



# Year 2 Data Report and Quality Assurance Evaluation

For the Pilot Study of Constituents of Emerging  
Concern During Fiscal Year 2021-22

Version 1.0

Submitted for Review by the Steering Committee December 15, 2022

Prepared By:



# TABLE OF CONTENTS

Introduction.....	9
Background .....	9
Analytical Scope .....	9
Involved Organizations.....	10
Sampling Overview.....	12
Study Background .....	17
Year 2 Sampling Events .....	18
Year 2 Monitoring Locations.....	19
Sampling Methods.....	21
Water Sample Collection .....	21
Sediment Sample Collection.....	21
Tissue Sample Collection .....	22
Sample Collection Completeness .....	23
Field Activities .....	23
Event 1 .....	23
Event 2 .....	24
Event 3.....	26
Event 4.....	28
Analytical Overview.....	30
Field Measurements.....	30
Analytical Laboratory Methods.....	30
Analytical Methods – Physis Laboratories .....	31
Analytical Methods – SGS-AXYS Laboratories .....	31
Analytical Methods – Vista Analytical Laboratories.....	32
Analytical Methods – Weck Laboratories .....	32
Analytical Completeness .....	32
Analysis Failures.....	32
Data Verification Overview.....	36
Verification Process.....	36
Verified Datasets .....	37
Data Verification: Sample Handling .....	40

Data Verification: Field Measurements.....	45
Data Verification: Chemistry .....	46
Contamination.....	46
Precision .....	59
Accuracy .....	65
Summary .....	85
Chemistry Results .....	85
Water Quality Analysis Results .....	86
Sediment Analysis Results.....	95
Tissue Analysis Results .....	97
Data Availability.....	99
Deviations and Corrective Actions .....	100
References .....	111

## LIST OF TABLES

Table 1. Analytical scope of CEC Year 2 monitoring. ....	10
Table 2. Involved organizations for CEC Year 2 monitoring.....	11
Table 3. Sampling event information for CEC Year 2 CEC monitoring. ....	12
Table 4. CEC Year 2 event descriptions and associated storm trigger criteria (reproduced from Tables 10-2 and 10-3 from the QAPP).....	18
Table 5. Analytical laboratory methods for CEC Year 2 monitoring. ....	30
Table 6. Analytical results rejected by the laboratory for CEC Year 2 monitoring. ....	34
Table 7. Verified datasets (analytical batches) for CEC Year 2 monitoring.....	38
Table 8. Year 2 CEC QAPP sample handling requirements.....	40
Table 9. Sample handling qualification for CEC Year 2 monitoring. ....	42
Table 10. Field blank qualification for CEC Year 2 monitoring.....	46
Table 11. Laboratory blank qualification for CEC Year 2 monitoring.....	48
Table 12. Laboratory blank qualification for CEC Year 2 monitoring: associated samples. ....	49
Table 13. Field duplicates for CEC Year 2 monitoring.....	60
Table 14. Field duplicate qualification for CEC Year 2 monitoring.....	61
Table 15. Laboratory duplicate frequency qualification for CEC Year 2 monitoring.....	62
Table 16. Laboratory duplicate precision qualification for CEC Year 2 monitoring.....	63
Table 17. Laboratory control spike duplicate frequency qualification for CEC Year 2 monitoring.....	64
Table 18. Laboratory control spike duplicate precision qualification for CEC Year 2 monitoring.....	65
Table 19. Matrix spike qualification for CEC Year 2 monitoring. ....	66

Table 20. Laboratory control spike qualification for CEC Year 2 monitoring. ....	66
Table 21. Surrogate qualification for CEC Year 2 monitoring.....	68
Table 22. Isotope dilution analogue qualification for CEC Year 2 monitoring.....	69
Table 23. Isotope dilution analogue qualification for CEC Year 2 monitoring: associated samples. ....	75
Table 24. Calibration-related qualification for CEC Year 2 monitoring. ....	83
Table 25. Interference-related qualification for CEC Year 2 monitoring.....	83
Table 26. Summary of field sample collections for CEC Year 2 monitoring. ....	85
Table 27. Summary of verified results for CEC Year 2 monitoring. ....	86
Table 28. PFOS and PFOA concentrations in environmental samples (water, ng/L). ....	86
Table 29. PPCP concentrations in environmental samples (water, ng/L).....	91
Table 30. PBDE concentrations in environmental samples (sediment, ng/g dw).....	95
Table 31. PFAS concentrations in environmental samples (sediment, ng/g dw).....	96
Table 32. PBDE concentrations in environmental samples (fish and bivalve tissue, ng/g dw). ....	97
Table 33. PFAS concentrations in environmental samples (fish tissue, ng/g dw). ....	99
Table 34. CEC Year 2 station names and associated sample matrices available on CEDEN. Locations associated with CEDEN Project Code “21DRMP5CEC” will have data available on CEDEN.....	99
Table 35. Bivalve composite sample masses and size class distributions of individual organisms for Year 2 CEC Monitoring. ....	101
Table 36. Referenced deviations from the Delta RMP CEC QAPP.....	108

## LIST OF FIGURES

Figure 1. Sampling sites for Year 2 CEC monitoring.....	20
Figure 2. Flow measurements recorded at USGS Station 11447650 near Freeport, California during Event 2 sample collections (October 25 and 26, 2021). ....	26
Figure 3. Flow measurements recorded at USGS Station 11447650 near Freeport, California. Event 3 monitoring occurred on March 28, 2022.....	28
Figure 4. PFOS and PFOA concentrations in environmental samples (water, ng/L). ....	89
Figure 5. PPCP concentrations in environmental samples (water, ng/L).....	94
Figure 6. PBDE concentrations in environmental samples (sediment, ng/g dw).....	95
Figure 7. PFAS concentrations in environmental samples (sediment, ng/g dw).....	96
Figure 8. PBDE concentrations in environmental samples (fish and bivalve tissue, ng/g dw). ....	98
Figure 9. Bivalve composite sample masses and size class distributions of individual organisms for Year 2 CEC Monitoring. ....	102

