Contra Costa Clean Water Program

Pollutants of Concern Monitoring Report

Submitted to the San Francisco Bay and Central Valley Regional Water Quality Control Boards

In Compliance with NPDES Permit Provision C.8.h.iv.(1)
Municipal Regional Stormwater Permit (Order No. R2-2022-0018)

March 31, 2023

Prepared for

Contra Costa Clean Water Program
255 Glacier Drive
Martinez, California 94553

Prepared by

KINNETIC
ENVIRONMENTAL

Kinnetic Environmental, Inc.
9057C Soquel Drive, Suite B
Aptos, California 95003

This page intentionally blank.

Contra Costa Clean Water Program

Pollutants of Concern Monitoring Report

March 31, 2023

Prepared for

Contra Costa Clean Water Program
255 Glacier Drive
Martinez, California 94553

Contra Costa Clean Water Program Participants

- Cities of: Antioch, Brentwood, Clayton, Concord, Danville (Town), El Cerrito, Hercules, Lafayette, Martinez, Moraga (Town), Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek
- Contra Costa County
- Contra Costa County Flood Control & Water Conservation District

Prepared by

Kinnetic Environmental, Inc.
9057C Soquel Drive, Suite B
Aptos, California 95003

This page intentionally blank.

Table of Contents

List of Tables

List of Figures

Acronyms and Abbreviations

Bay	San Francisco Bay
CCCWP	Contra Costa Clean Water Program
CVRWQCB	Central Valley Regional Water Quality Control Board
Delta	Sacramento-San Joaquin River Delta
MeHg	methylmercury
mg/kg	milligrams per kilogram
MRL	method reporting limit
MRP	municipal regional stormwater permit
MS4	municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
PCBs	polychlorinated biphenyl congeners
POC	pollutants of concern
ppm	parts per million
PSD	particle size distribution
RL	reporting limit
RMP	Regional Monitoring Program for Water Quality in San Francisco Bay
RPD	relative percent difference
RWL	Receiving Water Limitations
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SSC	suspended sediment concentration
SWAMP	Surface Water Ambient Monitoring Program
TMDL	total maximum daily load
TOC	total organic carbon
USEPA	U.S. Environmental Protection Agency
WWTP	wastewater treatment plant
WY	water year

1 Executive Summary

This report summarizes pollutants of concern (POC) monitoring conducted by Contra Costa Clean Water Program (CCCWP) during water year (WY) 2022 (Oct. 1, 2021-Sept. 30, 2022). This report fulfills Provision C.8.h.iv(1) of the Municipal Regional Stormwater Permit (MRP 3.0), Order R2-2022-0018, effective July1, 2022, issued by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB 2022).

POC monitoring is intended to assess inputs of POCs to San Francisco Bay (the Bay) from local tributaries and urban runoff, assess compliance with receiving waters limitations, assess progress toward achieving wasteload allocations for TMDLs, and to help resolve uncertainties associated with loading estimates for these pollutants.

Under MRP 3.0 Provision C.8.f., POC monitoring addresses six priority information management needs:

1. *Source Identification – identifying or confirming 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 – evaluating the effectiveness or impacts of existing management actions, including compliance with TMDLs and other POC requirements and providing support for planning future management actions*
4. *Loads and Status – providing information on POC loads, concentrations, and presence in local tributaries or urban stormwater discharges*
5. *Trends – evaluating trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time*
6. *Compliance with Receiving Water Limitations – providing information to assess whether receiving water limitations (RWLs) are achieved*

Not all the above information need apply to all POCs; MRP 3.0 Tables 8.1 and 8.2 specify the minimum monitoring types (corresponding to the above information needs), methods, and frequencies of monitoring for each countywide stormwater program for the following POCs or POC groups:

- Polychlorinated biphenyls (PCBs) and total mercury, for Monitoring Types 1-5
- Copper, for Monitoring Type 4
- Emerging contaminants, for Monitoring Type 4
- Ancillary parameters as necessary for each sample to address management questions for the above POCs (e.g., total organic carbon (TOC) concurrent with PCBs where normalizing concentrations in water or sediment; suspended sediment concentration (SSC) for water samples analyzed for PCBs or mercury for Monitoring Types 3, 4 or 5; and hardness in conjunction with copper samples from fresh water)

