

# INTEGRATED MONITORING REPORT

## FOR SAN MATEO COUNTY MRP PERMITTEES

Water Years 2014 – 2019

### EXECUTIVE SUMMARY



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



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

**March 31, 2020**

## CREDITS

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This report is submitted by the participating agencies in the



Town of Atherton  
City of Belmont  
City of Brisbane  
City of Burlingame  
Town of Colma  
City of Daly City  
City of East Palo Alto

City of Foster City  
City of Half Moon Bay  
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Town of Portola Valley  
City of Redwood City

City of San Bruno  
City of San Carlos  
City of San Mateo  
City of South San Francisco  
Town of Woodside  
County of San Mateo  
SMC Flood Control District

*Prepared for:*

**San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)**

**555 County Center, Redwood City, CA 94063**

**A Program of the City/County Association of Governments (C/CAG)**

*Prepared by:*

**EOA, Inc.**

**1410 Jackson St., Oakland, CA 94610**



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**Table E-1. Water Year 2019 Creek Status Monitoring Station Summary Table**

In compliance with Provision C.8.h.v(1), this table of all creek status monitoring stations sampled in Water Year 2019 is provided immediately following the Table of Contents.

| Map ID <sup>1</sup> | Station ID | Bayside or Coastside | Watershed           | Creek Name        | Land Use | Latitude | Longitude  | Probabilistic                        | Targeted |                       |                   |                       |                     |
|---------------------|------------|----------------------|---------------------|-------------------|----------|----------|------------|--------------------------------------|----------|-----------------------|-------------------|-----------------------|---------------------|
|                     |            |                      |                     |                   |          |          |            | Bioassessment, Nutrients, General WQ | Chlorine | Pesticides & Toxicity | Temp <sup>2</sup> | Cont. WQ <sup>3</sup> | Pathogen Indicators |
| 030                 | 202TUN030  | Coastal              | Tunitas Creek       | Tunitas Creek     | NU       | 37.37940 | -122.3748  | X                                    | X        |                       | X                 | X                     |                     |
| 040                 | 202TUN040  | Coastal              | Tunitas Creek       | Tunitas Creek     | NU       | 37.38847 | -122.3709  | X                                    | X        |                       |                   | X                     |                     |
| 005                 | 204BEL005  | Bayside              | Belmont Creek       | Belmont Creek     | U        | 37.51778 | -122.26914 | X                                    | X        |                       |                   |                       |                     |
| 4280                | 204R04280  | Bayside              | Belmont Creek       | Belmont Creek     | U        | 37.45434 | -122.20118 | X                                    | X        |                       |                   |                       |                     |
| 4428                | 204R04428  | Bayside              | Cordilleras Creek   | Cordilleras Creek | U        | 37.55466 | -122.35632 | X                                    | X        |                       |                   |                       |                     |
| 4160                | 204R04160  | Bayside              | Burlingame Creek    | Burlingame Creek  | U        | 37.51480 | -122.28340 | X                                    | X        |                       |                   |                       |                     |
| 3635                | 204R03635  | Bayside              | Atherton Creek      | Atherton Creek    | U        | 37.47975 | -122.25986 | X                                    | X        |                       |                   |                       |                     |
| 4600                | 204R04600  | Bayside              | Atherton Creek      | Atherton Creek    | U        | 37.43671 | -122.21467 | X                                    | X        |                       |                   |                       |                     |
| 4056                | 205R04056  | Bayside              | San Francisquito Cr | Dry Creek         | U        | 37.43885 | -122.26506 | X                                    | X        |                       |                   |                       |                     |
| 5044                | 205R05044  | Bayside              | San Francisquito Cr | Dry Creek         | U        | 37.42803 | -122.25148 | X                                    | X        |                       |                   |                       |                     |
| 010                 | 204PUL010  | Bayside              | Pulgas Creek        | Pulgas Creek      | U        | 37.50195 | -122.25238 |                                      |          | X                     |                   |                       |                     |
| 138                 | 202PES138  | Coastside            | Pescadero Creek     | Pescadero Creek   | NU       | 37.27410 | -122.28860 |                                      |          |                       |                   |                       | X                   |
| 142                 | 202PES142  | Coastside            | Pescadero Creek     | McCormick Creek   | NU       | 37.27757 | -122.28635 |                                      |          |                       |                   |                       | X                   |
| 144                 | 202PES144  | Coastside            | Pescadero Creek     | Pescadero Creek   | NU       | 37.27592 | -122.28550 |                                      |          |                       |                   |                       | X                   |
| 150                 | 202PES150  | Coastside            | Pescadero Creek     | Jones Gulch       | NU       | 37.27424 | -122.26811 |                                      |          |                       |                   |                       | X                   |
| 154                 | 202PES154  | Coastside            | Pescadero Creek     | Pescadero Creek   | NU       | 37.27446 | -122.26798 |                                      |          |                       |                   |                       | X                   |
| 5                   | 202TUN005  | Coastside            | Tunitas Creek       | Tunitas Creek     | NU       | 37.36202 | -122.39062 |                                      |          |                       | X                 |                       |                     |
| 25                  | 202TUN025  | Coastside            | Tunitas Creek       | Tunitas Creek     | NU       | 37.37735 | -122.37413 |                                      |          |                       | X                 |                       |                     |
| 35                  | 202TUN035  | Coastside            | Tunitas Creek       | Tunitas Creek     | NU       | 37.38425 | -122.37323 |                                      |          |                       | X                 |                       |                     |
| 60                  | 202TUN060  | Coastside            | Tunitas Creek       | Tunitas Creek     | NU       | 37.40476 | -122.35711 |                                      |          |                       | X                 |                       |                     |

**Notes:**

U = urban, NU = non-urban

<sup>1</sup> Map ID applies to Figure 1.1 in Part A of this Integrated Monitoring Report

<sup>2</sup> Temperature monitoring was conducted continuously (i.e., hourly) April through September.

<sup>3</sup> Continuous water quality monitoring (temperature, dissolved oxygen, pH, specific conductivity) was conducted during two 2-week periods (spring and late summer).

## INTRODUCTION AND BACKGROUND

This Integrated Monitoring Report (IMR), Water Year<sup>1</sup> (WY) 2014 through WY 2019, was prepared by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP). SMCWPPP is a program of the City/County Association of Governments (C/CAG) of San Mateo County. Each incorporated city and town in the county and the County of San Mateo share a common National Pollutant Discharge Elimination System (NPDES) stormwater permit for Bay Area municipalities referred to as the Municipal Regional Permit (MRP). The MRP was first adopted by the San Francisco Regional Water Quality Control Board (Regional Water Board) on October 14, 2009 as Order R2-2009-0074 (SFRWQCB 2009; referred to as MRP 1.0). On November 19, 2015, the Regional Water Board updated and reissued the MRP as Order R2-2015-0049 (SFRWQCB 2015; referred to as MRP 2.0).