## LIST OF APPENDICES

Appendix A. Field Reports for Year 2 Monitoring for Constituents of Emerging Concern ..	1
Event 1 – October 18, 20 and 21, 2021.....	1

AMS Field Report – Event 1 Water, Sediment, and Bivalve Tissue Samples .....	1
MPSL-DFW Cruise Report – Event 1 Fish Tissue Samples.....	2
Event 2 – October 25 and 26, 2021 .....	3
AMS Field Report – Event 2 Water Samples .....	3
Event 3 – March 28, 2022 .....	4
AMS Field Report – Event 3 Water Samples .....	4
Event 4 – June 8, 2022.....	5
AMS Field Report – Event 4 Water Samples .....	5
Appendix B. List of all CEC Analytes Reported for Year 2 Monitoring.....	1
Constituents of Emerging Concern Analytes Reported .....	2
Isotope Dilution Analogues and Associated Analytes.....	8
Appendix C. Summary of Completeness and Quality Control Sample Acceptability for Year 2 CEC Monitoring.....	1
Summary of Completeness.....	2
Sample Completeness .....	3
Field Measurement Completeness.....	14
Field Quality Control Frequency .....	15
Quality Control Sample Acceptability .....	20
Field Blanks Samples .....	20
Field Duplicate Samples .....	21
Laboratory Blank Samples.....	26
Laboratory Duplicate Samples (Unspiked).....	35
Laboratory Control Spike Samples .....	43
Matrix Spike Samples .....	61
Surrogate Samples.....	63
Isotope Dilution Standards .....	64
Summary of Sample Handling Acceptability .....	71
Hold Time Evaluations .....	71
Appendix D. Deviation Forms.....	1
2021-01. Year 2 Clam Tissue Collection.....	1
2021-02. Buckley Cove Location Offset.....	2
2021-03. TOC Missing Lab Duplicate Event 1 July.....	3
2021-04. Missing Laboratory Duplicate for SSC Analysis .....	4

2021-05. Weck MDLs and RL elevated for some Analytes .....	5
2021-06. Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported.....	6
2021-08. Weck Event 3 Missed Resolution Reporting Timeline.....	7
2021-09. CEC Year 2 Tissue RLs and Missing Lipids and Moisture Results .....	8
2021-10. CEC Year 2 Clam Laboratory Measurements .....	9

## LIST OF ABBREVIATIONS AND ACRONYMS

<b>AMS-CA</b>	Applied Marine Sciences, Inc. California
<b>ASTM</b>	American Society of Testing and Materials
<b>BFR</b>	Brominated Flame Retardants
<b>CEC</b>	Constituents of Emerging Concern
<b>CEDEN</b>	California Environmental Data Exchange Network
<b>CV RDC</b>	Central Valley Regional Data Center
<b>CVRWQCB</b>	Central Valley Regional Water Quality Control Board
<b>DO</b>	Dissolved Oxygen
<b>Delta RMP</b>	Delta Regional Monitoring Program
<b>DWR</b>	California Department of Water Resources
<b>EDD</b>	Electronic Data Deliverable
<b>EPA</b>	United States Environmental Protection Agency
<b>ESI</b>	Electrospray Ionization
<b>GC/MS</b>	Gas Chromatography/Mass Spectrometry
<b>HRGC-HRMS</b>	High-Resolution Gas Chromatography – High-Resolution Mass Spectrometry
<b>IDA</b>	Isotope Dilution Analogue
<b>LC/MS/MS</b>	Liquid Chromatography/Tandem Mass Spectrometry
<b>LCS</b>	Laboratory Control Sample
<b>LCSD</b>	Laboratory Control Sample Duplicate
<b>MDL</b>	Method Detection Limit
<b>MLJ</b>	MLJ Environmental
<b>MPSL-MLML</b>	Marine Pollution Studies Laboratory at Moss Landing Marine Laboratories
<b>MPSL-DFW</b>	Marine Pollution Studies Laboratory, Department of Fish and Wildlife
<b>MQO</b>	Measurement Quality Objective

<b>MRM</b>	Multiple Reaction Mode
<b>MS</b>	Matrix Spike
<b>MSD</b>	Matrix Spike Duplicate
<b>PBDE</b>	Polybrominated Diphenyl Ether
<b>PFAS</b>	Per- and Polyfluoroalkyl Substances
<b>Physis</b>	Physis Environmental Laboratories, Inc.
<b>PPCP</b>	Pharmaceutical and Personal Care Product
<b>PR</b>	Percent Recovery
<b>QA</b>	Quality Assurance
<b>QAPP</b>	Quality Assurance Project Plan
<b>QC</b>	Quality Control
<b>RPD</b>	Relative Percent Difference
<b>SGS-AXYS</b>	SGS AXYS Analytical Services Ltd.
<b>SPoT</b>	Stream Pollution Trends Monitoring Program
<b>SSC</b>	Suspended Sediment Concentration
<b>SWAMP</b>	State Water Resources Control Board's Surface Water Ambient Monitoring Program
<b>SWRCB</b>	State Water Resource Control Board
<b>TOC</b>	Total Organic Carbon
<b>UPLC/MS/MS</b>	Ultra-Performance Liquid Chromatography/Tandem Mass Spectrometry
<b>WKL</b>	Weck Laboratories, Inc.
<b>VAL</b>	Vista Analytical Laboratory

## LIST OF UNITS

°C	degrees Celsius
cfs	cubic feet per second
cm	centimeter
ft	feet
km	kilometer
L	liter
m	meter
mg	milligram
mL	milliliter
ng	nanogram
ng/g dw	nanogram per gram, dry weight
ng/L	nanogram per liter
NTU	Nephelometric Turbidity Unit
µg	microgram
µm	micrometer (micron)
µS	microsiemen

# INTRODUCTION

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## BACKGROUND

This report summarizes the Delta Regional Monitoring Program's (Delta RMP's) sample collection, laboratory analysis, and data verification for Year 2 as part of the [Central Valley Pilot Study for Monitoring Constituents of Emerging Concern \(CECs\) Work Plan](#) (Stakeholder Work Plan). Implementation of the Stakeholder Work Plan by the Delta RMP is referred to as the CEC Pilot Study). The CEC Pilot Study includes a three-year study design which began in 2020 for Year 1; Year 2 sampling occurred from July of 2021 through June of 2022.