- Copper, zinc, fecal indicator bacteria, and additional analytes selected for RWLs assessment for Monitoring Type 6

CCCWP Permittees prioritize monitoring pollutants of concern with the goal of identifying reasonable and foreseeable means of achieving load reductions of pollutants required by total maximum daily loads (TMDLs). TMDLs are watershed plans to attain water quality goals developed and established by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). The two most prominent TMDLs in driving stormwater monitoring, source control, and treatment control projects under MRP 3.0 are the mercury TMDL and the polychlorinated biphenyl congeners (PCBs) TMDL. In the interest of protecting the beneficial uses of the surface waters for people and wildlife dependent on the Bay for food, these regulatory plans are intended to reduce concentrations of mercury and PCBs in fish within the Bay.

Mercury and PCBs tend to bind to sediments. The principal means of transport from watersheds is via sediments washed into the Municipal Separate Storm Sewer System (MS4); therefore, an important focus of POC monitoring is identifying the most significant sources of contaminated sediments to the MS4. An additional focus is quantifying the effectiveness of control measures. The highest POC monitoring priorities for Permittees are answering these two basic TMDL implementation questions: where are the most significant sources of pollutants of concern, and what can be done to control them?

During WY 2022, the following monitoring activities were completed:

- PCBs and mercury sediment screening – sampling of street dirt and/or storm drain drop inlet sediment at ten locations adjacent to suspected source properties in old industrial areas throughout the county

Monitoring activities were performed in accordance with CCCWP's Pollutants of Concern Sampling and Analysis Plan and Quality Assurance Project Plan (ADH and AMS 2020a; ADH and AMS 2020b).

The WY 2022 monitoring effort and results are described in Section 2. Section 3 describes the allocation of sampling effort for POC monitoring for the forthcoming water year (WY 2024; Oct. 1, 2023-Sept. 30, 2024).

As discussed in Section 2.3, monitoring and assessment activities relevant to the Delta Methylmercury TMDL for East County Permittees will be reported in a separate section of the POCs report in WY 2023, per Provision C.19.d.iii.(3).

2 Monitoring Accomplished in Water Year 2022

During WY 2022, monitoring activities were performed with respect to MRP 2.0 and the newly promulgated MRP 3.0, to the extent practicable. The following subsections summarize the monitoring efforts and analytical results.

2.1 PCBs and Mercury Sediment Screening – Street Dirt and Storm Drain Drop Inlet Sampling

Ten composite samples of street dirt and storm drain drop inlet sediment were collected in September 2022. Sampling sites were selected based on 1) follow-up to WY 2021 elevated results, and 2) a GIS layer prepared by CCCWP's contractor, Geosyntec Consultants. The GIS layer identifies remaining old industrial properties throughout the county that may not have been thoroughly investigated in the past, and that may have the potential to contribute PCBs to the public right-of-way and the MS4. In generating the old industrial property database, careful consideration was given to the historic land use of each property and to results of previous monitoring efforts.

Table 1 provides site IDs, sampling dates, position coordinates and sampling notes for each location. Table 2 provides analytical test methods, reporting limits and holding times. Table 3 provides results of PCBs, mercury, total organic carbon (TOC), and particle size distribution (PSD) testing. Refer to Figure 1 for the general locations of the sampling sites.

The concentration of PCBs and mercury were nominal in seven of 10 sampling locations selected from the old industrial property database (i.e., Sample IDs KCrk1, LawRav1-LawRav3 MtzCrk1, SanFeCh10, and SanFeCh11). Test results from these seven samples ranged from 0.008 to 0.125 milligram per kilogram (mg/kg) or parts per million (ppm) for total PCBs, and from 0.081 to 0.265 ppm for total mercury (Table 3). Per MRP 3.0 Provisions C.11.c and C.12,c, moderate to high mercury and PCBs soil/sediment concentrations are generally greater than 0.3 ppm mercury and 0.2 ppm PCBs.