This IMR, including all appendices and attachments, fulfills the requirements of Provision C.8.h.v. of MRP 2.0 for comprehensively interpreting and reporting all monitoring data collected since the previous IMR. The previous IMR included data collected during WY 2012 and 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 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 Pollutant of Concern (POC) monitoring and related activities conducted during WY 2016 – WY 2019.

On behalf of San Mateo County MRP Permittees and pursuant to Provision C.8.h.ii of MRP 2.0, SMCWPPP also submitted the data presented in this report in electronic SWAMP-comparable formats to the Regional Water Board.

Provision C.8.a (Compliance Options) of the MRP allows Permittees to address monitoring requirements through a “regional collaborative effort,” their countywide stormwater program, and/or individually. On behalf of San Mateo County Permittees, SMCWPPP conducts creek water quality monitoring and monitoring projects in collaboration with the Bay Area Stormwater Management Agency Association (BASMAA) Regional Monitoring Coalition (RMC), and actively participates in the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP), which focuses on assessing Bay water quality and associated impacts.

Monitoring data were collected in accordance with the BASMAA RMC Quality Assurance Project Plan (QAPP; BASMAA 2016a) and the BASMAA RMC Standard Operating Procedures (SOPs; BASMAA 2016b). Where applicable, and in compliance with Provision C.8.b. of MRP 2.0, methods described in the QAPP and SOP are comparable with methods specified by the California Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Program Plan (QAPrP).

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<sup>1</sup> 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.

The IMR consists of five “Parts” that address the major sub-provisions of MRP Provision C.8 (Water Quality Monitoring). The following sections summarize each Part and, in compliance with Provision C.8.h.v(4), include recommendations for monitoring during future permit terms:

- Part A: San Francisco Estuary Receiving Water Monitoring
- Part B: Creek Status and Pesticides & Toxicity Monitoring
- Part C: Stressor/Source Identification Projects
- Part D: Pollutants of Concern Monitoring
- Part E: Budget Summary

## **PART A: SAN FRANCISCO ESTUARY RECEIVING WATER MONITORING**

In accordance with Provision C.8.b. of MRP 1.0 and Provision C.8.c. of MRP 2.0, Permittees are required to provide financial contributions towards implementing an Estuary receiving water monitoring program on an annual basis that, at a minimum, is equivalent to the monitoring conducted via the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP). SMCWPPP Permittees comply with this provision by making financial contributions to the RMP via SMCWPPP. Additionally, SMCWPPP Program staff and other BASMAA RMC representatives actively participate in RMP committees, workgroups, and strategy teams, such as the Small Tributaries Loading Strategy (STLS) to help oversee RMP activities and provide input, consistent with MRP Permittee interests.

## **PART B: CREEK STATUS AND PESTICIDES & TOXICITY MONITORING**

Part B of the IMR comprehensively interprets and reports all Creek Status and Pesticides & Toxicity monitoring data collected since the previous IMR (SMCWPPP 2014). As such, Part B includes data collected during WY 2014 through WY 2019, with bioassessment and chlorine data also inclusive of WY 2012 and WY 2013.

The RMC’s creek status monitoring strategy includes both a regional ambient/probabilistic monitoring design and a local “targeted” monitoring design. The probabilistic monitoring design selects sites randomly and was developed to remove bias from site selection such that ecosystem conditions can be objectively assessed on local (i.e., San Mateo County) and regional (i.e., RMC) scales. The targeted monitoring design focuses on sites selected based on the presence of significant fish and wildlife resources as well as historical and/or recent indications of water quality concerns. Monitoring results are compared to “triggers” listed in Provision C.8.d. of MRP 2.0. Some triggers are equivalent to regulatory Water Quality Objectives (WQOs); others are not WQOs but are thresholds above (or below) which potential impacts to aquatic life or other beneficial uses may occur. Sites where triggers are exceeded (or not met) are considered for future stressor/source identification (SSID) projects.

### **Bioassessment**

Bioassessments include the collection of benthic macroinvertebrate and algae samples, physical habitat measurements, collection of grab creek water samples for water chemistry (i.e., nutrient analyses), and measurement of general water quality parameters using a pre-calibrated multi-parameter field probe. During WY 2012 - WY 2019, SMCWPPP conducted biological assessments at 80 sites in San Mateo County. An additional 10 sites were monitored by the Regional Water Board for a total of 90 sites in the

County, of which 87 were selected using the probabilistic design and three were targeted. The California Stream Condition Index (CSCI), a statewide tool that translates benthic macroinvertebrate data into an overall measure of stream health, was used to assess biological condition:

- Of the 90 bioassessment sites (including three targeted sites), 60 received CSCI scores that were below the MRP trigger (0.795), corresponding to the two lower condition categories (*likely altered* and *very likely altered*). Fifty-five of the 60 low-scoring sites were classified as urban. The proportion of sites with good biological conditions was much higher in watersheds draining to the Pacific Ocean compared to sites located in watersheds draining to San Francisco Bay. Figure E-1 shows condition categories based upon CSCI scores at the 90 bioassessment sites.
- Cumulative frequency functions for CSCI scores indicate there is a 48% probability that a random site in San Mateo County will have a CSCI score below 0.795 (i.e., *likely altered* or *very likely altered*). There is an 86% probability that a random *urban* site in San Mateo County will have a CSCI score below 0.795 and there is a 22% probability that a random *non-urban* site will have a CSCI score below 0.795.

Ancillary parameters, such as physical habitat, nutrient concentrations, and general water quality measurements, along with land use data, were analyzed using Spearman's rank correlation and random forest models to identify stressors that are likely to pose the greatest risk to stream health:

- The random forest model of CSCI scores indicates that landscape, habitat, and water-quality stressors, specifically road density, impervious area, and total nitrogen, were the best predictors of biological condition. Results of the San Mateo stressor assessment differ from an assessment of the RMC regional dataset from WY 2012 – WY 2016. Although both San Mateo and regional CSCI scores are strongly influenced by imperviousness in the contributing area, the regional assessment did not identify nutrients as an important predictor of CSCI scores (BASMAA 2019).
- It should be noted that despite these apparent relationships to stressors, these analyses do not determine causation, particularly as stressors from habitat/landscape factors are often present at the same sites that exhibit water quality impairment.