Year 2 CEC monitoring and data management was conducted under the [Quality Assurance Project Plan for the Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta, Version 2](#). The CEC Quality Assurance Project Plan (QAPP) was revised ahead of the second year of monitoring, with the final revision receiving approval from all signatories, including the State Water Resource Control Board (SWRCB) Quality Assurance (QA) Officer on November 29, 2021. Approval to conduct monitoring while the document was being finalized was provided by the Central Valley Regional Water Quality Control Board (CVRWQC) via email on October 13, 2021, prior to the first October sampling event (**Table 3**).

## ANALYTICAL SCOPE

Year 2 CEC monitoring included the sampling and analysis for three major groups of CEC constituents: polybrominated diphenyl ethers (PBDEs), per- and polyfluoralkyl substances (PFAS), and pharmaceutical and personal care products (PPCPs). In addition, two ancillary parameters, total organic carbon (TOC) and suspended sediment concentration (SSC), were analyzed to facilitate interpretation of the ecotoxicity of the targeted CEC analytes. Analysis for various combinations of these constituents is conducted on three different sample matrices including water, sediment, and tissue (fish and bivalves). The analyses conducted in each matrix and sample fraction or organism are defined in **Table 1**.

The specific CECs analyzed within each constituent group is based on the Stakeholder Work Plan suite list. In addition to these high priority, required constituents, the Delta RMP has requested that laboratories include results for any additional analytes that may be included in the same analytical suite that will not cost extra for analysis and reporting by the laboratory. This is similar to the direction in Year 1; however, it should be noted

that there were differences in what additional analytes could be included in the Year 2 analysis for no additional cost. Based on discussions at the July 2021 Steering Committee meeting, it was agreed by the Board of Directors (BOD) to develop a Year 2 Study Plan that would remain consistent with the CECs analyzed in Year 1. Both the required and additional CEC analytes are included in the summaries provided below. A complete list of the analytical constituents and their designation as required, additional, or ancillary is provided in **Appendix B, Table B.1**.

Field measurements for dissolved oxygen (DO), pH, specific conductivity, temperature, and turbidity are collected during each sampling event alongside the collection of samples for chemical analysis, except for fish tissue samples which were collected separately by Marine Pollution Studies Laboratory, Department of Fish and Wildlife (MPSL-DFW) (**Table 1**).

**Table 1. Analytical scope of CEC Year 2 monitoring.**

MATRIX	FRACTION/ ORGANISM	ANALYTE/PARAMETER
Water	Total	Galaxolide (PPCP)
Water	Total	Hormones (PPCP)
Water	Total	Pharmaceuticals (PPCPs) <sup>1</sup>
Water	Total	Hormones (PPCPs) <sup>1</sup>
Water	Particulate	Suspended Sediment Concentration (SSC)
Water	Total	Per- and Polyfluoroalkyl Substances (PFAS) <sup>1</sup>
Water	NA	Dissolved Oxygen (DO)
Water	NA	pH
Water	NA	Specific Conductivity
Water	NA	Turbidity
Water	NA	Temperature
Sediment	Total	Total Organic Carbon (TOC)
Sediment	Total	Polybrominated Diphenyl Ethers (PBDEs) <sup>1</sup>
Sediment	Total	Per- and Polyfluoroalkyl Substances (PFAS) <sup>1</sup>
Tissue	Bivalves, Fish	Polybrominated Diphenyl Ethers (PBDEs) <sup>1</sup>
Tissue	Fish	Per- and Polyfluoroalkyl Substances (PFAS) <sup>1</sup>

<sup>1</sup> See Appendix B Table B.1 for complete list.

## INVOLVED ORGANIZATIONS

The CEC Year 2 monitoring includes ten organizations performing administrative, laboratory, and/or field tasks. Organization details are included in **Table 2**.

**Table 2. Involved organizations for CEC Year 2 monitoring.**

ORGANIZATION	TASK(S)
Marine Pollution Studies Laboratory at Moss Landing Marine Laboratories (MPSL-MLML)	Data Management, Quality Assurance
MLJ Environmental (MLJ)	Project Management, Data Management, Quality Assurance, Sample Collection (water and sediment)
Applied Marine Sciences, Inc. California (AMS)	Sample Collection (water, sediment, and bivalves)
ICF International (ICF)	Sample Collection (water, sediment, and bivalves)
Marine Pollution Studies Laboratory, Department of Fish and Wildlife (MPSL-DFW)	Sample Collection (fish)
Stream Pollution Trends Monitoring Program (SPoT)	Sample Collection (sediment)
Physis Environmental Laboratories, Inc.	Sample Analysis – PPCPs (water)
SGS AXYS Analytical Services Ltd.	Sample Analysis – PBDEs, PFAS (sediment, bivalves, and fish)
Vista Analytical Laboratory	Sample Analysis – PFAS (water)
Weck Laboratories, Inc.	Sample Analysis – PPCPs (water)

## SAMPLING OVERVIEW

Sampling logistics for Year 2 CEC monitoring are summarized in **Table 3** and detailed in the sections that follow.