Three of 10 sampling locations were selected for follow-up investigation based on a single elevated result in WY 2021 sampling (1.1 ppm total PCBs for Site SanFeCh2) (CCCWP 2022a). The suspected source property on the northeast corner of S 8th Street and Ohio Avenue in Richmond was targeted for WY 2022 confirmatory sampling. Sample SanFeCh2A targeted the entrance to and exit from the property on S 8th Street; Sample SanFeCh2B targeted the perimeter of the property along Ohio Avenue; and Sample SanFeCh9 targeted the property across S 8th Street from the suspected source property (Table 1).

Follow-up sampling and analysis indicated that PCBs and mercury were highly elevated at the property entrance/exit (4.6 ppm PCBs and 1.2 ppm mercury for sample SanFeCh2A) (Table 3). Sample SanFeCh2A from the property perimeter along Ohio Avenue was also elevated (0.69 ppm PCBs and 1.0 ppm mercury). Results for Sample SanFeCh9 across S 8th Street were moderately elevated for PCBs but not mercury (0.250 ppm for PCBs and 0.173 ppm for mercury). These results seem to indicate that the source of POCs is confined to the east side of S 8th Street.

The intended follow-up action to these findings is to work with the City of Richmond to draft a source property referral form for submittal to the SFBRWQCB.

Table 1. Sediment Screening Sampling Locations and Sampling Notes – Water Year 2022

Site ID [1]	Date Sampled	Latitude[2]	Longitude[2]	City/Town	Sampling Notes	Monitoring Types
KCrk1	09/22/22	38.01513	-121.88796	Pittsburg	Sampled adjacent to vacant lot on Bliss Avenue, remainder of block along Bliss Avenue, and backside of block along Clark Avenue; the composite sample comprises 16 discrete sampling points.	Type 2
LawRav1	09/22/22	38.03002	-121.94336	Bay Point	Five discrete sampling points compose the composite sample collected along fence line of property; loose soil and gopher mounds present.	Type 1
LawRav2	09/23/22	38.03237	-121.94477	Bay Point	Composite sample comprises 12 discrete points along roadway; samples generally taken from areas where sediment accumulated around drop inlet grates where street sweepers appear to be less effective.	Type 2
LawRav3	09/23/22	38.02728	-121.94360	Martinez	Composite sample comprises 7 discrete points along fence line of property. Accessed a portion of fence line from adjacent parking lot.	Type 1
MtzCrk1	09/23/22	38.00087	-122.06725	Richmond	Composite sample comprises swept areas around drop inlets and driveways; sampled both sides of Imhoff Drive.	Type 2
SanFeCh2A	09/27/22	37.93100	-122.36184	Richmond	Composite sample comprises swept areas of the curb and gutter and sediment grabbed from broken portions of the drive apron; 4 sampling points compose the composite sample at the ingress/egress point to the property; site was selected for follow-up sampling based on WY 2021 elevated results.	Type 1, Type 5
SanFeCh2B	09/27/22	37.93093	-122.36180	Richmond	Collected 4 samples along fence line of property on Ohio Avenue. and 3 samples around rock structure on corner of S 8th Street and Ohio Avenue to compose this composite sample; site was selected for follow-up sampling based on WY 2021 elevated results.	Type 1, Type 5
SanFeCh9	09/27022	37.93106	-122.36216	Richmond	Composite sample comprises 9 sampling locations along fence line and on parcel at NW corner of S 8th Street and Ohio Avenue; this site is across the street from Site SanFeCh2A; site was selected for follow-up sampling based on WY 2021 elevated results.	Type 1
SanFeCh10	09/27/22	37.96892	-122.37140	Richmond	Three points of ingress/egress to/from the parcel were sampled along Parr Boulevard to compose this composite sample.	Type 1
SanFeCh11	09/27/22	37.96828	-122.36704	Richmond	Composite sample comprises 8 sampling locations along perimeter of property along Parr Boulevard and Goodrick Avenue.	Type 1