## Continuous Temperature and Water Quality Monitoring

Continuous monitoring of water temperature and general water quality in WY 2014 through WY 2019 was conducted in compliance with Provisions C.8.c. of MRP 1.0 and C.8.d.iii. – iv. of MRP 2.0. Hourly temperature measurements were recorded at a minimum of four sites each year from April through September. Continuous (15-minute) general water quality measurements (pH, DO, specific conductance, temperature) were recorded at two sites each year during two 2-week periods in spring (Event 1) and summer (Event 2). Monitoring stations (Figure E-2) were selected based on the presence of significant fish and wildlife resources as well as historical and/or recent indications of water quality concerns. The same sites were often monitored for multiple years to gain a better understanding of the range of water quality conditions that may occur over time. In some years, continuous monitoring data were used to support or follow-up on SSID investigations.



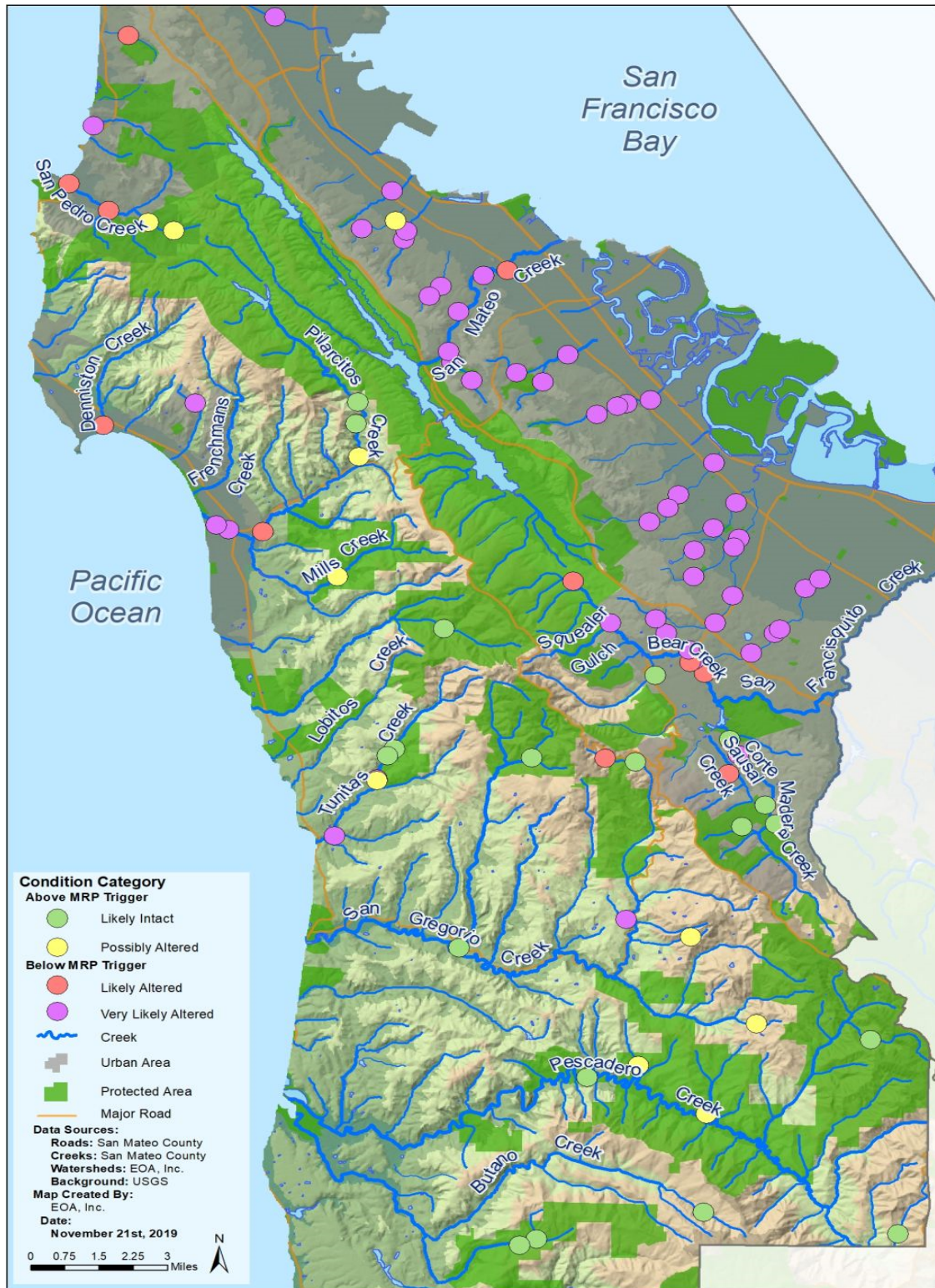


Figure E-1. Biological condition category based upon CSCI scores from 90 bioassessment sites in San Mateo County, WY 2012 – WY 2019.