**Table 3. Sampling event information for CEC Year 2 CEC monitoring.**

EVENT	SEASON	CEDEN STATION CODE	CEDEN STATION NAME	MATRIX	AGENCY	LATITUDE <sup>1</sup>	LONGITUDE <sup>1</sup>	DATE	TIME
1	Late Summer/ Early Fall	519AMNDVY	American River at Discovery Park	Sediment	SPoT	38.60099	-121.50546	7/22/2021	9:00
1	Late Summer/ Early Fall	519ST1309	Sacramento River at Veterans Bridge- 03SWSBIO-519ST1309	Fish Tissue	MPSL- DFW	38.67299	-121.62657	10/18/2021	9:00
1	Late Summer/ Early Fall	510ST1317	Sacramento River/Freeport-510ST1317	Fish Tissue	MPSL- DFW	38.45920	-121.50252	10/18/2021	11:32
1	Late Summer/ Early Fall	544LSAC13	San Joaquin R at Buckley Cove	Fish Tissue	MPSL- DFW	37.97768	-121.38235	10/18/2021	16:45
1	Late Summer/ Early Fall	541SJC501	San Joaquin River at Airport Way near Vernalis	Fish Tissue	MPSL- DFW	37.674241	-121.26511	10/20/2021	10:30
1	Late Summer/ Early Fall	519PGC010	Roseville Urban Runoff	Water	AMS	38.80474	-121.32738	10/20/2021	10:25
1	Late Summer/ Early Fall	541SJC501	San Joaquin River at Airport Way near Vernalis	Water, Bivalve Tissue	AMS	37.67571	-121.2649	10/20/2021	11:15
1	Late Summer/ Early Fall	519DRYCRK	Dry Creek at Roseville WWTP	Water, Sediment	AMS	38.7342	-121.31444	10/20/2021	11:48
1	Late Summer/ Early Fall	519POTW01	POTW Source No. 1	Water	AMS	38.73404	-121.32186	10/20/2021	13:00
1	Late Summer/ Early Fall	519SACUR3	Sacramento Urban Runoff 3; Sump 111	Water	AMS	38.60127	-121.49299	10/20/2021	14:20

EVENT	SEASON	CEDEN STATION CODE	CEDEN STATION NAME	MATRIX	AGENCY	LATITUDE <sup>1</sup>	LONGITUDE <sup>1</sup>	DATE	TIME
1	Late Summer/ Early Fall	544SJRNBC	San Joaquin River near Buckley Cove	Water, Bivalve Tissue	AMS	37.97124	-121.37426	10/21/2021	7:45
1	Late Summer/ Early Fall	511SOL011	Old Alamo Creek at Lewis Road	Water, Sediment	AMS	38.34649	-121.89686	10/21/2021	10:20
1	Late Summer/ Early Fall	519AMNDVY	American River at Discovery Park	Water, Bivalve Tissue	AMS	38.60083	-121.50458	10/21/2021	10:55
1	Late Summer/ Early Fall	511POTW02	POTW Source No. 2	Water	AMS	38.3466	-121.901603	10/21/2021	12:20
1	Late Summer/ Early Fall	519SUT108	Sacramento River at Elkhorn Boat Launch Facility	Water, Bivalve Tissue	AMS	38.672077	-121.625008	10/21/2021	12:57
1	Late Summer/ Early Fall	510SACC3A	Sacramento River at Hood Monitoring Station Platform	Water, Bivalve Tissue	AMS	38.367739	-121.521217	10/21/2021	15:15
1	Late Summer/ Early Fall	510ST1301	Sacramento River at Freeport	Water, Bivalve Tissue	AMS	38.455413	-121.501925	10/21/2021	16:20
2	First Flush	519PGC010	Roseville Urban Runoff	Water	AMS	38.8047	-121.3273	10/25/2021	10:40
2	First Flush	541SJC501	San Joaquin River at Airport Way near Vernalis	Water	ICF	37.67565	-121.26484	10/25/2021	11:05
2	First Flush	519SACUR3	Sacramento Urban Runoff 3; Sump 111	Water	AMS	38.6013	-121.49298	10/25/2021	12:10
2	First Flush	544SJRNBC	San Joaquin River near Buckley Cove	Water	ICF	37.97417	-121.37601	10/25/2021	12:40
2	First Flush	511SOL011	Old Alamo Creek at Lewis Road	Water	AMS	38.34649	-121.89685	10/25/2021	13:20
2	First Flush	511POTW02	POTW Source No. 2	Water	AMS	38.34658	-121.90162	10/25/2021	14:30

EVENT	SEASON	CEDEN STATION CODE	CEDEN STATION NAME	MATRIX	AGENCY	LATITUDE <sup>1</sup>	LONGITUDE <sup>1</sup>	DATE	TIME
2	First Flush	519AMNDVY	American River at Discovery Park	Water	AMS	38.6008	-121.50475	10/26/2021	9:50
2	First Flush	519SUT108	Sacramento River at Elkhorn Boat Launch Facility	Water	AMS	38.67177	-121.62465	10/26/2021	11:00
2	First Flush	519DRYCRK	Dry Creek at Roseville WWTP	Water	MLJ	38.73423	-121.31445	10/26/2021	11:20
2	First Flush	519POTW01	POTW Source No. 1	Water	MLJ	38.73405	-121.32187	10/26/2021	12:30
2	First Flush	510SACC3A	Sacramento River at Hood Monitoring Station Platform	Water	AMS	38.36729	-121.5213	10/26/2021	13:10
2	First Flush	510ST1301	Sacramento River at Freeport	Water	AMS	38.45541	-121.50195	10/26/2021	14:00
3	Spring Storm	519SACUR3	Sacramento Urban Runoff 3; Sump 111	Water	MLJ	38.60122	-121.49307	3/28/2022	9:40
3	Spring Storm	519PGC010	Roseville Urban Runoff	Water	MLJ	38.80475	-121.32735	3/28/2022	10:00
3	Spring Storm	519DRYCRK	Dry Creek at Roseville WWTP	Water	MLJ	38.73422	-121.31445	3/28/2022	11:00
3	Spring Storm	511POTW02	POTW Source No. 2	Water	MLJ	38.34666	-121.9016	3/28/2022	11:20
3	Spring Storm	519POTW01	POTW Source No. 1	Water	MLJ	38.73401	-121.32188	3/28/2022	11:30
3	Spring Storm	511SOL011	Old Alamo Creek at Lewis Road	Water	MLJ	38.34642	-121.89709	3/28/2022	11:50
3	Spring Storm	541SJC501	San Joaquin River at Airport Way near Vernalis	Water	ICF	37.67539	-121.26468	3/28/2022	12:10
3	Spring Storm	519SUT108	Sacramento River at Elkhorn Boat Launch Facility	Water	AMS	38.67173	-121.62488	3/28/2022	12:15
3	Spring Storm	544SJRNBC	San Joaquin River near Buckley Cove	Water	ICF	37.974196	-121.376	3/28/2022	13:20