1 Site ID Key: KCrk = Kirker Creek, LawRav = Lawlor Ravine, MtzCrk = Martinez Creek, SanFeCh = Santa Fe Channel
2 Referenced to North American Datum of 1983

Table 2. Sediment Screening Analytical Tests, Methods, Reporting Limits, and Holding Times

Sediment Analytical Test	Method	Target Reporting Limit	Holding Time
Total PCBs (RMP 40 congeners)[1]	USEPA 8082A	0.5 µg/kg	1 year
Total Mercury	USEPA 7471B	5 µg/kg	1 year
Total Organic Carbon	ASTM D4129-05M	0.05%	28 days
Particle Size Distribution[2]	ASTM D422M	0.01%	28 days

1 San Francisco Bay RMP 40 PCB congeners include PCB-8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, 105, 110, 118, 128, 132, 138, 141, 149, 151, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203.

2 Particle size distribution by the Wentworth scale; percent fines (slit and clay) are less than 62.5 microns.

Table 3. Sediment Screening Sampling Results – Water Year 2022

Sample ID	Total PCBs (mg/Kg or ppm) [1,2]	Total Hg (mg/Kg or ppm)[3]	TOC (%)	Particle Size Distribution[4]			
				Clay (%)	Silt (%)	Sand (%)	Gravel (%)
KCrk1	0.125	0.105	2.48	1.58	12.07	55.46	30.88
LawRav1	0.052	0.158	2.61	4.19	29.03	57.05	9.74
LawRav2	0.053	0.185	5.70	2.29	22.51	61.97	13.22
LawRav3	0.076	0.081	4.44	5.52	31.79	51.58	11.11
MtzCrk1	0.008	***0.318***	3.07	3.60	23.66	49.63	23.11
SanFeCh2A	***4.650***	***1.240***	5.93	2.81	20.55	45.26	31.38
SanFeCh2B	***0.687***	***1.010***	4.51	2.72	19.50	56.66	21.12
SanFeCh9	0.250	0.173	3.92	1.99	30.10	44.84	23.08
SanFeCh10	0.037	0.217	1.53	2.97	16.69	58.98	21.36
SanFeCh11	0.010	0.265	1.34	2.00	11.04	62.16	24.80