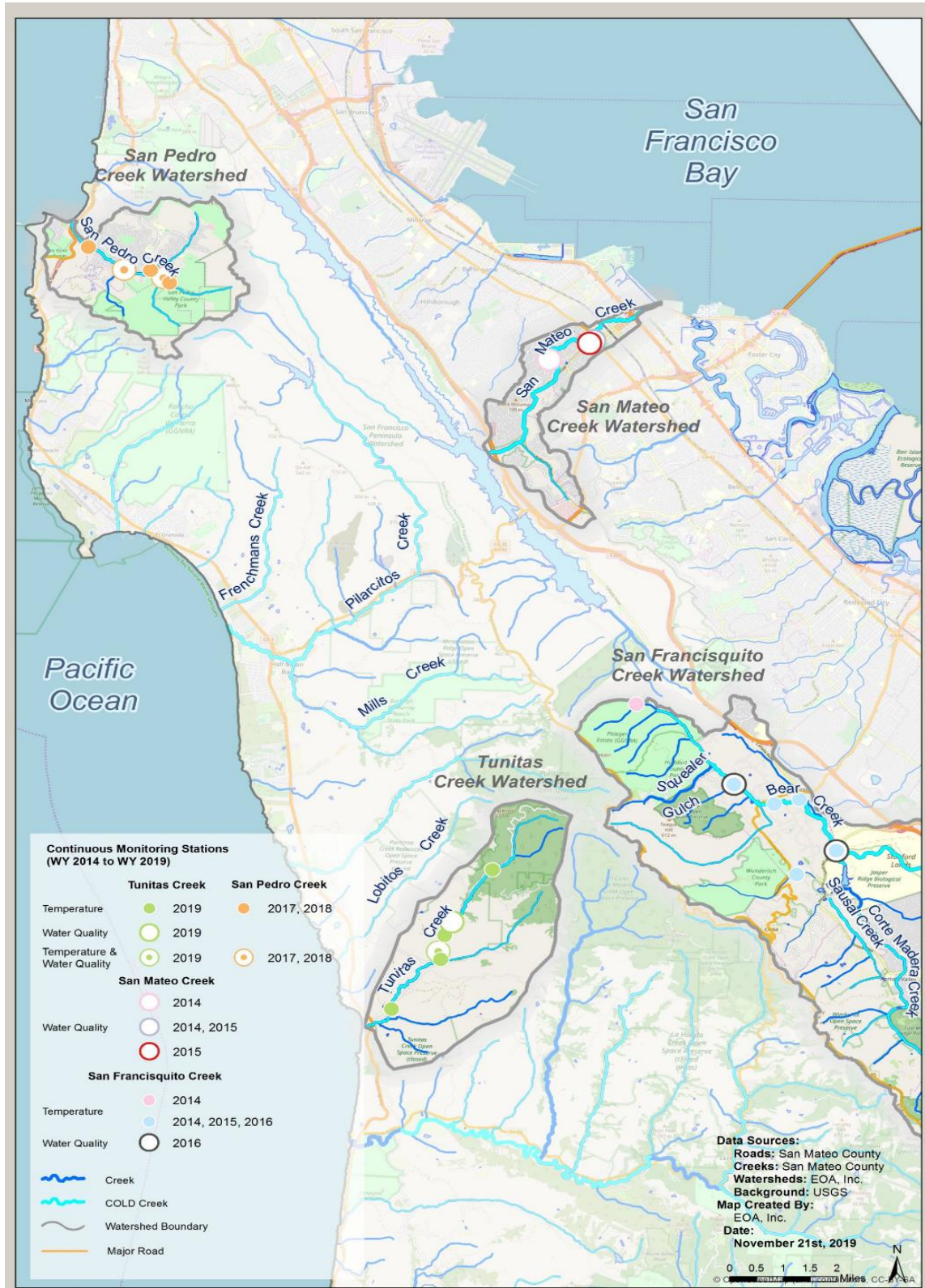


Figure E-2. Continuous temperature and water quality stations in San Mateo County, WY 2014 – WY 2019.

Overall, continuous monitoring results typically indicate that temperature and specific conductivity increase in the downstream direction, which in San Mateo County watersheds is characterized by increasing urbanization. In addition, the MRP maximum weekly average temperature (MWAT) trigger threshold of 17°C was often exceeded. These exceedances resulted in sites being placed on the list of candidate SSID projects, but were usually explained by lack of continuous flow in the late summer. Other locations where the MWAT trigger was exceeded were in reaches that cold-water fish migrate through rather than reside or rear in.

## **Pathogen Indicator Monitoring**

From WY 2014 through WY 2019, in compliance with Provisions C.8.c. of MRP 1.0 and C.8.d.v. of MRP 2.0, SMCWPPP collected five grab samples per year for pathogen indicator bacteria analysis. Monitoring was conducted in three areas at sites selected to inform bacteria SSID investigations and/or follow-up on reports (e.g., by San Mateo County Parks staff) of potential high bacteria in creeks where water contact recreation (REC-1) is likely. The overall goal of pathogen indicator monitoring is to assess whether WQOs are being met and whether creeks are supportive of REC-1 Beneficial Uses.

Overall, pathogen indicator monitoring results from San Mateo County were highly variable and sometimes exceed WQOs. It is important to recognize that pathogen indicators do not directly represent actual pathogen concentrations and do not distinguish among sources of bacteria. Sources of pathogen indicator bacteria include wildlife, livestock, pets, leaking septic systems/sanitary sewers, homeless encampments, and regrowth of bacteria in biofilms. Bacteria from human sources are more likely to be associated with human health risks during water contact recreation. In addition, WQOs were derived based upon studies conducted at bathing beaches, not creeks where lower levels of human exposure generally occur. As a result, the comparison of pathogen indicator results to WQOs may not be appropriate and should be interpreted cautiously.

## **Chlorine Monitoring**

From WY 2012 through WY 2019, in compliance with Provision C.8.c of MRP 1.0 and Provision C.8.d.ii of MRP 2.0, SMCWPPP collected field measurements of total and free chlorine residual in creeks where bioassessments were conducted.

While chlorine residual has generally not been a concern in San Mateo County creeks, WY 2019 and prior monitoring results suggest there are occasional trigger exceedances of free chlorine and/or total chlorine residual in the County. Trigger exceedances may be the result of one-time potable water discharges, and it is generally challenging to determine the source of elevated chlorine from such episodic discharges. Furthermore, chlorine in surface waters can dissipate from volatilization and reaction with sediment and organic matter. Over the past eight years of monitoring (WY 2012 – WY 2019), of the 80 stations where chlorine was measured, a total of 11 exceeded the MRP chlorine trigger. The appropriate municipalities were informed of the exceedances at the time they happened but efforts by municipal staff to track down the sources were generally unsuccessful. Chlorine sources are generally transient and challenging to trace.

## **Pesticides & Toxicity Monitoring**

Toxicity testing, sediment chemistry monitoring, and water column pesticides monitoring, collectively referred to as pesticides and toxicity monitoring, was conducted during WY 2014 through WY 2019 in

compliance with Provisions C.8.c of MRP 1.0 and C.8.g of MRP 2.0. There were slight differences between the two permit terms regarding the required number of samples, toxicity test organisms, chemical constituents, and MRP triggers.

Toxicity and chemistry data from WY 2014 through WY 2019 were reviewed for overall findings and evidence of trends. There were 18 test results that had significant toxicity, but with a Percent Effect that did not exceed the MRP trigger thresholds. A majority of these toxicity results were found in water samples and were associated with either *C. dubia* reproduction (six samples), a chronic toxicity endpoint, or *H. azteca* survival (six samples), an acute toxicity endpoint. Five of the six water samples with toxicity to *H. azteca* were collected during wet season sampling events, suggesting that stormwater runoff is impacting this organism. The water samples with toxicity to *C. dubia* were more evenly divided between wet and dry season sampling events.

Probable effect concentration (PEC) quotients calculated based upon chemical analysis results from sediment samples collected in San Mateo County from WY 2014 through WY 2019 did not exceed the applicable threshold ( $\geq 1.0$ ) for any analytes except chromium and nickel. Excluding these metals which occur naturally in San Mateo County geologic materials, there were four samples with threshold effect concentration (TEC) quotients  $\geq 1.0$ ; the more conservative of the two evaluation criteria. These included legacy insecticide DDT compounds in Laurel Creek and Atherton Creek, individual PAHs in Laurel Creek and Atherton Creek, and copper and zinc in Pulgas Creek. Overall, detection frequencies for pesticides bifenthrin and fipronil were on par with results from the DPR Northern California study (Ensminger 2019) and *H. azteca* toxicity responses were similar to SPoT monitoring in San Mateo Creek (Phillips et al. 2014).

