018 | 15.2 | 3.67 | 241 | 5.55 | 365 |
| SM-SSF-356A | South San Francisco | MS4 | 37.64851 | -122.40913 | WY 2018 | 1/24/2018 | 55.8 | 4.89 | 88 | 0.44 | 7.89 |
| SM-RCY-266A | Redwood City | MS4 | 37.49483 | -122.21869 | WY 2018 | 3/1/2018 | 21.6 | 0.11 | 4.91 | 4.06 | 188 |
| SM-RCY-333A | Redwood City | MS4 | 37.49549 | -122.21984 | WY 2018 | 3/1/2018 | 417 | 6.30 | 15.1 | 4.43 | 10.6 |
| SM-SCS-1011D | San Carlos | MS4 | 37.51238 | -122.25777 | WY 2018 | 3/1/2018 | 25.3 | 5.82 | 230 | 0.66 | 26.1 |
| SM-SCS-1011C | San Carlos | MS4 | 37.51246 | -122.25781 | WY 2018 | 3/1/2018 | 28.5 | 5.80 | 204 | 0.72 | 25.3 |

| Site Name (RMP Site Name in Parentheses) | Permittee | Sample Type | Latitude | Longitude | Water Year | Sample Date | SSC (mg/L) | Total PCBs (ng/L) | Total PCBs (ng/g) | Total Hg (ng/L) | Total Hg (ng/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SM-SSF-1001C | South San Francisco | MS4 | 37.64309 | -122.39930 | WY 2018 | 3/1/2018 | 3.20 | 1.13 | 353 | 7.31 | 2284 |
| SM-SSF-306B (South Linden PS) | South San Francisco | MS4 | 37.65025 | -122.41170 | WY 2018 | 4/6/2018 | 14.5 | 2.51 | 173 | 4.68 | 323 |

**Notes:**
SSC – Suspended Sediment Concentration.
Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.
PCBs and mercury results with units of ng/g are particle ratios.