EVENT	SEASON	CEDEN STATION CODE	CEDEN STATION NAME	MATRIX	AGENCY	LATITUDE <sup>1</sup>	LONGITUDE <sup>1</sup>	DATE	TIME
3	Spring Storm	519AMNDVY	American River at Discovery Park	Water	AMS	38.60085	-121.50462	3/28/2022	13:50
3	Spring Storm	510ST1301	Sacramento River at Freeport	Water	AMS	38.45552	-121.50189	3/28/2022	15:00
3	Spring Storm	510SACC3A	Sacramento River at Hood Monitoring Station Platform	Water	AMS	38.36715	-121.52088	3/28/2022	15:45
4	Summer	519AMNDVY	American River at Discovery Park	Water	AMS	38.60102	-121.50454	6/8/2022	9:05
4	Summer	511POTW02	POTW Source No. 2	Water	MLJ	38.34662	-121.90157	6/8/2022	9:10
4	Summer	519SACUR3	Sacramento Urban Runoff 3; Sump 111	Water	MLJ	38.6013	-121.49297	6/8/2022	9:30
4	Summer	544SJRNBC	San Joaquin River near Buckley Cove	Water	ICF	37.97419	-121.37608	6/8/2022	9:35
4	Summer	511SOL011	Old Alamo Creek at Lewis Road	Water	MLJ	38.34649	-121.89687	6/8/2022	9:50
4	Summer	519SUT108	Sacramento River at Elkhorn Boat Launch Facility	Water	AMS	38.67191	-121.62515	6/8/2022	10:09
4	Summer	519DRYCRK	Dry Creek at Roseville WWTP	Water	MLJ	38.73423	-121.31441	6/8/2022	10:40
4	Summer	519POTW01	POTW Source No. 1	Water	MLJ	38.73403	-121.32181	6/8/2022	11:20
4	Summer	541SJC501	San Joaquin River at Airport Way near Vernalis	Water	ICF	37.67542	-121.26462	6/8/2022	11:20
4	Summer	510ST1301	Sacramento River at Freeport	Water	AMS	38.45545	-121.50199	6/8/2022	12:00
4	Summer	519PGC010	Roseville Urban Runoff	Water	MLJ	38.80474	-121.32733	6/8/2022	12:10

EVENT	SEASON	CEDEN STATION CODE	CEDEN STATION NAME	MATRIX	AGENCY	LATITUDE <sup>1</sup>	LONGITUDE <sup>1</sup>	DATE	TIME
4	Summer	510SACC3A	Sacramento River at Hood Monitoring Station Platform	Water	AMS	38.36769	-121.52079	6/8/2022	12:45

<sup>1</sup>Where the recorded latitude and longitude measurements occur over multiple locations for a single sample collection, the first recorded coordinate values are provided.

## STUDY BACKGROUND

The [Central Valley Pilot Study for Monitoring Constituents of Emerging Concern \(CECs\) Work Plan](#) (Stakeholder Work Plan) was developed by a stakeholder group to better understand methods of evaluating ambient concentrations and sources of CECs in different Central Valley surface water scenarios based on the guidance provided by the SWRCB 2016 Statewide Monitoring Plan (Tadesse 2016). This CEC Pilot Study is the Delta RMP's implementation of the Stakeholder Work Plan as part of a statewide pilot study of CECs being conducted in different regions of California following a mandate and guidelines by the SWRCB. The stated goals in the statewide guidance document are:

“This statewide pilot study implements the second phase of the recommendation which is to gather data to determine the occurrence and biological impacts of CECs. The result of this pilot study will help the State Water Board to develop a statewide CEC monitoring strategy and control action.”

“The objective of the CEC statewide pilot study monitoring plan is to generate statewide data to inform Water Board managers of the status and trends of CECs in water. The plan is designed to narrow the data gap among regions by producing comparable CEC data throughout the state.”

The CEC Pilot Study is designed to collect samples for targeted chemistry analyses from ambient and source locations over a three-year period with phased study components and some adaptive management elements as follows:

- Year 1 – ambient monitoring. The first year of monitoring includes ambient monitoring to assess the presence of the targeted CECs at specific locations in the Delta.
- Year 2 – ambient and source monitoring. The second year of monitoring continues the ambient monitoring conducted during the first year and adds source characterization sites to monitor Publicly Owned Treatment Works (POTW) effluent and urban runoff.
- Year 3 – gradient source study. The third year continues only the source monitoring from Year 2 and adds gradient sampling upstream and downstream of POTWs and other identified sources.