1 Sum of RMP 40 congeners

2 Values in ***bold italics*** indicate a moderate to high source area for PCBs (>0.2 ppm)

3 Values in ***bold italics*** indicate a moderate to high source area for mercury (>0.3 ppm)

ppm parts per million

Normalized to 100 percent

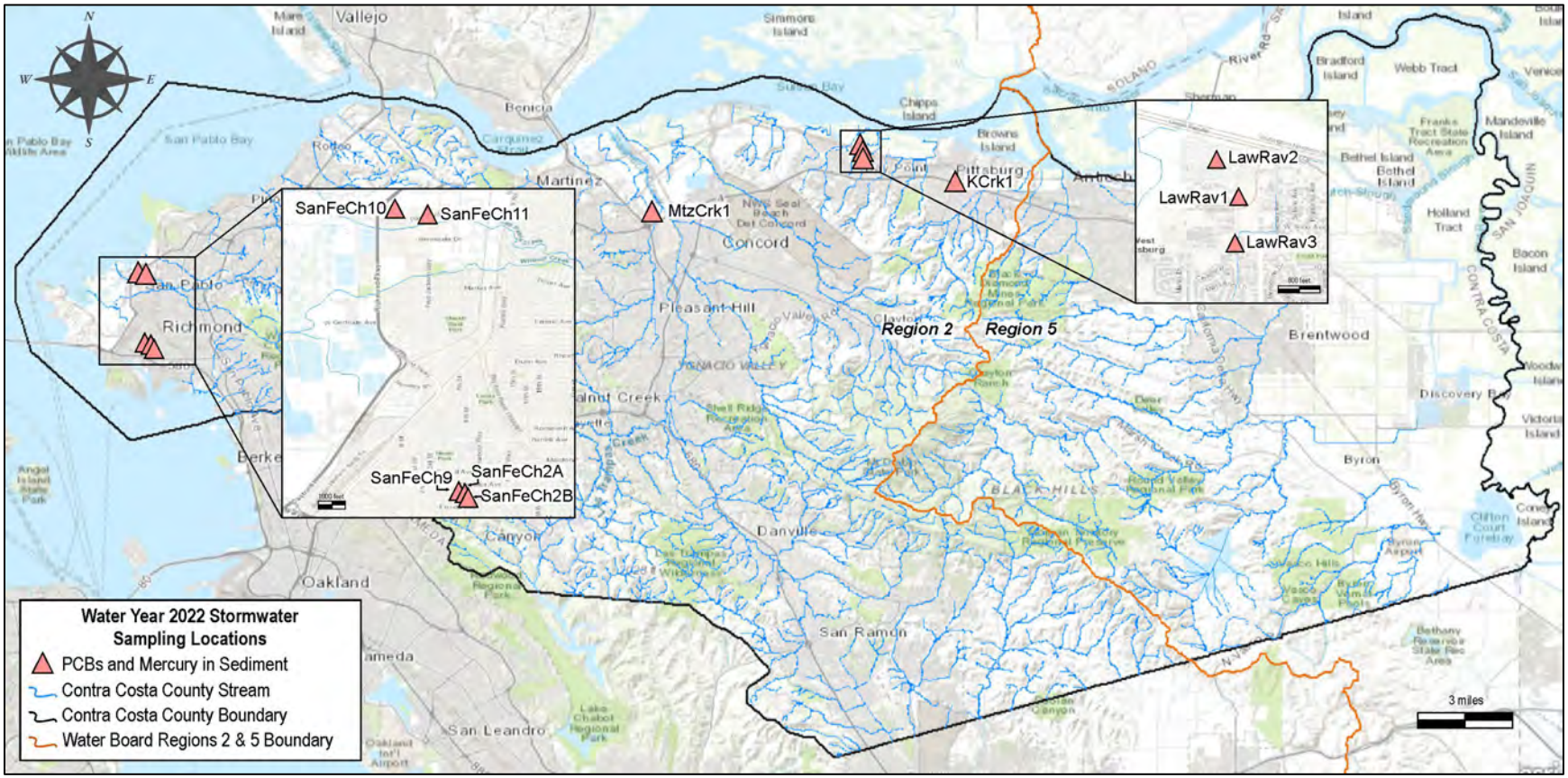

Figure 1. Location of Water Year 2022 Monitoring Activities – County Overview

2.2 Quality Assurance / Quality Control Analysis

Project staff performed verification and validation of laboratory data per the project quality assurance project plan (ADH and AMS 2020b) and consistent with California Surface Water Ambient Monitoring Program measurement quality objectives (SWAMP 2022).

Samples for all analyses met laboratory quality control objectives, except for minor instances detailed in Table 4 below. Given that the quality control issues described in Table 4 show the issues were of relatively minor consequence, 100% of the data from these samples are of acceptable quality and are included in the dataset for this report.

Table 4. Quality Control Issues and Analysis in the Water Year 2022 Project Data Set