## Attachment 4

Results of Monitoring San Mateo County Sediments for PCBs and Mercury

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| Belmont | 60 | SM-BEL-60-A | 5/22/2018 | 37.52699 | -122.27609 | 0.00 | 0.21 |
| | | SM-BEL-60-B | 5/22/2018 | 37.52667 | -122.27568 | 0.00 | 0.02 |
| | | SM-BEL-60-C | 5/22/2018 | 37.52297 | -122.27790 | 0.01 | 0.17 |
| | | SM-BEL-60-D | 5/22/2018 | 37.52281 | -122.27776 | 0.02 | 0.23 |
| | | SM-BEL-60-E | 5/22/2018 | 37.52200 | -122.27684 | 0.02 | 0.09 |
| | | SM-BEL-60-F | 5/22/2018 | 37.52295 | -122.27849 | 0.02 | 0.12 |
| | | SM-BEL-60-G | 5/22/2018 | 37.52701 | -122.27293 | 0.01 | 0.08 |
| | | SM-BEL-60-J | 5/13/2019 | 37.52585 | -122.27464 | 0.00 | 0.01 |
| | 77 | SM-BEL-01-A | 5/13/2019 | 37.52513 | -122.26635 | 0.01 | 0.24 |
| Brisbane | 1004 | SMC025 | 9/20/2001 | 37.70673 | -122.39801 | 0.14 | 1.73 |
| | | SM-BRI-01-A | 2/18/2015 | 37.70150 | -122.40867 | 0.04 | 0.17 |
| | | SM-BRI-01-B | 2/18/2015 | 37.70102 | -122.40810 | 0.01 | 0.04 |
| | | SM-BRI-01-C | 2/18/2015 | 37.69897 | -122.40682 | 0.04 | 0.06 |
| | | SM-BRI-01-D | 2/18/2015 | 37.70024 | -122.40736 | 0.01 | 0.04 |
| | 17 | SM-BRI-02-A | 2/18/2015 | 37.68805 | -122.40444 | 1.22 | 0.07 |
| | | SM-BRI-02-B | 5/29/2018 | 37.68805 | -122.40570 | 1.02 | 0.12 |
| | | SM-BRI-02-C | 5/29/2018 | 37.68809 | -122.40442 | 0.04 | 0.07 |
| | | SM-BRI-02-D | 5/29/2018 | 37.68975 | -122.41143 | 0.01 | 0.04 |
| | | SM-BRI-02-G | 5/29/2018 | 37.68803 | -122.40585 | 0.01 | 0.06 |
| | | SM-BRI-02-H | 5/29/2018 | 37.68933 | -122.40681 | 0.01 | 0.05 |
| | | SM-BRI-02-I | 5/29/2018 | 37.68765 | -122.40319 | 0.04 | 0.23 |
| | | SM-BRI-02-J | 5/14/2019 | 37.68805 | -122.40571 | 0.03 | 0.06 |
| | | SM-BRI-02-L | 5/14/2019 | 37.68826 | -122.40579 | 0.56 | 0.14 |
| | | SM-BRI-02-M | 5/14/2019 | 37.68930 | -122.41998 | 0.01 | 0.09 |
| | | SM-BRI-02-N | 5/14/2019 | 37.69007 | -122.40282 | 0.15 | 0.05 |
| Burlingame | 1006 | SMC015 | 9/6/2001 | 37.59387 | -122.36823 | 0.06 | 0.12 |
| | | SMC017 | 9/6/2001 | 37.59229 | -122.36591 | 0.14 | 0.35 |
| | | SM-BUR-02-A | 2/11/2015 | 37.59448 | -122.36737 | 0.10 | 0.30 |
| | | SM-BUR-04-A | 2/11/2015 | 37.59425 | -122.37052 | 0.10 | 0.39 |
| | | SM-BUR-04-B | 2/12/2015 | 37.59425 | -122.36840 | 0.01 | 0.06 |
| | | SM-BUR-03-D | 5/23/2018 | 37.59043 | -122.36304 | 0.03 | 0.12 |
| | | SM-BUR-03-E | 5/23/2018 | 37.59030 | -122.36303 | 0.03 | 0.15 |
| | 138 | SM-BUR-06-B | 5/13/2019 | 37.58840 | -122.33720 | 0.18 | 0.16 |
| | 142 | SM-BUR-03-A | 2/11/2015 | 37.58994 | -122.36429 | 0.15 | 0.33 |
| | | SM-BUR-03-B | 2/12/2015 | 37.59181 | -122.36623 | 0.06 | 0.09 |
| | | SM-BUR-03-C | 5/23/2018 | 37.59087 | -122.36455 | 0.01 | 0.07 |
| | | SM-BUR-03-F | 5/23/2018 | 37.59119 | -122.36517 | 0.02 | 0.05 |
| | | SM-BUR-03-G | 5/23/2018 | 37.59098 | -122.36502 | 0.03 | 0.06 |
| | | SM-BUR-03-H | 5/23/2018 | 37.59134 | -122.36547 | 0.01 | 0.06 |
| | | SM-BUR-03-I | 5/23/2018 | 37.59049 | -122.36408 | 0.03 | 0.08 |
| | 16 | SM-BUR-06-A | 2/11/2015 | 37.59107 | -122.33662 | 0.05 | 0.14 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | 164 | SMC016 | 9/6/2001 | 37.59790 | -122.37708 | 0.08 | 0.10 |
| | | SM-BUR-05-A | 2/11/2015 | 37.59820 | -122.38085 | 0.05 | 0.31 |
| | | SM-BUR-05-B | 2/11/2015 | 37.59761 | -122.37918 | 0.09 | 0.83 |
| | | SM-BUR-05-C | 2/11/2015 | 37.59523 | -122.37808 | 0.04 | 0.10 |
| | 85 | SM-BUR-01-A | 2/12/2015 | 37.60248 | -122.37588 | 0.03 | 0.16 |
| | | SM-BUR-01-B | 2/11/2015 | 37.59990 | -122.37191 | 0.03 | 0.17 |
| Colma | Other - COL | SMC024 | 9/6/2001 | 37.67407 | -122.45691 | 16.81 | 1.31 |
| | | SMC024 | 10/16/2003 | 37.67407 | -122.45691 | 0.00 | 0.02 |
| | | SMC048 | 10/16/2003 | 37.67407 | -122.45728 | 0.00 | 0.02 |
| | | SMC049 | 10/16/2003 | 37.67352 | -122.45770 | 0.05 | 0.24 |
| Daly City | 1004 | SM-DCY-01-A | 5/29/2018 | 37.70427 | -122.41417 | 0.01 | 0.06 |
| East Palo Alto | 1015 | SM-EPA-01-C | 1/19/2015 | 37.47474 | -122.12710 | 0.02 | 0.08 |
| | | SM-EPA-01-D | 1/19/2015 | 37.47558 | -122.13191 | 0.06 | 0.10 |
| | 67 | SM-EPA-01-A | 1/19/2015 | 37.47722 | -122.13418 | 0.21 | 0.22 |
| | | SM-EPA-01-B | 1/19/2015 | 37.47208 | -122.13429 | 0.02 | 0.12 |
| | 70 | SM-EPA-02-A | 1/19/2015 | 37.47084 | -122.13069 | 0.05 | 0.26 |
| | | SM-EPA-02-D | 1/19/2015 | 37.47033 | -122.13036 | 0.34 | 0.45 |
| | | SM-EPA-02-G | 3/27/2017 | 37.47029 | -122.13244 | 0.03 | 0.05 |
| | | SM-EPA-02-H | 3/27/2017 | 37.47194 | -122.13406 | 0.01 | 0.05 |
| | 72 | SM-EPA-02-C | 1/19/2015 | 37.47443 | -122.12743 | 0.02 | 0.33 |
| | | SM-EPA-02-F | 3/27/2017 | 37.47300 | -122.13143 | 0.02 | 0.08 |
| | Other - EPA | SMC019 | 9/20/2001 | 37.46112 | -122.12421 | 0.07 | 0.13 |
| Foster City | 1010 | SM-FCY-01-A | 5/13/2019 | 37.56762 | -122.27260 | 0.00 | 0.09 |
| Menlo Park | 1012 | SM-MPK-05-A | 3/27/2017 | 37.48209 | -122.16096 | 0.06 | 0.10 |
| | 1014 | SM-MPK-03-A | 1/22/2015 | 37.48678 | -122.18090 | 0.02 | 0.04 |
| | | SM-MPK-02-E | 3/27/2017 | 37.48525 | -122.18228 | 0.03 | 0.04 |
| | 238A | SM-MPK-04-A | 1/20/2015 | 37.48307 | -122.17529 | 0.03 | 0.21 |
| | | SM-MPK-04-C | 1/20/2015 | 37.48270 | -122.17420 | 0.01 | 0.12 |
| | | SM-MPK-04-D | 1/19/2015 | 37.48342 | -122.17178 | 0.25 | 0.03 |
| | 238B | SM-MPK-04-E | 1/19/2015 | 37.48281 | -122.16719 | 0.29 | 0.10 |
| | 239 | SM-MPK-02-B | 1/20/2015 | 37.48610 | -122.18564 | 0.57 | 0.13 |
| | | SM-MPK-02-D | 3/27/2017 | 37.48592 | -122.18493 | 0.01 | 0.06 |
| | 332 | SM-MPK-02-A | 1/20/2015 | 37.48664 | -122.18868 | 0.03 | 0.04 |
| | 66 | SM-MPK-06-A | 1/19/2015 | 37.47566 | -122.14726 | 0.06 | 0.12 |
| | 71 | SM-MPK-05-B | 3/27/2017 | 37.47939 | -122.15569 | 0.01 | 0.13 |
| | Other - MPK | SM-MPK-01-A | 1/20/2015 | 37.45565 | -122.18395 | 0.02 | 0.07 |
| Millbrae | 401 | SM-MIL-01-A | 5/13/2019 | 37.60764 | -122.39189 | 0.00 | 0.03 |
| Redwood City | 1000 | SM-RCY-04-D | 1/22/2015 | 37.49742 | -122.21299 | 0.02 | 0.07 |
| | | SM-RCY-05-A | 1/22/2015 | 37.50961 | -122.20813 | 0.57 | 0.96 |
| | | SM-RCY-05-C | 4/5/2017 | 37.51096 | -122.20742 | 0.75 | 0.35 |
| | 1014 | SM-RCY-10-E | 3/27/2017 | 37.48510 | -122.18221 | 0.01 | 0.05 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | 239 | SM-RCY-10-A | 1/20/2015 | 37.48636 | -122.18757 | 0.04 | 0.06 |
| | | SM-RCY-10-C | 3/27/2017 | 37.48581 | -122.18504 | 0.16 | 0.05 |
| | | SM-RCY-10-D | 3/27/2017 | 37.48571 | -122.18474 | 0.02 | 0.04 |
| | 253 | SM-RCY-09-A | 1/22/2015 | 37.48606 | -122.19643 | 0.05 | 0.06 |
| | 254 | SM-RCY-06-A | 1/22/2015 | 37.48850 | -122.20902 | 0.09 | 0.07 |
| | 267 | SM-RCY-04-B | 1/22/2015 | 37.49303 | -122.21726 | 0.01 | 0.10 |
| | 269 | SM-RCY-05-D | 5/13/2019 | 37.51154 | -122.20694 | 0.02 | 0.01 |
| | 327 | SMC-033 | 10/4/2001 | 37.48907 | -122.23151 | 0.00 | -- |
| | | SMC-034 | 10/4/2001 | 37.48889 | -122.22821 | 0.08 | -- |
| | | SM-RCY-15-A | 2/10/2015 | 37.48952 | -122.23632 | 0.05 | 0.08 |
| | 333 | SM-RCY-04-A | 1/22/2015 | 37.49547 | -122.21968 | 0.02 | 0.07 |
| | 336 | SM-RCY-03-B | 5/13/2019 | 37.49198 | -122.22804 | 0.01 | 0.03 |
| | 337 | SMC004 | 10/24/2000 | 37.49731 | -122.23700 | 0.08 | 0.11 |
| | | SM-RCY-01-A | 2/10/2015 | 37.49504 | -122.23654 | 0.03 | 0.33 |
| | | SM-RCY-01-B | 2/10/2015 | 37.49607 | -122.23841 | 0.05 | 0.09 |
| | | SM-RCY-03-A | 2/10/2015 | 37.49366 | -122.23425 | 0.02 | 0.13 |
| | 379 | SMC002 | 10/24/2000 | 37.48730 | -122.21368 | 0.12 | -- |
| | | SMC-035 | 10/4/2001 | 37.48651 | -122.21399 | 0.08 | -- |
| | | SMC-036 | 10/4/2001 | 37.48810 | -122.21338 | 0.07 | -- |
| | | SMC-037 | 10/4/2001 | 37.48309 | -122.21759 | 0.01 | -- |
| | | SMC-038 | 10/4/2001 | 37.48413 | -122.21667 | 0.09 | -- |
| | | SMC001 | 10/24/2000 | 37.48730 | -122.20648 | 0.07 | 0.17 |
| | | SM-RCY-07-A | 1/21/2015 | 37.48669 | -122.21235 | 0.10 | 0.08 |
| | | SM-RCY-07-B | 1/21/2015 | 37.48650 | -122.20665 | 0.35 | 0.21 |
| | | SM-RCY-07-C | 1/21/2015 | 37.48650 | -122.20681 | 0.13 | 0.08 |
| | | SM-RCY-11-A | 1/22/2015 | 37.48006 | -122.22206 | 0.03 | 0.16 |
| | | SM-RCY-07-D | 3/28/2017 | 37.48532 | -122.21334 | 1.97 | 0.14 |
| | | SM-RCY-12-A | 3/28/2017 | 37.48444 | -122.21848 | 0.02 | 0.07 |
| | | SM-RCY-12-B | 3/28/2017 | 37.48430 | -122.21787 | 0.08 | 0.09 |
| | | SM-RCY-12-C | 3/30/2017 | 37.48438 | -122.21774 | 0.00 | 0.01 |
| | | SM-RCY-12-E | 3/28/2017 | 37.48471 | -122.21958 | 0.01 | 0.05 |
| | | SM-RCY-12-F | 3/28/2017 | 37.48551 | -122.21624 | 0.01 | 0.08 |
| | | SM-RCY-07-E | 5/29/2018 | 37.48604 | -122.21158 | 0.04 | 0.07 |
| | | SM-RCY-07-F | 5/29/2018 | 37.48554 | -122.21191 | 0.04 | 0.06 |
| | | SM-RCY-12-G | 5/22/2018 | 37.48419 | -122.21715 | 0.01 | 0.10 |
| | | RCA-201409241050 | 9/24/2014 | 37.48538 | -122.21345 | 2.37 | -- |
| | | RCB-201409241015 | 9/24/2014 | 37.48528 | -122.21358 | 1.25 | -- |
| | | RCC-201409291115 | 9/29/2014 | 37.48550 | -122.21441 | 0.57 | -- |