The ambient sampling locations include entry points into the Delta, in-Delta waters, and locations in the vicinity of POTW discharges and within the influence of urban runoff. Ambient monitoring to characterize background conditions is the strategy recommended in the CEC Statewide Pilot Study Monitoring Plan.

Year 1 monitoring was completed in June 2021 ([Delta RMP CEC Year 1 Data Report](#)).

Year 2 monitoring assesses both ambient and source locations and occurred between July

2021 and June 2022. The Year 2 results discussed in this report are being used to inform the design of the third year of monitoring. Results from all three years of the study will be used by the Delta RMP and the State Board to inform regional and statewide assessments of future CEC monitoring needs.

## Year 2 Sampling Events

Year 2 CEC monitoring occurred over four sampling events throughout 2021 and 2022. Events 1 and 2 occurred in October of 2021, with the first event capturing dry weather conditions while the second, which occurred the following week, captured the runoff conditions produced by the first flush storm event of the season (**Table 3**). Event 3 occurred in March of 2022, following a spring storm event, while Event 4 occurred in June to reflect dry season conditions. Storm sampling triggers are defined in the CEC QAPP (v2); descriptions of the hydrologic conditions are provided in **Appendix A. Table 4** includes event descriptions and storm trigger criteria from the CEC QAPP (v2). Storm triggers are evaluated across the basin and therefore one monitoring site may have more rain than another leading up to the sampling event. This is likely true for the October first flush rain event where there was more rain in localized areas but samples were not collected until the storm trigger for the basin was met.

**Table 4. CEC Year 2 event descriptions and associated storm trigger criteria (reproduced from Tables 10-2 and 10-3 from the QAPP).**

EVENT NUMBER	DESCRIPTION	TIMING	STORM TRIGGER FOR WET-WEATHER EVENTS
1	Late summer, early Fall	August, September, or October	n/a
2	First flush (Wet 1)	October - January	0.5 inches in 24 hours over the basin based on NWS forecasts for Sacramento and Stockton (50% probability 48 hours prior to event)
3	Spring storm (Wet 2)	Feb, Mar, or April of	0.25 inches in 24 hours over the basin based on NWS forecasts for Sacramento and Stockton (75% probability 48 hours prior to event)
4	Summer - dry season	May, June, or July	n/a

In addition, a single sediment sample from the American River at Discovery Park was collected by SPoT crews in July 2021 during their normally scheduled collections. These samples were stored frozen at the MLJ office and submitted to the laboratory with the rest of the sediment samples collected in October (except for TOC).