Sample ID / Type	Issue	Analysis
KCrk1/Mercury laboratory duplicate	RPD of lab duplicate was 54%, well beyond the control limit of 20%. The original sample was 0.105 mg/Kg and the replicate result of 0.182 mg/Kg.	The variability in the result was attributed to the heterogeneous character of the sample; standard mixing techniques were used but were not sufficient for complete homogenization of this sample.
KCrk1/PCB matrix spike/matrix spike duplicate	For two PCB congeners (PCB 138 and 194), the RPD of the MS/MSD was greater than the 40% control limit (43% and 85%, respectively).	PCB 194 was not detected in the original sample; since the MS/MSD recoveries both indicated a high bias, the data quality was not greatly affected. PCB 138 MS/MDS RPD was only slighted elevated above the 40% limit; since the MSD recovery that led to the elevated RPD indicated a high bias, the data quality was not greatly affected.
Method 8082A, PCB congeners	On 11/16/22, the upper control criterion was exceeded for some analytes in the continuing calibration verification (CCV).	The field samples analyzed in this sequence did not contain the analytes in question; since the apparent problem indicated a high bias, the data quality was not affected, and no further corrective action was required.
Method 8082A, PCB congeners	On 10/19/22, the upper control criterion was exceeded for PCB 151, 194, 201, and 203 in the CCV.	The field samples analyzed in this sequence did not contain the analytes in question at concentrations above the MRL; since the apparent problem indicated a high bias, the data quality was not affected.
Particle size distribution field duplicate	RPD of field duplicate for coarse gravel was outside of precision control limits (40%)	Precision outside of control limits for gravel is not uncommon in field duplicate samples due to sample heterogeneity.
Method 8082A, PCB congeners	Several of the PCB congers from Method 8082A were "P" qualified, indicating the GC or HPLC confirmation criteria was exceeded and the RPD was greater than 40% between the two results.	Exceedance of this type are common with results that are only slightly above the RL. Since the "P" qualified data represent low detections, the sum of the RMP 40 congeners is acceptable for screening purposes.

CCV Continuing Calibration Verification
GC gas chromatography
HPLC high pressure liquid chromatography
MS matrix spike
MSD matrix spike duplicate
MRL method reporting limit
RMP Regional Monitoring Program for Water Quality in San Francisco Bay
RPD relative percent difference

2.3 Summary of Monitoring Completed in Water Year 2022

WY 2022 monitoring is summarized in Table 5. The table lists the total number of tests completed for each pollutant class, the monitoring types that were addressed, and the corresponding targets outlined in MRP 3.0.

Except for aqueous methylmercury, the number of samples collected and analyzed in WY 2022 met the minimum annual requirements of MRP 3.0 in all pollutant categories. Aqueous methylmercury sampling that was required annually by MRP 2.0 was customarily conducted late in each water year (i.e., after July 1 of each year). MRP 3.0 became effective on July 1, 2022, which included the following directive in Provision C.19.d.ii.(2).e:

> "*By January 1, 2024, address whether eutrophication and low dissolved oxygen concentrations increase methylmercury in ponded areas of Marsh Creek during low flow periods (depending on the year, low flow periods can range between mid-March and Mid-November), and, if so:*
>
> *i. Under what hydrologic or seasonal circumstances do increased methylmercury concentrations reach the Delta?*
>
> *ii. Are there reasonable and foreseeable management actions to ameliorate increased methylmercury concentrations?*"

Because of this directive, sampling was re-prioritized and was focused on attending to this requirement and its questions. Monitoring and assessment activities relevant to this directive and the Delta Methylmercury TMDL for East County Permittees will be reported in a separate section of the POCs report in WY 2023 per Provision C.19.d.iii.(3). Refer to Section 3 for a discussion of methylmercury sampling planned for WY 2024.

Table 5. Summary of Monitoring Completed in Water Year 2022 by Pollutant Class, Analyte, Management Information Need, and MRP Targets

Pollutant Class / Type of Monitoring	Analyte									Monitoring Types						Samples Collected and Analyzed in WY 2022	Cumulative Samples Collected and Analyzed Under MRP 3	Total Samples Required by MRP 3 (and Annual Minimum Requirement)
	PCBs	Mercury	Methylmercury	SSC	PSD	TOC	Copper [1]	Hardness	RWL Analytes[2]	(1) Source ID	(2) Bay Impairment	(3) Management Action	(4) Loads & Status	(5) Trends	(6) Receiving Water Limits			
PCBs - sediment	✓				✓	✓				✓	✓			✓		10[a]	10	65 (8)
PCBs - water																0		
Mercury – sediment		✓			✓					✓	✓			✓		10[a]	10	50 (8)
Mercury – water																0		
Methylmercury[3] – aqueous																0	0	50 (8)
Copper[1] - water																0	0	5
Emerging Contaminants[4]																NA	NA	NA
Receiving Water Limitations[2]																0	0	5