| | | RCD-201409241200 | 9/24/2014 | 37.48418 | -122.21685 | 6.93 | -- |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | RCE-201409291030 | 9/29/2014 | 37.48573 | -122.21774 | 0.04 | -- |
| | | RCF-201409291230 | 9/29/2014 | 37.48721 | -122.21461 | 0.02 | -- |
| | | RCG-201409240945 | 9/24/2014 | 37.48726 | -122.21372 | 0.07 | -- |
| | 407 | SM-RCY-04-C | 1/22/2015 | 37.49129 | -122.21345 | 0.01 | 0.23 |
| | | SM-RCY-04-E | 5/13/2019 | 37.49309 | -122.21312 | 0.00 | 0.12 |
| | Other - RCY | SMC011 | 10/24/2000 | 37.48889 | -122.22699 | 0.34 | -- |
| | | SMC-032 | 10/4/2001 | 37.48828 | -122.22699 | 0.02 | -- |
| | | SMC030 | 10/4/2001 | 37.48090 | -122.23450 | 0.01 | 0.66 |
| | | SMC031 | 10/4/2001 | 37.48053 | -122.22693 | 0.14 | 0.18 |
| | | SM-RCY-13-A | 1/22/2015 | 37.48136 | -122.22602 | 0.01 | 0.10 |
| San Bruno | 292 | SBO01 | 7/12/2007 | 37.63690 | -122.41241 | 0.03 | 0.36 |
| | | SBO02 | 7/12/2007 | 37.63708 | -122.41162 | 0.18 | 0.27 |
| | | SSO05 | 7/12/2007 | 37.63690 | -122.41229 | 0.00 | 0.47 |
| | | SBO03 | 7/12/2007 | 37.63489 | -122.41150 | 0.01 | 0.15 |
| | | SBO04 | 7/12/2007 | 37.63647 | -122.41241 | 0.00 | 0.07 |
| | | SBO05 | 7/12/2007 | 37.63611 | -122.41150 | 0.16 | 0.11 |
| | | SBO06 | 7/12/2007 | 37.63892 | -122.41248 | 0.00 | 0.23 |
| | | SBO07 | 7/12/2007 | 37.63928 | -122.41241 | 0.11 | 0.30 |
| | | SBO08 | 7/12/2007 | 37.63928 | -122.41272 | 0.00 | 0.20 |
| | | SBO09 | 7/12/2007 | 37.63892 | -122.41162 | 0.15 | 0.21 |
| | | SBO10 | 7/12/2007 | 37.63831 | -122.41162 | 0.00 | 0.06 |
| | | SBO11 | 7/12/2007 | 37.63971 | -122.41162 | 0.12 | 0.22 |
| | | SBO13 | 7/12/2007 | 37.63831 | -122.41339 | 0.00 | 0.13 |
| | 362 | SM-SBO-05-D | 5/14/2019 | 37.63538 | -122.40616 | 0.07 | 0.06 |
| San Carlos | 1011 | S-1 | 7/10/2015 | 37.51538 | -122.25843 | 0.02 | -- |
| | | S-10 | 7/10/2015 | 37.51589 | -122.25769 | 0.03 | -- |
| | | S-11 | 7/10/2015 | 37.51560 | -122.25717 | 0.05 | -- |
| | | S-12 | 7/10/2015 | 37.51551 | -122.25644 | 0.08 | -- |
| | | S-13 | 7/10/2015 | 37.51549 | -122.25581 | 0.10 | -- |
| | | S-14 | 7/10/2015 | 37.51579 | -122.25521 | 0.02 | -- |
| | | S-15 | 7/10/2015 | 37.51632 | -122.25485 | 0.01 | -- |
| | | S-16 | 7/10/2015 | 37.51681 | -122.25468 | 0.01 | -- |
| | | S-17 | 7/10/2015 | 37.51711 | -122.25429 | 0.01 | -- |
| | | S-2 | 7/10/2015 | 37.51519 | -122.25826 | 0.01 | -- |
| | | S-3 | 7/10/2015 | 37.51435 | -122.25789 | 0.02 | -- |
| | | S-4 | 7/10/2015 | 37.51377 | -122.25783 | 0.05 | -- |
| | | S-5 | 7/10/2015 | 37.51328 | -122.25760 | 0.04 | -- |
| | | S-6 | 7/10/2015 | 37.51286 | -122.25743 | 0.07 | -- |
| | | S-7 | 7/10/2015 | 37.51232 | -122.25783 | 0.01 | -- |
| | | S-8 | 7/10/2015 | 37.52043 | -122.26604 | 0.02 | -- |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | S-9 | 7/10/2015 | 37.52019 | -122.26633 | 0.01 | -- |
| | | SMC028 | 9/20/2001 | 37.52051 | -122.26599 | 0.00 | 0.05 |
| | | SMC029 | 9/20/2001 | 37.51251 | -122.25879 | 0.42 | 0.63 |
| | | BG-1 | 10/17/2014 | 37.51785 | -122.26117 | 0.72 | 0.09 |
| | | S-1 | 10/17/2014 | 37.51775 | -122.26106 | 0.37 | 0.09 |
| | | SCA37 | 8/24/2007 | 37.50909 | -122.25781 | 0.00 | 0.06 |
| | | SCA38 | 8/24/2007 | 37.50970 | -122.25708 | 0.00 | 0.07 |
| | | SCA39 | 9/21/2007 | 37.51050 | -122.25598 | 0.00 | 0.13 |
| | 1016 | PUL27 | 5/14/2013 | 37.50470 | -122.24899 | 0.96 | 0.15 |
| | | SMC023 | 9/25/2001 | 37.50472 | -122.24899 | 2.26 | 0.32 |
| | | SCA11 | 8/23/2007 | 37.50189 | -122.25281 | 0.00 | 0.28 |
| | | SMC-023 | 9/25/2001 | 37.50472 | -122.24895 | 6.19 | -- |
| | | SMC-045 | 10/3/2002 | 37.50171 | -122.25238 | 0.00 | -- |
| | 210 | PUL12 | 9/25/2012 | 37.49697 | -122.24599 | 0.84 | 0.07 |
| | | PUL13 | 9/25/2012 | 37.49748 | -122.24727 | 0.02 | 0.36 |
| | | PUL14 | 9/25/2012 | 37.49804 | -122.24707 | 0.11 | 0.18 |
| | | PUL18 | 5/14/2013 | 37.50006 | -122.24399 | 0.22 | 0.10 |
| | | PUL19 | 5/14/2013 | 37.49980 | -122.24349 | 0.09 | 0.21 |
| | | PUL20 | 5/14/2013 | 37.49959 | -122.24349 | 0.55 | 0.10 |
| | | PUL21 | 5/14/2013 | 37.49897 | -122.24209 | 0.02 | 0.05 |
| | | PUL22 | 5/14/2013 | 37.50027 | -122.24356 | 192.91 | 0.07 |
| | | PUL23 | 5/14/2013 | 37.49852 | -122.24898 | 0.11 | 0.06 |
| | | PUL24 | 5/14/2013 | 37.49770 | -122.24746 | 0.07 | 0.12 |
| | | PUL25 | 5/14/2013 | 37.49620 | -122.24625 | 0.02 | 0.07 |
| | | PUL28 | 5/14/2013 | 37.49824 | -122.24547 | 1.19 | 0.14 |
| | | PUL4 | 9/25/2012 | 37.50014 | -122.24373 | 2.45 | 0.13 |
| | | PUL7 | 9/24/2012 | 37.50029 | -122.24783 | 0.40 | 0.13 |
| | | PUL8 | 9/25/2012 | 37.49979 | -122.24445 | 0.05 | 0.22 |
| | | PUL9 | 9/25/2012 | 37.49940 | -122.24394 | 0.05 | 1.10 |
| | | SMC021 | 9/20/2001 | 37.49876 | -122.24596 | 1.22 | 0.92 |
| | | SCA01 | 8/23/2007 | 37.49811 | -122.24268 | 0.13 | 0.17 |
| | | SCA02 | 8/23/2007 | 37.49609 | -122.24530 | 0.00 | 0.13 |
| | | SCA03 | 8/23/2007 | 37.49670 | -122.24628 | 0.41 | 0.30 |
| | | SCA04 | 8/23/2007 | 37.49817 | -122.24532 | 2.22 | 0.24 |
| | | SCA05 | 8/23/2007 | 37.49872 | -122.24609 | 0.07 | 0.27 |
| | | SCA06 | 8/23/2007 | 37.49829 | -122.24658 | 0.00 | 0.13 |
| | | SCA07 | 8/23/2007 | 37.49811 | -122.24701 | 0.10 | 0.19 |
| | | SCA08 | 8/23/2007 | 37.49768 | -122.24750 | 0.00 | 0.09 |
| | | SCA09 | 8/23/2007 | 37.49824 | -122.24880 | 0.00 | 0.11 |
| | | SCA10 | 8/23/2007 | 37.50067 | -122.25153 | 0.00 | 0.12 |
| | | SCA16 | 8/23/2007 | 37.50371 | -122.24857 | 0.04 | 0.10 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SCA17 | 8/23/2007 | 37.50067 | -122.24481 | 0.10 | 0.18 |
| | | SCA18 | 8/23/2007 | 37.50049 | -122.24469 | 0.06 | 0.29 |
| | | SCA19 | 8/23/2007 | 37.49918 | -122.24656 | 0.13 | 0.24 |
| | | SCA20 | 8/23/2007 | 37.49926 | -122.24664 | 0.17 | 0.15 |
| | | SCA21 | 8/23/2007 | 37.50035 | -122.24769 | 0.10 | 0.16 |
| | | SCA22 | 8/23/2007 | 37.50005 | -122.24397 | 0.12 | 0.11 |
| | | SCA25 | 8/23/2007 | 37.49887 | -122.24225 | 0.01 | 0.07 |
| | | SCA36 | 8/24/2007 | 37.49969 | -122.24463 | 0.30 | 0.77 |
| | | SMC-021 | 9/20/2001 | 37.49875 | -122.24597 | 1.82 | -- |
| | | SMC-046 | 10/3/2002 | 37.50269 | -122.24719 | 0.18 | -- |
| | | SMC-047 | 10/3/2002 | 37.50012 | -122.24371 | 11.52 | -- |
| | | SM-SCS-06-A | 3/30/2017 | 37.49628 | -122.24492 | 0.01 | 0.17 |
| | | SM-SCS-06-B | 3/30/2017 | 37.49690 | -122.24589 | 0.03 | 0.08 |
| | | SM-SCS-06-C | 3/30/2017 | 37.49746 | -122.24638 | 5.64 | 0.04 |
| | | SM-SCS-06-D | 3/30/2017 | 37.49733 | -122.24555 | 1.84 | 3.93 |
| | | SM-SCS-06-E | 3/30/2017 | 37.49614 | -122.24537 | 0.00 | 0.02 |
| | | SM-SCS-06-F | 3/30/2017 | 37.49768 | -122.24626 | 3.73 | 0.12 |
| | | SM-SCS-06-G | 3/30/2017 | 37.49776 | -122.24615 | 1.29 | 0.07 |
| | | SM-SCS-06-H | 3/30/2017 | 37.49942 | -122.24278 | 0.07 | 0.06 |
| | | SM-SCS-06-I | 3/30/2017 | 37.50158 | -122.24354 | 0.03 | 0.27 |
| | | SM-SCS-06-L | 4/5/2017 | 37.50021 | -122.24113 | 0.06 | 0.13 |
| | | SM-SCS-06-M | 5/22/2018 | 37.49727 | -122.24686 | 0.25 | 0.10 |
| | | SM-SCS-06-N | 5/22/2018 | 37.49731 | -122.24662 | 0.06 | 0.05 |
| | 31 | PUL1 | 9/24/2012 | 37.50623 | -122.25353 | 1.61 | -- |
| | | PUL10 | 9/24/2012 | 37.50583 | -122.25432 | 0.34 | -- |
| | | PUL15 | 9/25/2012 | 37.50661 | -122.25300 | 1.44 | 0.23 |
| | | PUL2 | 9/24/2012 | 37.50510 | -122.25538 | 0.05 | -- |
| | | PUL26 | 5/14/2013 | 37.50653 | -122.25444 | 0.14 | 0.07 |
| | | PUL5 | 9/24/2012 | 37.50484 | -122.25542 | 0.02 | -- |
| | | SMC022 | 9/20/2001 | 37.50653 | -122.25330 | 0.29 | 0.07 |
| | | SCA12 | 8/23/2007 | 37.50372 | -122.25403 | 0.00 | 0.13 |
| | | SCA13 | 8/23/2007 | 37.50378 | -122.25417 | 0.01 | 0.21 |
| | | SCA14 | 8/23/2007 | 37.50452 | -122.25311 | 0.30 | 0.35 |
| | | SCA15 | 8/23/2007 | 37.50606 | -122.25071 | 0.00 | 0.05 |
| | | SCA26 | 8/23/2007 | 37.50484 | -122.25572 | 0.00 | 0.09 |
| | | SCA27 | 8/23/2007 | 37.50639 | -122.25329 | 1.09 | 0.06 |
| | | SCA28 | 8/24/2007 | 37.50633 | -122.25355 | 0.19 | 0.04 |
| | | SCA29 | 8/24/2007 | 37.50751 | -122.25194 | 0.09 | 0.08 |
| | | SCA30 | 8/24/2007 | 37.50737 | -122.25185 | 0.21 | 0.15 |
| | | SCA31 | 8/24/2007 | 37.50838 | -122.25279 | 0.87 | 0.12 |
| | | SCA32 | 8/24/2007 | 37.50732 | -122.25439 | 0.00 | 0.08 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SCA33 | 8/24/2007 | 37.50700 | -122.25572 | 0.27 | 0.29 |
| | | SCA34 | 8/24/2007 | 37.50787 | -122.25421 | 0.01 | 0.13 |
| | | SCA35 | 8/24/2007 | 37.50873 | -122.25330 | 0.05 | 0.27 |
| | | SMC-042 | 10/3/2002 | 37.50738 | -122.25189 | 0.31 | -- |
| | | SMC-043 | 10/3/2002 | 37.50761 | -122.25178 | 0.32 | -- |
| | | SMC-044 | 10/3/2002 | 37.50525 | -122.24961 | 0.03 | -- |
| | | SM-SCS-05-A | 4/3/2017 | 37.50645 | -122.25071 | 0.12 | 0.06 |
| | | SM-SCS-05-B | 4/3/2017 | 37.50686 | -122.25492 | 0.14 | 0.07 |
| | 59 | SM-SCS-01-L | 3/30/2017 | 37.51528 | -122.26202 | 0.18 | 0.17 |
| | | SM-SCS-01-M | 3/30/2017 | 37.51397 | -122.26382 | 0.04 | 2.36 |
| | | SM-SCS-01-O | 5/22/2018 | 37.51538 | -122.26179 | 0.31 | 0.16 |
| | 75 | SMC020 | 9/20/2001 | 37.51770 | -122.26379 | 20.29 | 1.84 |