## Creek Status and Pesticides & Toxicity Monitoring Recommendations

Impacts to urban streams identified through creek status monitoring are likely the result of long-term changes in stream hydrology, channel geomorphology, in-stream habitat complexity, and other modifications associated with urban development and associated impervious surfaces, and, to a lesser extent, pollutants typically found in urban watersheds. San Mateo County MRP Permittees are actively implementing many stormwater runoff management programs to address these stressors and pollutants found in local creeks and the Bay, with the goal of protecting these natural resources. Through the continued implementation of MRP-associated and other watershed stewardship programs, SMCWPPP anticipates that channel conditions and water quality in local creeks and the Bay will continue to improve over time.

The following recommendations were developed based upon the Creek Status and Pesticides & Toxicity monitoring data and are directed towards the next iteration of the MRP, which is referred to as MRP 3.0 (MRP 3.0 is currently under development and will likely become effective in WY 2022):

- Transition from the current ambient probabilistic biological condition assessment monitoring design to a targeted design that would focus on specific watersheds or reaches of interest. A targeted watershed approach would provide SMCWPPP and San Mateo County Permittees with more flexibility to evaluate areas that are priority to stakeholders to study, improve, and/or protect and where it is anticipated that the associated resources may be available.

- Continuous monitoring for temperature and general water quality under MRP 1.0 and 2.0 has been an effective tool in supporting SSID studies and evaluating cold water habitat. It could also complement targeted biological condition assessments. Continued implementation of this approach during MRP 3.0 is recommended.
- Pathogen indicator monitoring has generally not been very informative due to the prevalence of uncontrollable sources, such as wildlife, and sources outside the scope of stormwater management programs, such as homeless encampments. Monitoring efforts for pathogen indicators should instead be used to support investigations and implementation plans for bacteria Total Maximum Daily Load (TMDL) or related water quality restoration projects.
- Although chlorine monitoring can be an important tool when needed in investigating fish kills, continued periodic reconnaissance chlorine monitoring is not recommended for MRP 3.0. Chlorine sources are generally transient and challenging to trace. In addition, the most common source, discharges of potable water, is already addressed by other MRP provisions and other NPDES permits.
- The current Pesticides & Toxicity monitoring requirements should remain unchanged until a statewide monitoring program, currently under development by the State Water Board, is in place.

## PART C: STRESSOR/SOURCE IDENTIFICATION (SSID) PROJECTS

SSID projects identify potential sources and/or stressors associated with observed water quality impacts. In compliance with MRP 1.0 (Provision C.8.d.) and MRP 2.0 (Provision C.8.e.), Permittees were required to initiate a minimum number of SSID projects during the permit term. The projects are intended to be oriented towards taking action(s) to alleviate stressors and reduce sources of pollutants. During MRP 1.0 (WY 2012 – WY 2015), SMCWPPP initiated three SSID projects as part of a regional collaborative. During MRP 2.0 (WY 2016 – WY 2019), SMCWPPP initiated one individual project and participated in one regional project. Brief summaries of these projects are as follows:

- The San Mateo Creek Low Dissolved Oxygen (DO) SSID Project was triggered by low DO measurements in 2003 and 2013. However, low concentrations of DO were not observed during implementation of the work plan in WY 2014, WY 2015, or WY 2016. A new schedule of dry season releases from the upstream Crystal Springs Reservoir appears to alleviate low DO in the impacted creek reaches (SMCWPPP 2016).
- The San Mateo Creek Pathogen Indicator SSID Project was triggered by fecal indicator bacteria (FIB) at densities exceeding WQOs in 2003 and 2012. Several bacteria control measures were recommended including pet waste cleanup outreach and additional measures to improve the sanitary sewer conveyance system (SMCWPPP 2016).
- The Pillar Point Harbor Watershed Pathogen Indicator SSID Project investigated FIB sources from the MS4 to receiving waters. Results showed that FIB densities are highly variable and do not follow predictable patterns. Furthermore, very few human or dog markers were present, suggesting that FIB conveyed by the MS4 may be challenging to control. However, the data available at this time are limited, introducing uncertainty into the conclusions reached to-date. The project report recommended additional outreach and measures to reduce standing water in the MS4 which is assumed to create conditions suitable for biofilm regrowth of FIB. The final project report was submitted with this IMR.



- Electrical Utilities as a Potential PCBs Source to Stormwater in the San Francisco Bay Area is a Regional SSID Project. PCBs monitoring by the BASMAA RMC partners and the RMP suggests that diffuse sources of PCBs are present throughout the region. One potential diffuse source is releases and spills from electrical utility equipment. The work plan, developed in WY 2018, presents a framework to investigate electrical utility equipment as a source of PCBs to urban stormwater runoff and identify appropriate actions and control measures to reduce the water quality impacts of this source. The RMC partners are currently gathering information from municipally owned electrical utilities to improve current estimates of PCBs loadings to MS4s and to identify opportunities to reduce releases (e.g., develop improved spill response and reporting procedures).

Overall, Permittees have found that SSID monitoring projects provided valuable information. Although the SSID studies have often found that the primary stressor sources are unrelated to municipal stormwater runoff and/or the source/stressor identification effort is inconclusive, they have resulted in a greater understanding of hydrology, water quality, and land use in the targeted watersheds, and the findings inform other aspects of stormwater runoff management. Continuation of SSID monitoring projects in the next permit should be considered, with a level-of-effort that does not increase the overall costs of Provision C.8 monitoring beyond current costs.

## **PART D: POLLUTANTS OF CONCERN (POC) MONITORING**

In compliance with MRP Provision C.8.f. of MRP 2.0, SMCWPPP conducted POC monitoring for PCBs, mercury, copper, and nutrients over the permit term. The MRP-required yearly minimum number of samples was met or exceeded for all POCs. In addition, the MRP-required minimum number of samples addressing each Management Question specified in Provision C.8.f. by the end of year four of the permit term was met or exceeded for all POCs.

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).

### **PCBs and Mercury**

This section 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:

- SMCWPPP'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.
- 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. 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<sup>2</sup> 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 (Figure E-3). 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).

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<sup>2</sup> Not including about 30 additional stormwater runoff samples collected at the Pulgas Creek pump station stormwater loading station.