1 Total and dissolved fractions of copper
2 Receiving water limitations analytes include: dissolved copper, zinc, and lead, hardness, *E. coli*, total nitrogen, total phosphorus, ammonia, temperature, pH, and specific conductance
3 Methylmercury monitoring requirements per MRP 3 Provision C.19.d.ii.(2).
4 CCCWP is satisfying this permit requirement through augmentation of the RMP Emerging Contaminates Monitoring Strategy
a Sediment screening adjacent to old industrial source properties in high opportunity areas
SSC suspended sediment concentration
PSD particle size distribution
TOC total organic carbon
RWL receiving water limitations
NA Not applicable

This page intentionally blank.

..

3 Monitoring Planned for Water Year 2024

POC monitoring conducted by CCCWP in WY 2024 will meet or exceed the minimum number of samples required each year for PCBs and mercury (eight). Monitoring Types 1 through 6 will be addressed for PCBs and mercury.

Monitoring efforts in WY 2024 will continue to include identifying mercury and PCBs source properties and areas, as required by MRP Provision C.11.b/C.12.b (Monitoring Types 1 and 2). Sediment investigation of the remaining old industrial source areas for PCBs and mercury will take place at locations identified through ongoing desktop research and field surveys. Sites which may be added to the sampling list include locations of interest due to historic or present-day land use, lack of adequate source control, and reoccurring accumulation of sediment within the right-of-way.

WY 2024 will also include sampling at the bottom of the watershed in Old Industrial areas that are expected to have few source properties to confirm this assumption (Monitoring Type 4).

A few additional previous monitoring locations will be revisited to evaluate trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time (Monitoring Type 5).

Receiving Water Limitations Monitoring (Type 6) will be conducted per the Receiving Water Limitations Monitoring Plan (see Urban Creeks Monitoring Report, Appendix 7).

Mercury and methylmercury monitoring in Marsh Creek will be conducted to address MRP 3.0 Provision C.19.d.ii.(2).e, as detailed in the Annual Mercury Monitoring Plan prepared for the CVRWQCB (see Urban Creeks Monitoring Report, Appendix 6). Methylmercury monitoring in Marsh Creek will be conducted at Stations M0, M1, and M2.

This page intentionally blank.

4 References

ADH Environmental and Applied Marine Sciences (ADH and AMS). 2020a. Contra Costa County Clean Water Program, Sampling and Analysis Plan, Pollutants of Concern Monitoring; Pesticides and Toxicity Monitoring. Feb. 14, 2020.

ADH Environmental and Applied Marine Sciences (ADH and AMS). 2020b. Contra Costa County Clean Water Program, Quality Assurance Project Plan, Pollutants of Concern Monitoring; Pesticides and Toxicity Monitoring. Feb. 14, 2020.

Contra Costa Clean Water Program (CCCWP). 2022a. Contra Costa Clean Water Program, Pollutants of Concern Monitoring Report: Water Year 2021. Prepared by Kinnetic Environmental. March 2022.

Contra Costa Clean Water Program (CCCWP). 2022b. Contra Costa Clean Water Program, Annual Mercury Monitoring Plan: Water Year 2023. Prepared by Kinnetic Environmental. September 2022.

Contra Costa Clean Water Program (CCCWP). 2022c. Contra Costa Clean Water Program, Addendum to Annual Mercury Monitoring Plan: Water Year 2023. Prepared by Kinnetic Environmental. December 2022.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 2015. California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit, Order R2-2015-0049, NPDES Permit CAS612008. Nov. 19, 2015. (MRP 2.0)

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 2022. California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit, Order R2-2022-0018. May 11, 2022. (MRP 3.0)

Surface Water Ambient Monitoring Program (SWAMP). 2022. SWAMP Quality Assurance Project Plan, Version 2.0. Prepared for the California State Water Resources Control Board. January 2022.

This page intentionally blank.