| | | SM-SCS-01-A | 2/10/2015 | 37.51798 | -122.26640 | 0.10 | 0.05 |
| | | SM-SCS-01-B | 2/10/2015 | 37.51915 | -122.26483 | 0.09 | 0.05 |
| | | SM-SCS-01-C | 2/10/2015 | 37.51631 | -122.26494 | 0.04 | 0.17 |
| | | SM-SCS-01-D | 2/10/2015 | 37.51778 | -122.26358 | 0.02 | 0.08 |
| | | SM-SCS-01-E | 2/10/2015 | 37.51548 | -122.26660 | 0.03 | 0.09 |
| | | SM-SCS-01-G | 3/30/2017 | 37.51664 | -122.26351 | 1.20 | 0.11 |
| | | SM-SCS-01-H | 4/3/2017 | 37.51623 | -122.26485 | 0.06 | 0.14 |
| | | SM-SCS-01-I | 4/3/2017 | 37.51798 | -122.26386 | 0.02 | 0.05 |
| | | SM-SCS-01-J | 4/3/2017 | 37.51818 | -122.26392 | 0.09 | 0.09 |
| | | SM-SCS-01-N | 3/30/2017 | 37.51686 | -122.26358 | 49.40 | 0.80 |
| | | SM-SCS-01-P | 5/22/2018 | 37.51643 | -122.26308 | 0.76 | 0.06 |
| | 80 | SM-SCS-07-A | 5/13/2019 | 37.49684 | -122.24727 | 0.14 | 0.17 |
| San Mateo | 1007 | SMC012 | 10/25/2000 | 37.57013 | -122.31860 | 0.01 | 0.05 |
| | 1009 | SM-SMO-07-B | 2/12/2015 | 37.55247 | -122.30973 | 0.04 | 0.04 |
| | | SM-SMO-08-A | 2/12/2015 | 37.54986 | -122.30739 | 0.03 | 0.04 |
| | 101 | SM-SMO-11-A | 2/18/2015 | 37.53200 | -122.28861 | 0.08 | 0.13 |
| | 111 | SM-SMO-04-A | 2/18/2015 | 37.56774 | -122.32320 | 0.06 | 0.11 |
| | | SM-SMO-05-A | 2/12/2015 | 37.56514 | -122.31933 | 0.05 | 0.07 |
| | 114 | SM-SMO-06-A | 2/18/2015 | 37.56134 | -122.31515 | 0.23 | 0.25 |
| | 149 | SMC005 | 10/25/2000 | 37.58691 | -122.33191 | 0.19 | 0.20 |
| | | SM-SMO-14-A | 2/12/2015 | 37.58631 | -122.33303 | 0.07 | 0.63 |
| | 156 | SM-SMO-07-C | 4/5/2017 | 37.55516 | -122.30717 | 0.01 | 0.05 |
| | 25 | SM-SMO-02-A | 2/11/2015 | 37.57746 | -122.32173 | 0.03 | 0.13 |
| | 403 | SM-SMO-15-A | 2/12/2015 | 37.56700 | -122.31035 | 0.02 | 0.08 |
| | 408 | SM-SMO-07-D | 5/23/2018 | 37.55756 | -122.30338 | 0.01 | 0.11 |
| | | SM-SMO-07-E | 5/23/2018 | 37.55402 | -122.30207 | 0.00 | 0.04 |
| | | SM-SMO-07-F | 5/23/2018 | 37.55515 | -122.30259 | 0.00 | 0.06 |
| | | SM-SMO-07-G | 5/23/2018 | 37.55513 | -122.30234 | 0.00 | 0.04 |
| | | SM-SMO-07-H | 5/23/2018 | 37.55674 | -122.30272 | 0.02 | 0.10 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SM-SMO-07-I | 5/23/2018 | 37.55757 | -122.30439 | 0.01 | 0.13 |
| | | SM-SMO-07-J | 5/23/2018 | 37.55840 | -122.30395 | 0.01 | 0.13 |
| | 89 | SM-SMO-08-B | 2/12/2015 | 37.54552 | -122.30445 | 0.01 | 0.07 |
| | 92 | SM-SMO-08-C | 5/13/2019 | 37.54847 | -122.29967 | 0.00 | 0.02 |
| | Other - SMO | SMC013 | 10/25/2000 | 37.58087 | -122.32343 | 0.09 | 0.11 |
| | | SM-SMO-09-A | 5/23/2018 | 37.54157 | -122.30636 | 0.04 | 0.07 |
| South San Francisco | 1001 | SM-SSF-09-D | 2/13/2015 | 37.65025 | -122.41140 | 0.04 | 0.07 |
| | | SM-SSF-09-A | 2/17/2015 | 37.65047 | -122.41284 | 0.02 | 0.18 |
| | | SM-SSF-09-C | 2/17/2015 | 37.65147 | -122.41703 | 0.02 | 0.16 |
| | | SM-SSF-10-A | 2/17/2015 | 37.65328 | -122.42609 | 0.01 | 0.05 |
| | | SM-SSF-03-E | 5/24/2018 | 37.64792 | -122.40022 | 0.09 | 0.07 |
| | | SM-SSF-04-G | 5/29/2018 | 37.64229 | -122.40323 | 0.01 | 0.11 |
| | 1001B | SM-SSF-05-A | 2/17/2015 | 37.63734 | -122.40605 | 0.46 | 0.05 |
| | | SM-SSF-05-C | 5/24/2018 | 37.64013 | -122.40653 | 0.06 | 0.06 |
| | | SM-SSF-05-D | 5/24/2018 | 37.63774 | -122.40618 | 0.01 | 0.07 |
| | | SM-SSF-05-E | 5/24/2018 | 37.64090 | -122.40648 | 0.02 | 0.10 |
| | | SM-SSF-05-F | 5/24/2018 | 37.64025 | -122.40633 | 0.35 | 0.06 |
| | | SM-SSF-05-G | 5/24/2018 | 37.64072 | -122.40652 | 0.01 | 0.18 |
| | 1001D | SMC003 | 10/25/2000 | 37.65033 | -122.41388 | 0.23 | 0.17 |
| | | SSO10 | 7/12/2007 | 37.64807 | -122.41248 | 0.43 | 0.34 |
| | | SSO19 | 7/12/2007 | 37.64709 | -122.41290 | 0.04 | 0.12 |
| | | SSO24 | 7/12/2007 | 37.64893 | -122.41461 | 0.02 | 0.10 |
| | | SM-SSF-08-B | 2/13/2015 | 37.65035 | -122.41412 | 0.04 | 0.06 |
| | | SM-SSF-08-C | 2/13/2015 | 37.64932 | -122.41211 | 0.01 | 0.04 |
| | | SM-SSF-08-D | 2/13/2015 | 37.64706 | -122.41390 | 0.04 | 0.17 |
| | 1002 | SMC026 | 9/6/2001 | 37.65088 | -122.38373 | 0.12 | 0.35 |
| | | SM-SSF-02-C | 4/5/2017 | 37.66440 | -122.39508 | 0.02 | 0.05 |
| | | SM-SSF-02-D | 4/5/2017 | 37.66303 | -122.39861 | 0.08 | 0.15 |
| | 291 | SMC009 | 10/25/2000 | 37.64429 | -122.41669 | 0.48 | -- |
| | | SMC-039 | 10/2/2001 | 37.64508 | -122.41632 | 0.07 | -- |
| | | SMC-040 | 10/2/2001 | 37.64429 | -122.41718 | 2.72 | -- |
| | | SMC-041 | 10/2/2001 | 37.64410 | -122.41650 | 0.04 | -- |
| | | SSO16 | 7/12/2007 | 37.64252 | -122.41119 | 0.00 | 0.03 |
| | | SSO18 | 7/12/2007 | 37.64209 | -122.41241 | 0.00 | 0.01 |
| | | SSO20 | 7/12/2007 | 37.64752 | -122.41638 | 0.00 | 0.05 |
| | | SSO21 | 7/12/2007 | 37.64771 | -122.41663 | 0.00 | 0.08 |
| | | SSO22 | 7/12/2007 | 37.64728 | -122.41803 | 0.13 | 0.09 |
| | | SSO25 | 7/5/2007 | 37.64313 | -122.41742 | 0.03 | 0.12 |
| | | SM-SSF-06-A | 2/16/2015 | 37.64411 | -122.41159 | 0.02 | 0.06 |
| | | SM-SSF-06-B | 2/17/2015 | 37.64219 | -122.41329 | 0.48 | 0.07 |
| | | SM-SSF-06-C | 2/13/2015 | 37.64612 | -122.41585 | 0.05 | 0.05 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SM-SSF-06-F | 4/5/2017 | 37.64299 | -122.41425 | 0.04 | 0.08 |
| | | SM-SSF-06-H | 4/5/2017 | 37.64240 | -122.41370 | 0.44 | 0.08 |
| | | SM-SSF-06-I | 4/5/2017 | 37.64212 | -122.41325 | 0.04 | 0.24 |
| | | SM-SSF-07-C | 5/24/2018 | 37.64534 | -122.42094 | 0.21 | 0.06 |
| | 292 | SBO12 | 7/12/2007 | 37.64111 | -122.41150 | 0.00 | 0.10 |
| | | SSO15 | 7/12/2007 | 37.64093 | -122.41241 | 0.00 | 0.17 |
| | | SMC027 | 9/6/2001 | 37.64130 | -122.40961 | 0.03 | 0.04 |
| | | SM-SSF-05-B | 2/17/2015 | 37.64109 | -122.41145 | 0.02 | 0.09 |
| | | SM-SSF-06-D | 2/17/2015 | 37.64128 | -122.40868 | 0.14 | 3.40 |
| | | SM-SSF-06-G | 4/5/2017 | 37.64079 | -122.41729 | 0.15 | 0.06 |
| | 293 | SM-SSF-02-A | 2/16/2015 | 37.65172 | -122.40318 | 0.07 | 0.37 |
| | | SM-SSF-02-B | 2/16/2015 | 37.65591 | -122.40464 | 0.01 | 0.07 |
| | 294 | SM-SSF-03-A | 2/16/2015 | 37.64910 | -122.40172 | 0.07 | 0.28 |
| | | SM-SSF-03-C | 2/16/2015 | 37.65181 | -122.40008 | 0.19 | 0.18 |
| | | SM-SSF-03-D | 4/5/2017 | 37.65253 | -122.40021 | 0.28 | 0.47 |
| | 295 | SSO01 | 7/5/2007 | 37.63971 | -122.40381 | 0.33 | 0.18 |
| | | SSO02 | 7/5/2007 | 37.64130 | -122.40363 | 0.00 | 0.06 |
| | | SM-SSF-04-B | 2/16/2015 | 37.63974 | -122.40212 | 0.30 | 0.09 |
| | 296 | SM-SSF-07-B | 5/24/2018 | 37.64722 | -122.41981 | 0.02 | 0.83 |
| | 313 | SM-SSF-02-F | 4/5/2017 | 37.66189 | -122.39608 | 0.01 | 0.05 |
| | 314 | SM-SSF-01-B | 2/16/2015 | 37.66032 | -122.38511 | 0.12 | 0.07 |
| | | SM-SSF-01-E | 4/3/2017 | 37.65864 | -122.39130 | 0.15 | 0.19 |
| | | SM-SSF-01-G | 4/3/2017 | 37.66241 | -122.38908 | 0.05 | 0.03 |
| | | SM-SSF-01-R | 5/14/2019 | 37.65858 | -122.39122 | 0.02 | 0.16 |
| | 315 | SM-SSF-01-L | 5/14/2019 | 37.65693 | -122.39556 | 0.27 | 0.27 |
| | | SM-SSF-01-M | 5/14/2019 | 37.66021 | -122.38526 | 0.02 | 0.26 |
| | | SM-SSF-01-N | 5/14/2019 | 37.65977 | -122.38571 | 0.03 | 0.50 |
| | | SM-SSF-01-O | 5/14/2019 | 37.65871 | -122.38623 | 0.43 | 0.14 |
| | | SM-SSF-01-P | 5/14/2019 | 37.65504 | -122.39049 | 0.01 | 0.06 |
| | | SM-SSF-01-Q | 5/14/2019 | 37.65647 | -122.39420 | 0.07 | 0.56 |
| | 316 | SSO03 | 7/12/2007 | 37.65192 | -122.39429 | 0.00 | 1.24 |
| | | SM-SSF-01-D | 2/16/2015 | 37.65031 | -122.39213 | 0.02 | 0.14 |
| | | SM-SSF-01-J | 5/24/2018 | 37.65270 | -122.39367 | 0.03 | 0.05 |
| | 318 | SM-SSF-01-C | 2/16/2015 | 37.64896 | -122.38728 | 0.01 | 0.24 |
| | 319 | SM-SSF-01-I | 4/3/2017 | 37.65870 | -122.38012 | 0.06 | 0.22 |
| | 354 | SM-SSF-08-A | 2/13/2015 | 37.65088 | -122.41622 | 0.02 | 0.23 |
| | 356 | SSO17 | 7/12/2007 | 37.64587 | -122.40991 | 0.00 | 0.08 |
| | | SM-SSF-06-E | 2/13/2015 | 37.64883 | -122.40961 | 0.03 | 3.59 |
| | 357 | SM-SSF-03-B | 2/16/2015 | 37.64918 | -122.40410 | 0.09 | 0.15 |
| | 358 | SM-SSF-04-A | 2/16/2015 | 37.64606 | -122.40160 | 1.46 | 0.15 |
| | | SM-SSF-04-C | 4/3/2017 | 37.64613 | -122.40198 | 0.01 | 0.08 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SM-SSF-04-D | 4/3/2017 | 37.64450 | -122.40173 | 0.09 | 0.11 |
| | | SM-SSF-04-E | 4/3/2017 | 37.64608 | -122.40147 | 0.05 | 0.07 |
| | | SM-SSF-04-H | 5/14/2019 | 37.64551 | -122.40344 | 0.03 | 0.09 |
| | 359 | SM-SSF-03-F | 5/24/2018 | 37.64449 | -122.39690 | 0.05 | 0.07 |
| | | SM-SSF-03-G | 5/24/2018 | 37.64458 | -122.39694 | 0.01 | 0.08 |
| | | SM-SSF-03-H | 5/24/2018 | 37.64463 | -122.39747 | 0.02 | 0.09 |
| | | SM-SSF-03-J | 5/14/2019 | 37.64438 | -122.39728 | 0.13 | 0.44 |
| | 362 | SM-SSF-05-H | 5/24/2018 | 37.63642 | -122.40572 | 0.01 | 0.08 |
| | | SM-SSF-05-J | 5/14/2019 | 37.63666 | -122.40587 | 0.00 | 0.12 |
| | Other - SSF | SMC010 | 10/25/2000 | 37.65332 | -122.42548 | 0.19 | 0.06 |
| Unincorporated | 1005 | SM-SMC-09-A | 2/17/2015 | 37.63283 | -122.40533 | 0.01 | 0.05 |
| | 1011 | SM-SMC-08-A | 2/10/2015 | 37.51758 | -122.27088 | 0.02 | 0.10 |
| | 247 | SM-SMC-01-A | 3/27/2017 | 37.41451 | -122.19379 | 0.00 | 0.04 |
| | 379 | SM-SMC-04-A | 1/21/2015 | 37.47622 | -122.20808 | 0.09 | 0.11 |