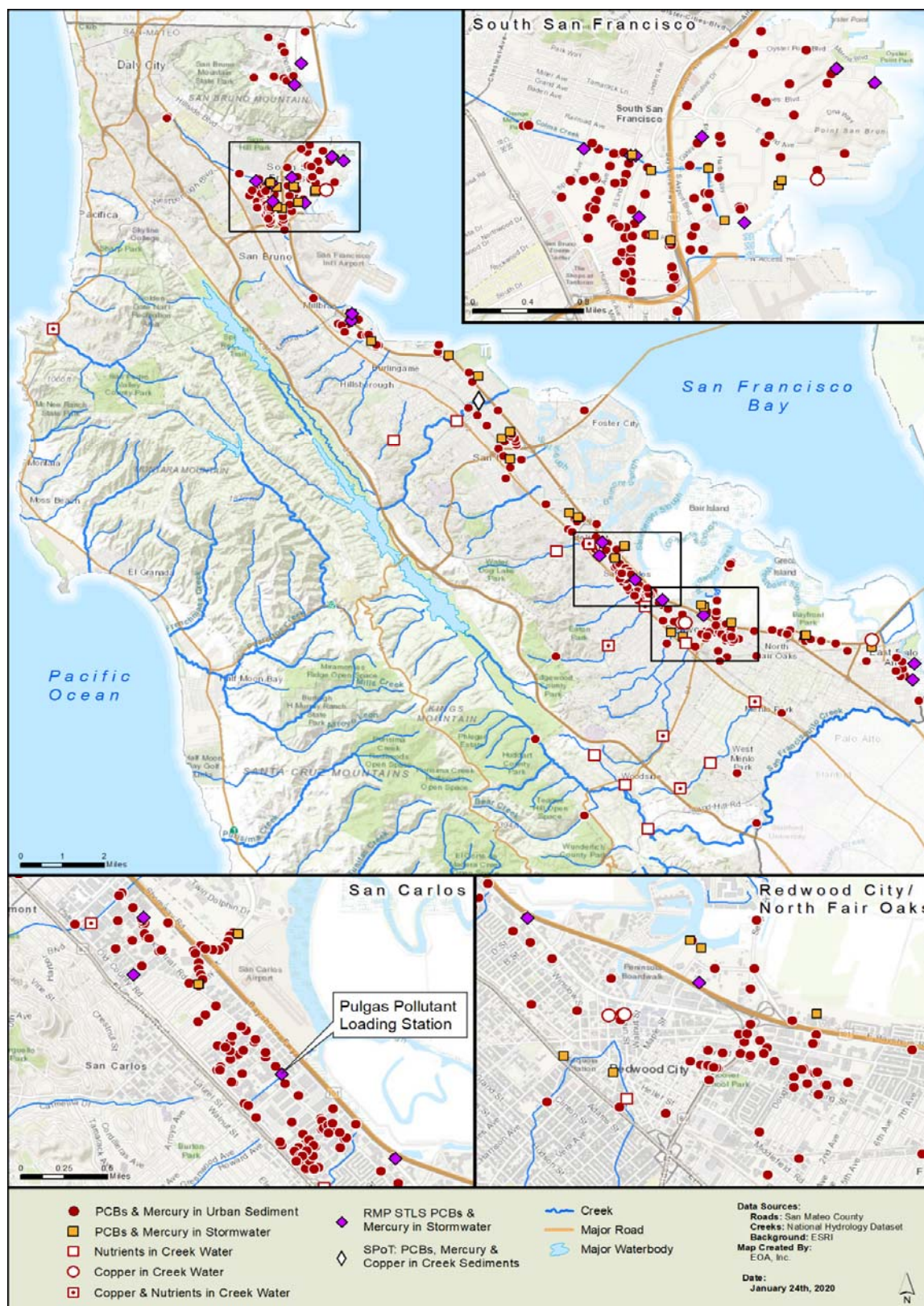
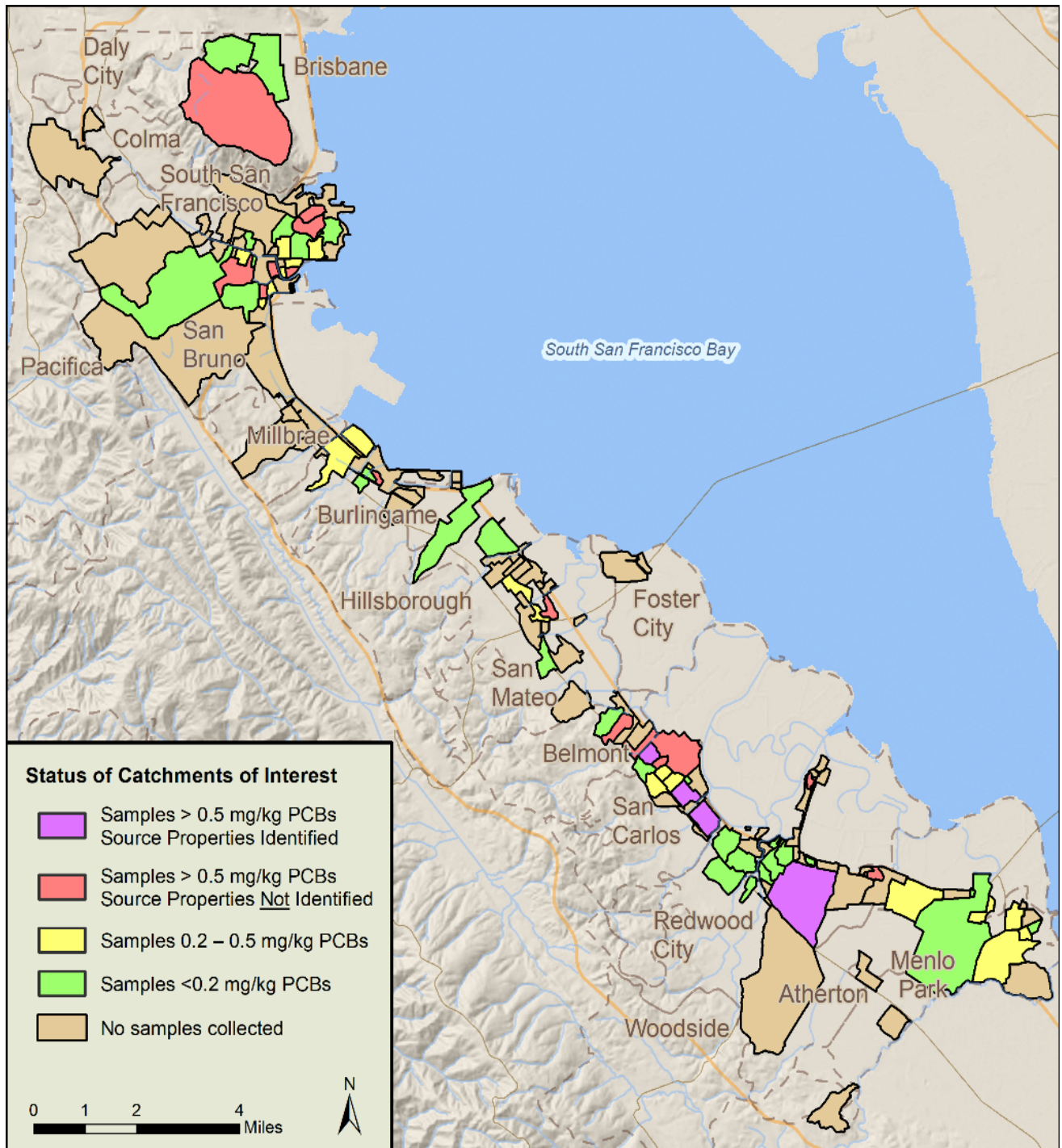


Figure E-3. POC Monitoring Stations in San Mateo County (includes all PCBs and mercury samples from early 2000s to WY 2019).