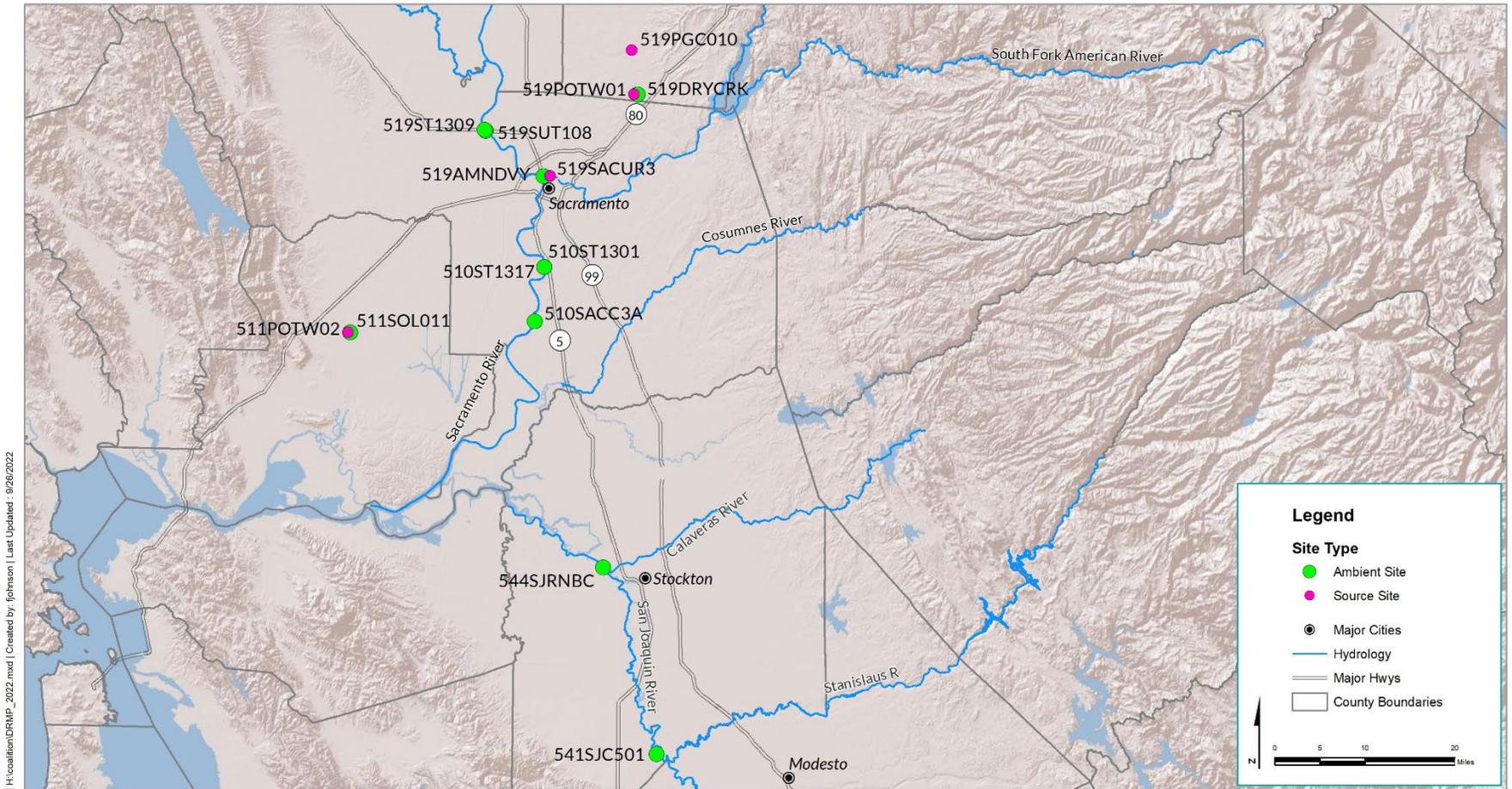
## Year 2 Monitoring Locations

The Year 2 CEC monitoring was conducted at the same ambient sites that were monitored in Year 1 with the addition of four source sites (**Figure 1**). The source sites added for Year 2 monitoring include two urban runoff sites and two POTW effluent locations. All Year 2 monitoring locations were consistent with the CEC Pilot Study Workplan with the following exceptions.

The Year 2 fish tissue collections were conducted by MPSL-DFW field crews. Two of the four fish collection sites are reported under different station names than the associated water and bivalve samples. Fish tissue samples were collected near the Sacramento River at Elkhorn Boat Launch Facility and the Sacramento River at Freeport sites but due to the specifics listed on the permits were associated with the SWAMP station names of Sacramento River at Veterans Bridge -03SWSBIO-519ST1309 and Sacramento River/Freeport-510ST1317, respectively. These additional monitoring stations are identified in the approved CEC QAPP (v2) and the results associated with the MPSL-DFW fish tissue collections can be found under station codes 510ST1317 and 519ST1309.

During Year 2 of the CEC Pilot Study, the ambient sampling location on the San Joaquin River at Buckley Cove was re-evaluated and updated from the original Station Code and coordinates identified in the Pilot Study Workplan and CEC QAPP. After repeated sample collections that occurred farther than 100 meters from the target coordinates that is allowed by the QAPP, the decision was made to move the site approximately 350 m downstream to a location more consistently accessible and more easily identifiable by field crews. The QAPP was amended (approved and signed on June 8, 2022) to identify the updated station name “San Joaquin River near Buckley Cove,” as the correct targeted monitoring location; all sample collection results for Year 2 were updated to reflect the new location. For more details, see **Deviations and Corrective Actions**.

Figure 1. Sampling sites for Year 2 CEC monitoring.



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### Delta RMP Year 2 CEC Monitoring Locations

Coordinate System: NAD 1983 StatePlane California II FIPS 4003 Feet  
 Projection: prprojcs= Lambert, Conformal Conic  
 Units: Feet US  
 North Pole: 49.000000  
 Standard Parallel 1: 38.000000  
 Standard Parallel 2: 38.000000  
 False Easting: 1000000.000000  
 False Northing: 1000000.000000  
 Scale: 1.000000  
 Datum: North American 1983  
 Authority: ESRI



## SAMPLING METHODS

Sampling for Events 1-4 was conducted by personnel from AMS, ICF, SPoT, MPSL-DFW, and MLJ field crews at sites shown in **Figure 1** and following procedures described in the [CEC QAPP \(v2\)](#). Water, sediment, bivalve tissue, and fish tissue samples were collected for analysis of the CECs listed in **Appendix B**. Field measurements were taken alongside all sample collections except for the fish tissue collected by MPSL-DFW field crews.

### Water Sample Collection

Water samples were collected from 12 locations throughout the Delta during all four Year 2 sampling events. Sites were sampled midchannel via a vessel operated by ICF using a pole sampler or via land access by hand collection or bailer. Samples were collected directly into sample bottles wherever possible or, where sample containers were pre-charged with preservatives, poured off from a pre-cleaned bottle of the same material as the sample bottle. Water samples were stored in coolers with double-bagged wet ice from time of collection until delivery to the laboratory. Field crews collecting and handling water samples for PFAS analysis adhered to the contamination prevention protocols outlined in the [CEC QAPP \(v2\)](#) and Sampling and Analysis Plan (SAP). Water samples collected by all field crews were delivered to MLJ Environmental under standard Chain of Custody protocols; MLJ staff submitted all samples to the associated laboratory by shipment or hand delivery.

### Sediment Sample Collection

Sediment samples were collected by AMS and SPoT field crews at three locations during Event 1. Samples for PBDE analysis were collected by taking 2-3 grabs of sediment and placing them into a clean stainless-steel bucket. The sediment composite was then homogenized before being subsampled into the appropriate laboratory containers and placed in a cooler on wet ice. Sediment samples for PFAS analysis were collected by scooping the sediment sample directly into the sample jars provided by the laboratory. Field crews collecting and handling sediment samples for PFAS analysis adhered to the contamination prevention protocols outlined in the [CEC QAPP \(v2\)](#) and SAP. When collection was complete, samples were placed in a cooler with double bagged wet ice and delivered to MLJ Environmental where they were then frozen. Samples were stored frozen to -20 °C until being shipped to SGS-AXYS on January 4, 2022. Although the last sediment samples were collected in October, the samples were not shipped due to customs clearance concerns and winter storms in British Columbia that reduced the laboratory's capacity and jeopardized the ability for timely sample delivery. Samples were received within method hold time requirements and there were no issues with customs;

all sample handling requirements were met for Year 2 sediment samples (see **Data Verification: Sample Handling**).