| | | SM-SMC-04-C | 1/21/2015 | 37.47851 | -122.21224 | 0.06 | 0.13 |
| | | SM-SMC-05-A | 1/21/2015 | 37.47476 | -122.21126 | 0.03 | 0.10 |
| | | SM-SMC-06-A | 1/21/2015 | 37.48194 | -122.20616 | 0.02 | 0.05 |
| | | SM-SMC-06-B | 1/21/2015 | 37.48307 | -122.20310 | 0.02 | 0.06 |
| | | SM-SMC-06-C | 1/21/2015 | 37.48426 | -122.20777 | 0.93 | 0.39 |
| | | SM-SMC-07-A | 1/21/2015 | 37.48484 | -122.21082 | 0.06 | 0.20 |
| | | SM-SMC-07-B | 1/21/2015 | 37.48516 | -122.21341 | 0.07 | 0.14 |
| | | SM-SMC-06-D | 3/28/2017 | 37.48389 | -122.20673 | 0.05 | 0.06 |
| | | SM-SMC-06-E | 3/28/2017 | 37.48384 | -122.20653 | 0.01 | 0.07 |
| | | SM-SMC-06-F | 3/28/2017 | 37.48291 | -122.20734 | 0.02 | 0.07 |
| | | SM-SMC-06-G | 3/28/2017 | 37.48285 | -122.20546 | 0.05 | 0.30 |
| | | SM-SMC-06-H | 3/28/2017 | 37.48278 | -122.20531 | 0.03 | 0.07 |
| | | SM-SMC-06-I | 3/28/2017 | 37.48415 | -122.20792 | 0.14 | 3.15 |
| | | SM-SMC-06-J | 3/28/2017 | 37.48349 | -122.20874 | 0.08 | 0.09 |
| | | SM-SMC-06-K | 3/28/2017 | 37.48396 | -122.20634 | 0.02 | 0.04 |
| | | SM-SMC-06-L | 3/28/2017 | 37.48256 | -122.20875 | 0.03 | 0.10 |
| | Other - RCY | SMC006 | 10/24/2000 | 37.47528 | -122.28278 | 0.01 | 0.04 |
| | Other - SMC | SM-SMC-03-A | 1/21/2015 | 37.47682 | -122.19520 | 0.00 | 0.03 |
| | Other - SMC | SM-SMC-10-A | 1/20/2015 | 37.43302 | -122.20285 | 0.04 | 0.06 |
| | Other - WDE | SMC007 | 10/25/2000 | 37.44452 | -122.29108 | 0.00 | 0.03 |
| Woodside | Other - WDE | SMC008 | 10/24/2000 | 37.41632 | -122.26910 | 0.00 | 0.04 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| Belmont | 60 | SM-BEL-60-A | 5/22/2018 | 37.52699 | -122.27609 | 0.00 | 0.21 |
| | | SM-BEL-60-B | 5/22/2018 | 37.52667 | -122.27568 | 0.00 | 0.02 |
| | | SM-BEL-60-C | 5/22/2018 | 37.52297 | -122.27790 | 0.01 | 0.17 |
| | | SM-BEL-60-D | 5/22/2018 | 37.52281 | -122.27776 | 0.02 | 0.23 |
| | | SM-BEL-60-E | 5/22/2018 | 37.52200 | -122.27684 | 0.02 | 0.09 |
| | | SM-BEL-60-F | 5/22/2018 | 37.52295 | -122.27849 | 0.02 | 0.12 |
| | | SM-BEL-60-G | 5/22/2018 | 37.52701 | -122.27293 | 0.01 | 0.08 |
| | | SM-BEL-60-J | 5/13/2019 | 37.52585 | -122.27464 | 0.00 | 0.01 |
| | 77 | SM-BEL-01-A | 5/13/2019 | 37.52513 | -122.26635 | 0.01 | 0.24 |
| Brisbane | 1004 | SMC025 | 9/20/2001 | 37.70673 | -122.39801 | 0.14 | 1.73 |
| | | SM-BRI-01-A | 2/18/2015 | 37.70150 | -122.40867 | 0.04 | 0.17 |
| | | SM-BRI-01-B | 2/18/2015 | 37.70102 | -122.40810 | 0.01 | 0.04 |
| | | SM-BRI-01-C | 2/18/2015 | 37.69897 | -122.40682 | 0.04 | 0.06 |
| | | SM-BRI-01-D | 2/18/2015 | 37.70024 | -122.40736 | 0.01 | 0.04 |
| | 17 | SM-BRI-02-A | 2/18/2015 | 37.68805 | -122.40444 | 1.22 | 0.07 |
| | | SM-BRI-02-B | 5/29/2018 | 37.68805 | -122.40570 | 1.02 | 0.12 |
| | | SM-BRI-02-C | 5/29/2018 | 37.68809 | -122.40442 | 0.04 | 0.07 |
| | | SM-BRI-02-D | 5/29/2018 | 37.68975 | -122.41143 | 0.01 | 0.04 |
| | | SM-BRI-02-G | 5/29/2018 | 37.68803 | -122.40585 | 0.01 | 0.06 |
| | | SM-BRI-02-H | 5/29/2018 | 37.68933 | -122.40681 | 0.01 | 0.05 |
| | | SM-BRI-02-I | 5/29/2018 | 37.68765 | -122.40319 | 0.04 | 0.23 |
| | | SM-BRI-02-J | 5/14/2019 | 37.68805 | -122.40571 | 0.03 | 0.06 |
| | | SM-BRI-02-L | 5/14/2019 | 37.68826 | -122.40579 | 0.56 | 0.14 |
| | | SM-BRI-02-M | 5/14/2019 | 37.68930 | -122.41998 | 0.01 | 0.09 |
| | | SM-BRI-02-N | 5/14/2019 | 37.69007 | -122.40282 | 0.15 | 0.05 |
| Burlingame | 1006 | SMC015 | 9/6/2001 | 37.59387 | -122.36823 | 0.06 | 0.12 |
| | | SMC017 | 9/6/2001 | 37.59229 | -122.36591 | 0.14 | 0.35 |
| | | SM-BUR-02-A | 2/11/2015 | 37.59448 | -122.36737 | 0.10 | 0.30 |
| | | SM-BUR-04-A | 2/11/2015 | 37.59425 | -122.37052 | 0.10 | 0.39 |
| | | SM-BUR-04-B | 2/12/2015 | 37.59425 | -122.36840 | 0.01 | 0.06 |
| | | SM-BUR-03-D | 5/23/2018 | 37.59043 | -122.36304 | 0.03 | 0.12 |
| | | SM-BUR-03-E | 5/23/2018 | 37.59030 | -122.36303 | 0.03 | 0.15 |
| | 138 | SM-BUR-06-B | 5/13/2019 | 37.58840 | -122.33720 | 0.18 | 0.16 |
| | 142 | SM-BUR-03-A | 2/11/2015 | 37.58994 | -122.36429 | 0.15 | 0.33 |
| | | SM-BUR-03-B | 2/12/2015 | 37.59181 | -122.36623 | 0.06 | 0.09 |
| | | SM-BUR-03-C | 5/23/2018 | 37.59087 | -122.36455 | 0.01 | 0.07 |
| | | SM-BUR-03-F | 5/23/2018 | 37.59119 | -122.36517 | 0.02 | 0.05 |
| | | SM-BUR-03-G | 5/23/2018 | 37.59098 | -122.36502 | 0.03 | 0.06 |
| | | SM-BUR-03-H | 5/23/2018 | 37.59134 | -122.36547 | 0.01 | 0.06 |
| | | SM-BUR-03-I | 5/23/2018 | 37.59049 | -122.36408 | 0.03 | 0.08 |
| | 16 | SM-BUR-06-A | 2/11/2015 | 37.59107 | -122.33662 | 0.05 | 0.14 |
| | 164 | SMC016 | 9/6/2001 | 37.59790 | -122.37708 | 0.08 | 0.10 |
| | | SM-BUR-05-A | 2/11/2015 | 37.59820 | -122.38085 | 0.05 | 0.31 |
| | | SM-BUR-05-B | 2/11/2015 | 37.59761 | -122.37918 | 0.09 | 0.83 |
| | | SM-BUR-05-C | 2/11/2015 | 37.59523 | -122.37808 | 0.04 | 0.10 |
| | 85 | SM-BUR-01-A | 2/12/2015 | 37.60248 | -122.37588 | 0.03 | 0.16 |
| | | SM-BUR-01-B | 2/11/2015 | 37.59990 | -122.37191 | 0.03 | 0.17 |
| Colma | Other - COL | SMC024 | 9/6/2001 | 37.67407 | -122.45691 | 16.81 | 1.31 |
| | | SMC024 | 10/16/2003 | 37.67407 | -122.45691 | 0.00 | 0.02 |
| | | SMC048 | 10/16/2003 | 37.67407 | -122.45728 | 0.00 | 0.02 |
| | | SMC049 | 10/16/2003 | 37.67352 | -122.45770 | 0.05 | 0.24 |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| Daly City | 350 | SM-DCY-01-A | 5/29/2018 | 37.70427 | -122.41417 | 0.01 | 0.06 |
| East Palo Alto | 1015 | SM-EPA-01-C | 1/19/2015 | 37.47474 | -122.12710 | 0.02 | 0.08 |
| | | SM-EPA-01-D | 1/19/2015 | 37.47558 | -122.13191 | 0.06 | 0.10 |
| | 67 | SM-EPA-01-A | 1/19/2015 | 37.47722 | -122.13418 | 0.21 | 0.22 |
| | | SM-EPA-01-B | 1/19/2015 | 37.47208 | -122.13429 | 0.02 | 0.12 |
| | 70 | SM-EPA-02-A | 1/19/2015 | 37.47084 | -122.13069 | 0.05 | 0.26 |
| | | SM-EPA-02-D | 1/19/2015 | 37.47033 | -122.13036 | 0.34 | 0.45 |
| | | SM-EPA-02-G | 3/27/2017 | 37.47029 | -122.13244 | 0.03 | 0.05 |
| | | SM-EPA-02-H | 3/27/2017 | 37.47194 | -122.13406 | 0.01 | 0.05 |
| | 72 | SM-EPA-02-C | 1/19/2015 | 37.47443 | -122.12743 | 0.02 | 0.33 |
| | | SM-EPA-02-F | 3/27/2017 | 37.47300 | -122.13143 | 0.02 | 0.08 |
| | Other - EPA | SMC019 | 9/20/2001 | 37.46112 | -122.12421 | 0.07 | 0.13 |
| Foster City | 1010 | SM-FCY-01-A | 5/13/2019 | 37.56762 | -122.27260 | 0.00 | 0.09 |
| Menlo Park | 1012 | SM-MPK-05-A | 3/27/2017 | 37.48209 | -122.16096 | 0.06 | 0.10 |
| | 1014 | SM-MPK-03-A | 1/22/2015 | 37.48678 | -122.18090 | 0.02 | 0.04 |
| | | SM-MPK-02-E | 3/27/2017 | 37.48525 | -122.18228 | 0.03 | 0.04 |
| | 238A | SM-MPK-04-A | 1/20/2015 | 37.48307 | -122.17529 | 0.03 | 0.21 |
| | | SM-MPK-04-C | 1/20/2015 | 37.48270 | -122.17420 | 0.01 | 0.12 |
| | | SM-MPK-04-D | 1/19/2015 | 37.48342 | -122.17178 | 0.25 | 0.03 |
| | 238B | SM-MPK-04-E | 1/19/2015 | 37.48281 | -122.16719 | 0.29 | 0.10 |
| | 239 | SM-MPK-02-B | 1/20/2015 | 37.48610 | -122.18564 | 0.57 | 0.13 |
| | | SM-MPK-02-D | 3/27/2017 | 37.48592 | -122.18493 | 0.01 | 0.06 |
| | 332 | SM-MPK-02-A | 1/20/2015 | 37.48664 | -122.18868 | 0.03 | 0.04 |
| | 66 | SM-MPK-06-A | 1/19/2015 | 37.47566 | -122.14726 | 0.06 | 0.12 |
| | 71 | SM-MPK-05-B | 3/27/2017 | 37.47939 | -122.15569 | 0.01 | 0.13 |
| | Other - MPK | SM-MPK-01-A | 1/20/2015 | 37.45565 | -122.18395 | 0.02 | 0.07 |
| Millbrae | 401 | SM-MIL-01-A | 5/13/2019 | 37.60764 | -122.39189 | 0.00 | 0.03 |
| Redwood City | 1000 | SM-RCY-04-D | 1/22/2015 | 37.49742 | -122.21299 | 0.02 | 0.07 |
| | | SM-RCY-05-A | 1/22/2015 | 37.50961 | -122.20813 | 0.57 | 0.96 |
| | | SM-RCY-05-C | 4/5/2017 | 37.51096 | -122.20742 | 0.75 | 0.35 |
| | 1014 | SM-RCY-10-E | 3/27/2017 | 37.48510 | -122.18221 | 0.01 | 0.05 |
| | 239 | SM-RCY-10-A | 1/20/2015 | 37.48636 | -122.18757 | 0.04 | 0.06 |
| | | SM-RCY-10-C | 3/27/2017 | 37.48581 | -122.18504 | 0.16 | 0.05 |
| | | SM-RCY-10-D | 3/27/2017 | 37.48571 | -122.18474 | 0.02 | 0.04 |
| | 253 | SM-RCY-09-A | 1/22/2015 | 37.48606 | -122.19643 | 0.05 | 0.06 |
| | 254 | SM-RCY-06-A | 1/22/2015 | 37.48850 | -122.20902 | 0.09 | 0.07 |
| | 267 | SM-RCY-04-B | 1/22/2015 | 37.49303 | -122.21726 | 0.01 | 0.10 |
| | 269 | SM-RCY-05-D | 5/13/2019 | 37.51154 | -122.20694 | 0.02 | 0.01 |
| | 327 | SMC-033 | 10/4/2001 | 37.48907 | -122.23151 | 0.00 | -- |
| | | SMC-034 | 10/4/2001 | 37.48889 | -122.22821 | 0.08 | -- |
| | | SM-RCY-15-A | 2/10/2015 | 37.48952 | -122.23632 | 0.05 | 0.08 |
| | 333 | SM-RCY-04-A | 1/22/2015 | 37.49547 | -122.21968 | 0.02 | 0.07 |
| | 336 | SM-RCY-03-B | 5/13/2019 | 37.49198 | -122.22804 | 0.01 | 0.03 |
| | 337 | SMC004 | 10/24/2000 | 37.49731 | -122.23700 | 0.08 | 0.11 |
| | | SM-RCY-01-A | 2/10/2015 | 37.49504 | -122.23654 | 0.03 | 0.33 |
| | | SM-RCY-01-B | 2/10/2015 | 37.49607 | -122.23841 | 0.05 | 0.09 |
| | | SM-RCY-03-A | 2/10/2015 | 37.49366 | -122.23425 | 0.02 | 0.13 |
| | 379 | SMC002 | 10/24/2000 | 37.48730 | -122.21368 | 0.12 | -- |
| | | SMC-035 | 10/4/2001 | 37.48651 | -122.21399 | 0.08 | -- |
| | | SMC-036 | 10/4/2001 | 37.48810 | -122.21338 | 0.07 | -- |