- 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.
- 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.
- 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. 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 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 E-4 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.
- 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 SMCWPPP's FY 2017/18 Annual Report, submitted to the Regional Water Board on September 30, 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 reports that are appended to SMCWPPP's WY 2018 UCMR.



**Figure E-4. 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.**



- 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 Priority Margin Units (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, SMCWPPP 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.

## Copper

In WY 2019, SMCWPPP 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.

SMCWPPP 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 SMCWPPP. 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. SMCWPPP 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.

## Nutrients

In WY 2019, SMCWPPP 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, SMCWPPP 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, SMCWPPP 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<sup>3</sup> 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).

## Emerging Contaminants

During MRP 2.0, SMCWPPP has leveraged its participation in these RMP special studies to satisfy the POC monitoring requirement for Contaminants of Emerging Concern (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

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<sup>3</sup> [https://www.waterboards.ca.gov/water\\_issues/programs/biostimulatory\\_substances\\_biointegrity/](https://www.waterboards.ca.gov/water_issues/programs/biostimulatory_substances_biointegrity/)

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.

## PART E: MONITORING BUDGET SUMMARY

SMCWPPP developed a water quality monitoring cost summary for San Mateo County, WYs 2014 through 2019, in accordance with the requirements of Provision C.8.h.v(4) of MRP 2.0, which requires the IMR to include a “budget summary for each monitoring requirement”. Water quality monitoring in compliance with MRP 2.0 Provision C.8 is conducted by SMCWPPP on behalf of San Mateo County MRP Permittees. This report summarizes the approximate budget expended by SMCWPPP for its water quality monitoring conducted from WY 2014 through WY 2019, a six-year period. The previous SMCWPPP IMR was submitted to the Regional Water Board in March 2014 and summarized approximate costs for water quality monitoring conducted by SMCWPPP during WY 2012 and WY 2013 in compliance with MRP 1.0.

Water quality monitoring required by Provision C.8 of MRP 2.0 is intended to assess the condition of water quality in Bay Area receiving waters (creeks and Bay); identify and prioritize stormwater associated impacts, stressors, sources, and loads; identify appropriate management actions; and detect trends in water quality over time and the effects of stormwater control implementation. SMCWPPP conducts creek water quality monitoring and monitoring projects in San Mateo County in collaboration with the RMC, and actively participates in the RMP, which focuses on assessing Bay water quality and associated impacts. This report provides a summary of monitoring costs expended by SMCWPPP to comply with MRP 2.0 and provides qualitative estimates of the water quality benefits realized.

Table E-2 presents approximate costs expended by SMCWPPP to comply with Provision C.8 of MRP 2.0 during WYs 2014 – 2019.<sup>4</sup> Costs presented include all aspects of implementing Provision C.8, including:

- Monitoring program and project planning,
- Monitoring program coordination and management,
- Fieldwork to collect data,
- Laboratory analysis,
- Quality assurance / quality control (QA/QC),
- Data evaluation, analysis, and interpretation,

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<sup>4</sup> Costs presented do not include costs incurred by Permittees to implement other water quality monitoring activities and programs required by other NPDES permits issued to Permittees (e.g., POTW monitoring, aquatic pesticide application monitoring, stream maintenance program monitoring).

- Data management, and
- Data and reporting.

Direct financial contributions to the RMP by SMCWPPP on behalf of San Mateo County Permittees and the NPDES permit fee surcharges that were paid by Permittees during that time frame (and used by the State and/or Regional Water Board to fund its Surface Water Ambient Monitoring Program (SWAMP)) are also included in the reported costs.

The costs listed in Table E-2 show the considerable resources (~\$3.7 million) that SMCWPPP expended over the course of WYs 2014 – 2019 towards complying with water quality monitoring requirements described in MRP 2.0 Provision C.8. Average annual costs to San Mateo County Permittees during this six-year timeframe were roughly \$620,000. The costs are associated with the following monitoring activities:

- San Francisco Bay Estuary Receiving Water Monitoring (RMP) – Permittee monetary contributions and SMCWPPP and Permittee staff time spent actively participating in the RMP, including participation in several workgroups and strategy teams, in compliance with MRP 2.0 Provision C.8.c.
- Creek Status Monitoring – Preparation, coordination, management and implementation of the SMCWPPP's Creek Status Monitoring Program, which is implemented in compliance with MRP 2.0 Provision C.8.d.
- Stressor/Source Identification (SSID) Projects – Preparation, coordination, management and implementation of SSID projects that were implemented in compliance with MRP 2.0 Provision C.8.e.
- Pollutants of Concern Monitoring – Preparation, coordination, management and implementation of the SMCWPPP Pollutants of Concern (POC) Monitoring Program that was implemented in compliance with MRP 2.0 Provision C.8.f., including investigations conducted to attempt to find properties that are sources of PCBs to the storm drain system.
- Pesticides and Toxicity Monitoring – Preparation, coordination, management and implementation of the SMCWPPP Pesticides and Toxicity Monitoring Program that was implemented in compliance with MRP 2.0 Provision C.8.g.
- Data Management & QA/QC – Coordination and implementation of the SMCWPPP Water Quality Monitoring Data Management and Quality Assurance Program, which implements all aspect of data management and quality assurance procedures required by MRP 2.0 Provision C.8.b, and consistent with approved Standard Operating Procedures (SOPs) and Quality Assurance Project Plans (QAPPs).
- Reporting – Analysis, interpretation and reporting of all data collected via the SMCWPPP's Creek Status Monitoring, SSID projects, POC Monitoring, and Pesticides and Toxicity Monitoring Programs, consistent with MRP 2.0 Provision C.8.h.
- NPDES Surcharge: SWAMP – Monetary contributions provided by Permittees to the State of California as part of the SWAMP surcharge issued to Permittee as part of their annual NPDES fee.