| Permittee | WMA | Sample ID | Sample Date | Latitude | Longitude | Total PCBs (mg/kg) | Mercury (mg/kg) |
|---|---|---|---|---|---|---|---|
| | | SMC-037 | 10/4/2001 | 37.48309 | -122.21759 | 0.01 | -- |
| | | SMC-038 | 10/4/2001 | 37.48413 | -122.21667 | 0.09 | -- |
| | | SMC001 | 10/24/2000 | 37.48730 | -122.20648 | 0.07 | 0.17 |
| | | SM-RCY-07-A | 1/21/2015 | 37.48669 | -122.21235 | 0.10 | 0.08 |
| | | SM-RCY-07-B | 1/21/2015 | 37.48650 | -122.20665 | 0.35 | 0.21 |
| | | SM-RCY-07-C | 1/21/2015 | 37.48650 | -122.20681 | 0.13 | 0.08 |
| | | SM-RCY-11-A | 1/22/2015 | 37.48006 | -122.22206 | 0.03 | 0.16 |
| | | SM-RCY-07-D | 3/28/2017 | 37.48532 | -122.21334 | 1.97 | 0.14 |
| | | SM-RCY-12-A | 3/28/2017 | 37.48444 | -122.21848 | 0.02 | 0.07 |
| | | SM-RCY-12-B | 3/28/2017 | 37.48430 | -122.21787 | 0.08 | 0.09 |
| | | SM-RCY-12-C | 3/30/2017 | 37.48438 | -122.21774 | 0.00 | 0.01 |
| | | SM-RCY-12-E | 3/28/2017 | 37.48471 | -122.21958 | 0.01 | 0.05 |
| | | SM-RCY-12-F | 3/28/2017 | 37.48551 | -122.21624 | 0.01 | 0.08 |
| | | SM-RCY-07-E | 5/29/2018 | 37.48604 | -122.21158 | 0.04 | 0.07 |
| | | SM-RCY-07-F | 5/29/2018 | 37.48554 | -122.21191 | 0.04 | 0.06 |
| | | SM-RCY-12-G | 5/22/2018 | 37.48419 | -122.21715 | 0.01 | 0.10 |
| | | RCA-201409241050 | 9/24/2014 | 37.48538 | -122.21345 | 2.37 | -- |
| | | RCB-201409241015 | 9/24/2014 | 37.48528 | -122.21358 | 1.25 | -- |
| | | RCC-201409291115 | 9/29/2014 | 37.48550 | -122.21441 | 0.57 | -- |
| | | RCD-201409241200 | 9/24/2014 | 37.48418 | -122.21685 | 6.93 | -- |
| | | RCE-201409291030 | 9/29/2014 | 37.48573 | -122.21774 | 0.04 | -- |
| | | RCF-201409291230 | 9/29/2014 | 37.48721 | -122.21461 | 0.02 | -- |
| | | RCG-201409240945 | 9/24/2014 | 37.48726 | -122.21372 | 0.07 | -- |
| | 407 | SM-RCY-04-C | 1/22/2015 | 37.49129 | -122.21345 | 0.01 | 0.23 |
| | | SM-RCY-04-E | 5/13/2019 | 37.49309 | -122.21312 | 0.00 | 0.12 |
| | Other - RCY | SMC011 | 10/24/2000 | 37.48889 | -122.22699 | 0.34 | -- |
| | | SMC-032 | 10/4/2001 | 37.48828 | -122.22699 | 0.02 | -- |
| | | SMC030 | 10/4/2001 | 37.48090 | -122.23450 | 0.01 | 0.66 |
| | | SMC031 | 10/4/2001 | 37.48053 | -122.22693 | 0.14 | 0.18 |
| | | SM-RCY-13-A | 1/22/2015 | 37.48136 | -122.22602 | 0.01 | 0.10 |
| San Bruno | 292 | SBO01 | 7/12/2007 | 37.63690 | -122.41241 | 0.03 | 0.36 |
| | | SBO02 | 7/12/2007 | 37.63708 | -122.41162 | 0.18 | 0.27 |
| | | SSO05 | 7/12/2007 | 37.63690 | -122.41229 | 0.00 | 0.47 |
| | | SBO03 | 7/12/2007 | 37.63489 | -122.41150 | 0.01 | 0.15 |
| | | SBO04 | 7/12/2007 | 37.63647 | -122.41241 | 0.00 | 0.07 |
| | | SBO05 | 7/12/2007 | 37.63611 | -122.41150 | 0.16 | 0.11 |
| | | SBO06 | 7/12/2007 | 37.63892 | -122.41248 | 0.00 | 0.23 |
| | | SBO07 | 7/12/2007 | 37.63928 | -122.41241 | 0.11 | 0.30 |
| | | SBO08 | 7/12/2007 | 37.63928 | -122.41272 | 0.00 | 0.20 |
| | | SBO09 | 7/12/2007 | 37.63892 | -122.41162 | 0.15 | 0.21 |
| | | SBO10 | 7/12/2007 | 37.63831 | -122.41162 | 0.00 | 0.06 |
| | | SBO11 | 7/12/2007 | 37.63971 | -122.41162 | 0.12 | 0.22 |
| | | SBO13 | 7/12/2007 | 37.63831 | -122.41339 | 0.00 | 0.13 |
| | 362 | SM-SBO-05-D | 5/14/2019 | 37.63538 | -122.40616 | 0.07 | 0.06 |

**Note:**
Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.

# Attachment 5

Summary of PCBs and Mercury Monitoring Results in San Mateo County WMAs

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| 210 | San Carlos | 141 | 33 | 23.2% | 47 | 0.11 | 0 - 192.91 | 33 | 1.78 | 0.20 - 37 |
| 17 | Brisbane | 1,639 | 55 | 3.4% | 7 | 0.04 | 0.01 - 1.22 | 1 | -- | 0.11 |
| 142 | Burlingame | 20 | 9 | 44.3% | 9 | 0.03 | 0.01 - 0.15 | 1 | -- | 0.67 |
| 359 | South San Francisco | 23 | 12 | 51.2% | 3 | 0.02 | 0.01 - 0.06 | 1 | -- | 0.79 |
| 408 | San Mateo | 43 | 7 | 16.3% | 7 | 0.01 | 0 - 0.02 | 1 | -- | 1.90 |
| 60 | Belmont | 298 | 6 | 1.9% | 7 | 0.01 | 0 - 0.02 | 2 | 0.60 | 0.18 - 1.02 |
| 379 | Redwood City | 802 | 110 | 13.7% | 44 | 0.06 | 0 - 6.93 | 2 | 0.14 | 0.11 - 0.18 |
| 291 | South San Francisco | 194 | 64 | 33.1% | 19 | 0.05 | 0 - 2.72 | 1 | -- | 0.74 |
| 1000 | Redwood City | 148 | 108 | 73.0% | 3 | 0.57 | 0.02 - 0.75 | 0 | -- | -- |
| 75 | San Carlos | 66 | 38 | 58.3% | 12 | 0.09 | 0.02 - 49.4 | 1 | -- | 6.14 |
| 31 | San Carlos | 99 | 27 | 27.2% | 26 | 0.19 | 0 - 1.61 | 4 | 1.12 | 0.41 - 2.15 |
| 1016 | San Carlos | 142 | 27 | 19.0% | 8 | 0.54 | 0 - 6.19 | 0 | -- | -- |
| 239 | Menlo Park / EPA | 36 | 11 | 29.1% | 5 | 0.04 | 0.01 - 0.57 | 0 | -- | -- |
| 358 | South San Francisco | 32 | 7 | 21.8% | 4 | 0.07 | 0.01 - 1.46 | 0 | -- | -- |
| 70 | East Palo Alto | 490 | 16 | 3.3% | 4 | 0.04 | 0.01 - 0.34 | 1 | -- | 0.11 |
| 314 | South San Francisco | 66 | 4 | 5.4% | 2 | 0.10 | 0.05 - 0.15 | 2 | 0.91 | 0.86 - 0.95 |
| 294 | South San Francisco | 67 | 21 | 31.2% | 3 | 0.19 | 0.07 - 0.28 | 1 | -- | 0.37 |
| 1001 | South San Francisco | 413 | 107 | 26.0% | 17 | 0.04 | 0.01 - 0.43 | 2 | 1.03 | 0.35 - 1.71 |
| 407 | Redwood City | 18 | 10 | 52.9% | 1 | 0.01 | 0.01 - 0.01 | 0 | -- | -- |
| 85 | Burlingame | 121 | 13 | 10.4% | 2 | 0.03 | 0.03 - 0.03 | 1 | -- | 0.24 |
| 164 | Burlingame | 241 | 79 | 32.6% | 4 | 0.07 | 0.04 - 0.09 | 1 | -- | 0.45 |
| 336 | Redwood City | 66 | 4 | 6.6% | 0 | -- | -- | 0 | -- | -- |
| 1011 | Redwood City | 507 | 63 | 12.3% | 25 | 0.03 | 0 - 0.72 | 4 | 0.19 | 0.17 - 0.23 |
| 25 | San Mateo | 219 | 6 | 2.9% | 1 | -- | 0.03 | 1 | -- | 0.15 |
| 149 | Burlingame | 480 | 5 | 1.1% | 2 | 0.13 | 0.07 - 0.19 | 1 | -- | 0.11 |

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| 266 | Redwood City | 91 | 4 | 4.1% | 0 | -- | -- | 1 | -- | 0.00 |
| 77 | Belmont | 86 | 4 | 4.7% | 0 | -- | -- | 0 | -- | -- |
| 59 | San Carlos | 28 | 9 | 32.1% | 3 | 0.18 | 0.04 - 0.31 | 0 | -- | -- |
| 356 | South San Francisco | 10 | 2 | 18.0% | 2 | 0.02 | 0 - 0.03 | 1 | -- | 0.09 |
| 333 | Redwood City | 15 | 4 | 29.4% | 1 | -- | 0.02 | 1 | -- | 0.02 |
| 111 | San Mateo | 95 | 5 | 4.8% | 2 | 0.06 | 0.05 - 0.06 | 0 | -- | -- |
| 1008 | San Mateo | 111 | 1 | 0.5% | 0 | -- | -- | 0 | -- | -- |
| 139 | Burlingame | 63 | 2 | 3.0% | 0 | -- | -- | 0 | -- | -- |
| 181 | Daly City | 75 | 12 | 15.6% | 0 | -- | -- | 0 | -- | -- |
| 298 | South San Francisco | 122 | 3 | 2.7% | 0 | -- | -- | 0 | -- | -- |
| 307 | Daly City | 1,277 | 5 | 0.4% | 0 | -- | -- | 0 | -- | -- |
| 401 | Millbrae | 52 | 7 | 12.6% | 0 | -- | -- | 0 | -- | -- |
| 238 | Menlo Park | 345 | 84 | 24.2% | 4 | 0.14 | 0.01 - 0.29 | 2 | 0.08 | 0.04 - 0.12 |
| 67 | East Palo Alto | 95 | 11 | 12.0% | 2 | 0.12 | 0.02 - 0.21 | 0 | -- | -- |
| 114 | San Mateo | 85 | 8 | 9.3% | 1 | -- | 0.23 | 0 | -- | -- |
| 295 | South San Francisco | 25 | 3 | 11.7% | 4 | 0.155 | 0 - 0.33 | 0 | -- | -- |
| 362 | South San Francisco | 18 | 9 | 51.6% | 2 | 0.234 | 0.01 - 0.46 | 0 | -- | -- |
| 350 | Daly City | 317 | 15 | 4.8% | 1 | 0.009 | 0.01 | 0 | -- | -- |
| 32 | Belmont | 67 | 2 | 3.3% | 0 | -- | -- | 1 | -- | 0.17 |
| 317 | South San Francisco | 32 | 9 | 27.1% | 0 | -- | -- | 1 | -- | 0.45 |
| 66 | Menlo Park | 64 | 19 | 29.8% | 1 | 0.06 | 0.06 | 1 | -- | 0.39 |
| 1006 | Burlingame | 306 | 49 | 15.9% | 5 | 0.10 | 0.01 - 0.14 | 1 | -- | 0.36 |
| 319 | South San Francisco | 99 | 31 | 31.2% | 1 | -- | 0.06 | 1 | -- | 0.08 |
| 318 | South San Francisco | 70 | 32 | 45.4% | 1 | -- | 0.01 | 1 | -- | 0.27 |
| 1004 | Brisbane | 804 | 507 | 63.0% | 4 | 0.02 | 0.01 - 0.04 | 1 | -- | 0.11 |