**Table E-2. Water quality monitoring cost summary for implementing MRP Provision C.8 during WYs 2014 – 2019.**

| MRP 2.0 Sub-provision |  | Approximate<br>Total Costs<br>WYs 2014 - 2019<br>(6 years) | Approximate<br>Average Costs<br>per Water Year | Percent of<br>Total Costs |
|-----------------------|--|--|--|---------------------------|
| C.8.b                 | Data Management & Quality Assurance/Quality Control (QA/QC)        | \$200,000  | \$33,333                                       | 5%                        |
| C.8.c                 | San Francisco Bay Estuary Receiving Water Monitoring (RMP)         | \$600,000  | \$100,000                                      | 16%                       |
| C.8.d                 | Creek Status Monitoring  | \$1,300,000  | \$216,667                                      | 35%                       |
| C.8.e                 | Stressor/Source Identification (SSID) Projects                     | \$220,000  | \$36,667                                       | 6%                        |
| C.8.f                 | Pollutants of Concern (POC) Monitoring                             | \$800,000  | \$133,333                                      | 22%                       |
| C.8.g                 | Pesticides and Toxicity Monitoring                                 | \$200,000  | \$33,333                                       | 5%                        |
| C.8.h                 | Reporting  | \$250,000  | \$41,667                                       | 7%                        |
| NA                    | NPDES Surcharge - Surface Water Ambient Monitoring Program (SWAMP) | \$150,000  | \$25,000                                       | 4%                        |
| <b>Total</b>          |  | <b>\$3,720,000</b>   | <b>\$620,000</b>                               | <b>100%</b>               |

Note: see above bullets for the activities that are included in each monitoring line item.

SMCWPPP's water quality monitoring program generates data designed to answer core management questions outlined in MRP 2.0. In many instances, these management questions are further delineated into scientific monitoring questions, which assist in developing and implementing appropriate monitoring designs. This section provides a qualitative cost-benefit evaluation of the water quality monitoring data collection programs implemented by SMCWPPP to comply with MRP Provision C.8. The cost-benefit evaluation was conducted based on the ability of SMCWPPP to answer core management and scientific monitoring questions using the water quality monitoring data collected. Table E-3 presents the results of the evaluation, which informed SMCWPPP's recommendations for water quality monitoring under MRP 3.0.



Table E-3. Qualitative cost-benefit evaluation of MRP 2.0 Provision C.8 water quality monitoring.

| MRP 2.0 Sub-provision |  | Relative Cost of Implementing (\$ - \$\$\$\$) <sup>3</sup> | Benefit Towards Answering Core Management Questions (★ - ★★★★★) | Evaluation Summary   |
|-----------------------|--|--|---|--|
| C.8.c                 | San Francisco Bay Estuary Receiving Water Monitoring (RMP) | \$\$\$\$   | ★★★   | Contributions to the RMP provided useful information on the status and trends of water quality in the Bay and provided supplemental information to help SMCWPPP identify PCBs and mercury source areas for management actions. Attempts to focus RMP-led monitoring on high priority issues remains an on-going challenge due to competing interests and information needs. Overall, the RMP provides useful information to track water quality conditions in the Bay and help inform broad-scale management and policy directions based on science, but at a relatively high cost.  |
| C.8.d                 | Creek Status Monitoring                                    | \$\$\$\$   | ★★★   | Creek status monitoring continued to provide useful information on the status of water quality in urban creeks that receive stormwater discharges, and the biological condition of those creeks. Many parameters were monitored, however, the utility of the data that the MRP requires to be collected is variable among parameters. Some parameters have provided valuable, baseline data or helped identify concerns that should be addressed. Other parameters were less useful and did not directly assist stormwater managers in validating, refining, or adjusting current practices. The high relative costs and the variability in the usefulness of data collected via this provision suggest that refinements are needed to improve the cost-effectiveness of Creek Status Monitoring during MRP 3.0. |
| C.8.e                 | Stressor/Source Identification (SSID) Projects             | \$\$   | ★★★   | SSID studies have provided useful information that is needed to help better define potential water quality concerns and identify sources of pollutants or environmental stress occurring in San Mateo County streams. SSID projects have been challenging due to the lack of methods available to differentiate the causes of stress and sources of pollutants/stress, due to the complex and overlapping watershed/runoff processes observed in streams. The relatively moderate costs and moderate/high benefits of data collected via this provision suggest that SSID projects are cost-effective. However, refinements are needed to the study methods and endpoint expectations to improve the utility of the data collected via Provision C.8.e during MRP 3.0.   |

| MRP 2.0 Sub-provision |  | Relative Cost of Implementing (\$ - \$\$\$\$) <sup>3</sup> | Benefit Towards Answering Core Management Questions (★ - ★★★★★) | Evaluation Summary   |
|-----------------------|--|--|---|--|
| C.8.f                 | Pollutants of Concern (POC) Monitoring                             | \$\$\$\$   | ★★★   | Monitoring conducted under Provision C.8.f provided valuable data on potential sources of PCBs in Watershed Management Areas (WMAs) and helped prioritize land areas for further source property evaluations. Additionally, the data collected under this provision helped further understand the geographical distribution of POCs in the urban portion of San Mateo County that drains to the Bay. Although the costs associated with POC monitoring are relatively high, the PCBs data collected during MRP 2.0 have helped to characterize the urban landscape and identify some source areas. However, recent monitoring data 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. Thus PCBs monitoring would show a lower benefit towards answering core management questions (one or two stars) if evaluated solely on potential future benefit. In addition, nutrient and copper monitoring data collected during MRP 2.0 were not particularly useful in answering monitoring questions associated with these pollutants and would show a lower benefit towards answering core management questions (one or two stars) if evaluated individually. |
| C.8.g                 | Pesticides and Toxicity Monitoring                                 | \$\$   | ★★  | SMCWPPP expended a relatively low level of budget for Pesticides and Toxicity Monitoring during MRP 2.0. Data collected via the statewide SPoT program provided important information on trends in pesticides and toxicity in stream sediments over time. Low costs and low/moderate benefits suggest that refinements are needed to improve the cost-benefits of the data collected via Provision C.8.g during MRP 3.0. Currently a statewide effort to develop an Urban Pesticide Coordinated Monitoring Program is underway, and SMCWPPP is actively participating in this process. For SMCWPPP, the goal is to stabilize costs for pesticide/toxicity monitoring, while improving and enhancing coordination of data collection efforts on a statewide basis with the California Department of Pesticide Regulation (DRP) to fill important information gaps that will improve the regulation of pesticides that effect stormwater quality.  |
| NA                    | NPDES Surcharge - Surface Water Ambient Monitoring Program (SWAMP) | \$   | ★   | The costs to SMCWPPP for this program were relatively low, but benefits to local stormwater programs and managers were not readily apparent.   |

<sup>3</sup> Qualitative cost categories were based on the relative percentage of total costs for each major monitoring component shown above, with data management, QA/QC and reporting costs incorporated into the appropriate component costs. Cost categories were defined as: \$ = <5%, \$\$ = 5 - 10%; \$\$\$ = 10 - 15%; \$\$\$\$ = >15%.

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