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| 156 | San Mateo | 40 | 7 | 17.0% | 1 | -- | 0.01 | 1 | -- | 0.20 |
| 323 | Redwood City | 185 | 2 | 0.9% | 0 | -- | -- | 1 | -- | 0.19 |
| 306 | South San Francisco | 37 | 7 | 18.4% | 0 | -- | -- | 2 | 0.18 | 0.17 - 0.18 |
| 315 | South San Francisco | 108 | 34 | 31.8% | 1 | -- | 0.12 | 2 | 0.60 | 0.17 - 1.02 |
| 324 | Redwood City | 44 | 1 | 2.0% | 0 | -- | -- | 1 | -- | 0.17 |
| 141 | Burlingame | 62 | 4 | 6.9% | 0 | -- | -- | 1 | -- | 0.17 |
| 89 | San Mateo | 98 | 10 | 10.3% | 2 | 0.02 | 0.01 - 0.04 | 1 | -- | 0.14 |
| 327 | Redwood City | 126 | 7 | 5.1% | 3 | 0.05 | 0 - 0.08 | 1 | -- | 0.13 |
| 337 | Redwood City | 138 | 16 | 11.5% | 4 | 0.04 | 0.02 - 0.08 | 1 | -- | 0.12 |
| 293 | South San Francisco | 654 | 58 | 8.9% | 2 | 0.04 | 0.01 - 0.07 | 1 | -- | 0.12 |
| 254 | Redwood City | 39 | 4 | 9.9% | 1 | -- | 0.09 | 1 | -- | 0.11 |
| 316 | South San Francisco | 117 | 26 | 21.9% | 3 | 0.02 | 0 - 0.03 | 1 | -- | 0.10 |
| 72 | East Palo Alto | 26 | 12 | 44.4% | 2 | 0.02 | 0.02 - 0.02 | 1 | -- | 0.08 |
| 267 | Redwood City | 75 | 16 | 20.9% | 1 | -- | 0.01 | 1 | -- | 0.06 |
| 388 | Redwood City | 42 | 1 | 1.4% | 0 | -- | -- | 1 | -- | 0.05 |
| 71 | Menlo Park | 1,394 | 22 | 1.6% | 1 | -- | 0.01 | 1 | -- | 0.04 |
| 296 | South San Francisco | 1,272 | 7 | 0.6% | 0 | -- | -- | 1 | -- | 0.03 |
| 292 | San Bruno | 220 | 37 | 16.9% | 19 | 0.12 | 0 - 0.18 | 1 | -- | 0.01 |
| 313 | South San Francisco | 77 | 11 | 14.3% | 1 | -- | 0.01 | 0 | -- | -- |
| 1005 | Millbrae | 791 | 59 | 7.4% | 1 | -- | 0.01 | 0 | -- | -- |
| 1007 | San Mateo | 87 | 7 | 8.4% | 1 | -- | 0.01 | 0 | -- | -- |
| 1014 | Menlo Park | 176 | 18 | 10.3% | 3 | 0.02 | 0.01 - 0.03 | 0 | -- | -- |
| 354 | South San Francisco | 10 | 4 | 44.7% | 1 | -- | 0.02 | 0 | -- | -- |
| 403 | San Mateo | 48 | 1 | 1.4% | 1 | -- | 0.02 | 0 | -- | -- |
| 332 | Menlo Park | 17 | 1 | 5.1% | 1 | -- | 0.03 | 0 | -- | -- |

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| 1009 | San Mateo | 175 | 43 | 24.3% | 2 | 0.03 | 0.03 - 0.04 | 0 | -- | -- |
| 1015 | East Palo Alto | 52 | 48 | 92.7% | 2 | 0.04 | 0.02 - 0.06 | 0 | -- | -- |
| 253 | Redwood City | 280 | 16 | 5.8% | 1 | -- | 0.05 | 0 | -- | -- |
| 16 | Burlingame | 24 | 8 | 31.4% | 1 | -- | 0.05 | 0 | -- | -- |
| 1012 | Menlo Park | 54 | 42 | 79.4% | 1 | -- | 0.06 | 0 | -- | -- |
| 101 | San Mateo | 221 | 10 | 4.3% | 1 | -- | 0.08 | 0 | -- | -- |
| 1002 | South San Francisco | 316 | 66 | 20.9% | 3 | 0.08 | 0.02 - 0.12 | 0 | -- | -- |
| 357 | South San Francisco | 17 | 3 | 18.5% | 1 | -- | 0.09 | 0 | -- | -- |
| 1010 | Foster City | 273 | 8 | 3.1% | 0 | -- | -- | 0 | -- | -- |
| 1013 | Redwood City | 40 | 4 | 8.9% | 0 | -- | -- | 0 | -- | -- |
| 1017 | San Mateo | 19 | 4 | 21.1% | 0 | -- | -- | 0 | -- | -- |
| 120 | San Mateo | 10 | 1 | 4.9% | 0 | -- | -- | 0 | -- | -- |
| 138 | Burlingame | 15 | 5 | 29.9% | 0 | -- | -- | 0 | -- | -- |
| 207 | San Carlos | 82 | 7 | 8.2% | 0 | -- | -- | 0 | -- | -- |
| 247 | Menlo Park | 239 | 20 | 8.5% | 0 | -- | -- | 0 | -- | -- |
| 252 | Menlo Park | 108 | 5 | 4.9% | 0 | -- | -- | 0 | -- | -- |
| 261 | Atherton | 1,679 | 3 | 0.2% | 0 | -- | -- | 0 | -- | -- |
| 269 | Redwood City | 45 | 4 | 9.2% | 0 | -- | -- | 0 | -- | -- |
| 290 | San Bruno | 2,017 | 9 | 0.4% | 0 | -- | -- | 0 | -- | -- |
| 297 | South San Francisco | 30 | 2 | 6.7% | 0 | -- | -- | 0 | -- | -- |
| 311 | South San Francisco | 111 | 3 | 2.8% | 0 | -- | -- | 0 | -- | -- |
| 325 | Redwood City | 21 | 1 | 4.8% | 0 | -- | -- | 0 | -- | -- |
| 329 | Colma | 806 | 4 | 0.5% | 0 | -- | -- | 0 | -- | -- |
| 334 | Redwood City | 19 | 4 | 18.3% | 0 | -- | -- | 0 | -- | -- |
| 335 | Redwood City | 24 | 0 | 0.0% | 0 | -- | -- | 0 | -- | -- |

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| 352 | South San Francisco | 40 | 7 | 16.7% | 0 | -- | -- | 0 | -- | -- |
| 378 | Menlo Park | 138 | 4 | 2.9% | 0 | -- | -- | 0 | -- | -- |
| 395 | Millbrae | 480 | 8 | 1.6% | 0 | -- | -- | 0 | -- | -- |
| 399 | San Mateo | 32 | 1 | 4.6% | 0 | -- | -- | 0 | -- | -- |
| 405 | Redwood City | 22 | 22 | 100.0% | 0 | -- | -- | 0 | -- | -- |
| 57 | San Carlos | 63 | 4 | 5.6% | 0 | -- | -- | 0 | -- | -- |
| 68 | East Palo Alto | 317 | 0.5 | 0.2% | 0 | -- | -- | 0 | -- | -- |
| 80 | San Carlos | 21 | 1 | 4.7% | 0 | -- | -- | 0 | -- | -- |
| 90 | San Mateo | 21 | 0.3 | 1.4% | 0 | -- | -- | 0 | -- | -- |
| 92 | San Mateo | 136 | 4 | 2.7% | 0 | -- | -- | 0 | -- | -- |
| Other - | Unincorporated | 10,917 | 343 | 3.1% | 3 | 0.00 | 0 - 0.04 | 0 | -- | -- |
| Other - | Woodside | 7,286 | 5 | 0.1% | 1 | -- | 0 | 0 | -- | -- |
| Other - | Menlo Park | 2,487 | 25 | 1.0% | 1 | -- | 0.02 | 0 | -- | -- |
| Other - | Colma | 1,139 | 5 | 0.4% | 4 | 0.03 | 0 - 16.81 | 0 | -- | -- |
| Other - | San Carlos | 2,517 | 2 | 0.1% | 1 | -- | 0.06 | 0 | -- | -- |
| Other - | East Palo Alto | 274 | 4 | 1.4% | 1 | -- | 0.07 | 0 | -- | -- |
| Other - | Redwood City | 6,030 | 6 | 0.1% | 6 | 0.07 | 0.01 - 0.34 | 0 | -- | -- |
| Other - | San Mateo | 5,800 | 55 | 0.9% | 1 | -- | 0.09 | 0 | -- | -- |
| Other - | South San Francisco | 1,554 | 3 | 0.2% | 1 | -- | 0.19 | 0 | -- | -- |
| Other - | Atherton | 2,315 | 1 | 0.0% | 0 | -- | -- | 0 | -- | -- |
| Other - | Belmont | 2,511 | 5 | 0.2% | 0 | -- | -- | 0 | -- | -- |
| Other - | Brisbane | 245 | 0.4 | 0.2% | 0 | -- | -- | 0 | -- | -- |
| Other - | Burlingame | 1,827 | 9 | 0.5% | 0 | -- | -- | 0 | -- | -- |
| Other - | Daly City | 1,131 | 11 | 1.0% | 0 | -- | -- | 0 | -- | -- |
| Other - | Foster City | 2,065 | 0 | 0.0% | 0 | -- | -- | 0 | -- | -- |

| WMA ID | Permittee | Area (acres) | Area High Interest Parcels (acres) | Percent High Interest Parcels | Sediment Samples | | | Stormwater Runoff Samples | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | n | PCBs Median (mg/kg) | PCBs Range (mg/kg) | n | PCBs Particle Ratio Median (mg/kg) | PCBs Particle Ratio Range (mg/kg) |
| Other - | Hillsborough | 3,974 | 3 | 0.1% | 0 | -- | -- | 0 | -- | -- |
| Other - | Millbrae | 1,309 | 3 | 0.2% | 0 | -- | -- | 0 | -- | -- |
| Other - | Portola Valley | 5,790 | 0 | 0.0% | 0 | -- | -- | 0 | -- | -- |
| Other - | San Bruno | 542 | 0 | 0.0% | 0 | -- | -- | 0 | -- | -- |

**Notes:**

Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.