## Tissue Sample Collection

Bivalves of the species *Corbicula fluminea* (freshwater clam) were collected by AMS staff from six locations during Event 1. Organisms were collected by a clam dredge towed behind a vessel or manually using rakes and shovels. Repeated dredge or hand collection attempts were made at each site until the target sample composite of 20 individual clams comprised of roughly the same proportion of various size classes was reached. Clams were placed in a metal bucket for sorting and a subsample of live specimens were selected for measurement and processing. All organisms from a single site were individually wrapped in aluminum foil, compiled in a zip-top bag, and kept frozen on dry ice until delivered to MLJ Environmental. Bivalve composite samples were stored frozen to -20 °C until being shipped to SGS-AXYS on January 4, 2022. The field report for the bivalve collection noted that there was potential for insufficient tissue from the 25 clams collected at San Joaquin River at Airport Way near Vernalis (541SJC501) on October 21, 2021. Although more than 20 individual clams were collected per the protocol the sample collected was limited by the availability of the clams at the location and therefore there was a concern that the amount of tissue available would not meet the minimum requirements for analysis. To try to remediate this issue the samplers collected more than 20 clams. This potential for a deviation was documented in deviation **2021-01: Year 2 Clam Tissue Collection**.

Fish tissue samples were collected by MPSL-DFW staff from four locations during Event 1 with the target size for fish collection being 30-50 cm in total length. Up to five benthivorous fish of the same species were collected using an electrofishing boat for each of the four stations. Upon collection, each fish was tagged with a unique ID and physical parameters were collected for each individual fish, which included: weight, total length, fork length, and presence of any abnormalities. Large fish were partially dissected in the field using the following protocol: fish were placed on a cutting board covered with a clean plastic bag where the head, tail, and guts were removed using a clean (laboratory detergent, DI) cleaver. The sex of the fish was noted. The fish were then wrapped in tin foil, with the dull side inward, and double-bagged in zipper-closure bags with other fish from the same location. Fish samples were placed on wet ice in the field and frozen within 48 hours of collection. Samples were stored in a freezer at the MPSL until they were processed for authorized dissection as skin-off filets. The frozen dissected filets were shipped overnight in coolers to SGS-AXYS for analysis on January 24, 2022.

## SAMPLE COLLECTION COMPLETENESS

Sample collection completeness is based on the number of samples successfully collected and transported to the laboratory for analysis. Completeness is assessed as each analysis scheduled for each site over all events in the year; completeness counts by individual constituent are provided in Appendix **Table C.2**. All 1,282 samples scheduled for Year 2 monitoring were successfully collected and transferred to the appropriate laboratories and Year 2 sample collection completeness was 100%.

## FIELD ACTIVITIES

Field and cruise reports for Year 2 CEC sample collection are provided in **Appendix A**; collection activities are summarized below.

### Event 1

Event 1 sampling was conducted to capture water, sediment, and tissue samples from the end of the dry weather season and occurred during October 18, 2021 through October 21, 2021 (except the July sediment collection performed by SPoT). While there was light rainfall recorded in the project vicinity, there was no measurable rainfall prior to initiation of sampling, nor was there observable flow into the channels from stormwater sources. Sampling crews recorded low observed flows (0.1-1 cfs) at the Dry Creek at Roseville WWTP, Roseville Urban Runoff, and Sacramento Urban Runoff sites during this dry weather event. Water quality collections were completed before other types of sampling were performed per the field SAP and the CEC QAPP (v2).

AMS staff collected water samples midchannel via a vessel operated by ICF on October 21, 2021, from the sampling sites located at the Sacramento River at Elkhorn Boat Launch Facility, Sacramento River at Freeport, Sacramento River at Hood Monitoring Station Platform, American River at Discovery Park, and San Joaquin River near Buckley Cove. Water samples from the remaining eight stations were collected by land on October 20, 2021 and October 21, 2021 (**Table 3**).

AMS field crews collected sediment samples at two stream locations: Dry Creek at Roseville WWTP on October 20, 2021 and Old Alamo Creek at Lewis Road on October 21, 2021. SPoT field crews collected deep-water sediment samples at American River at Discovery Park on July 22, 2021. The SPoT sample collection occurred at a sediment depth of five cm using core equipment.

Clam tissue samples were collected by hand using rakes and shovels from San Joaquin River at Airport Way near Vernalis on October 20, 2021. Samples were collected by boat using a clam dredge from San Joaquin River near Buckley Cove, American River at Discovery Park, Sacramento River at Elkhorn Boat Launch Facility, Sacramento River at

Hood Monitoring Station Platform, and Sacramento River at Freeport on October 21, 2021. Sufficient amounts and size distributions of organisms was obtained from all sites except for at the San Joaquin River at Airport Way near Vernalis, where field crews attempted hand collection for three hours and encountered a low abundance of clams, the majority of which fell into the smallest size class (see deviation **2021-01: Year 2 Clam Tissue Collection**).

Fish samples were collected on October 18, 2021 and October 19, 2021, by MPSSL-DFW within 1 km of the target sites, per the QAPP. Organisms were collected from three sites October 18, 2021, including seven total fish (5 White Catfish and 2 Sacramento Suckers) collected from the Sacramento River at Freeport, five total fish (5 Sacramento Suckers) collected from the Sacramento River at Veteran's Bridge, and 10 total fish (10 White Catfish) collected from the San Joaquin River at Buckley Cove. Five total fish (5 Common Carp) were collected from the San Joaquin River at Airport Way near Vernalis on October 19, 2021.

## Event 2

Event 2 was a water sample collection event to capture the first flush storm event on October 25, 2021 and October 26, 2021. Sampling during this event was associated with the first major rainfall of the season. The storm event was the result of an atmospheric river that produced over 4.5 inches of rainfall at the Sacramento International Airport and over 3.5 inches at the Stockton Airport between 9 pm on Saturday, October 23, 2021 and 8 am on Monday, October 25, 2021. Other locations around the sampling area reported even higher precipitation levels. Water quality collections were completed per the field SAP and [CEC QAPP \(v2\)](#). Some locations within the large study area reported rainfall exceeding 0.5" prior to the event and experienced a seasonal first flush prior to October 25, 2021; sampling triggers were assessed using the rain gauges at the Stockton and Sacramento Airports, per the requirements in the CEC QAPP (v2).

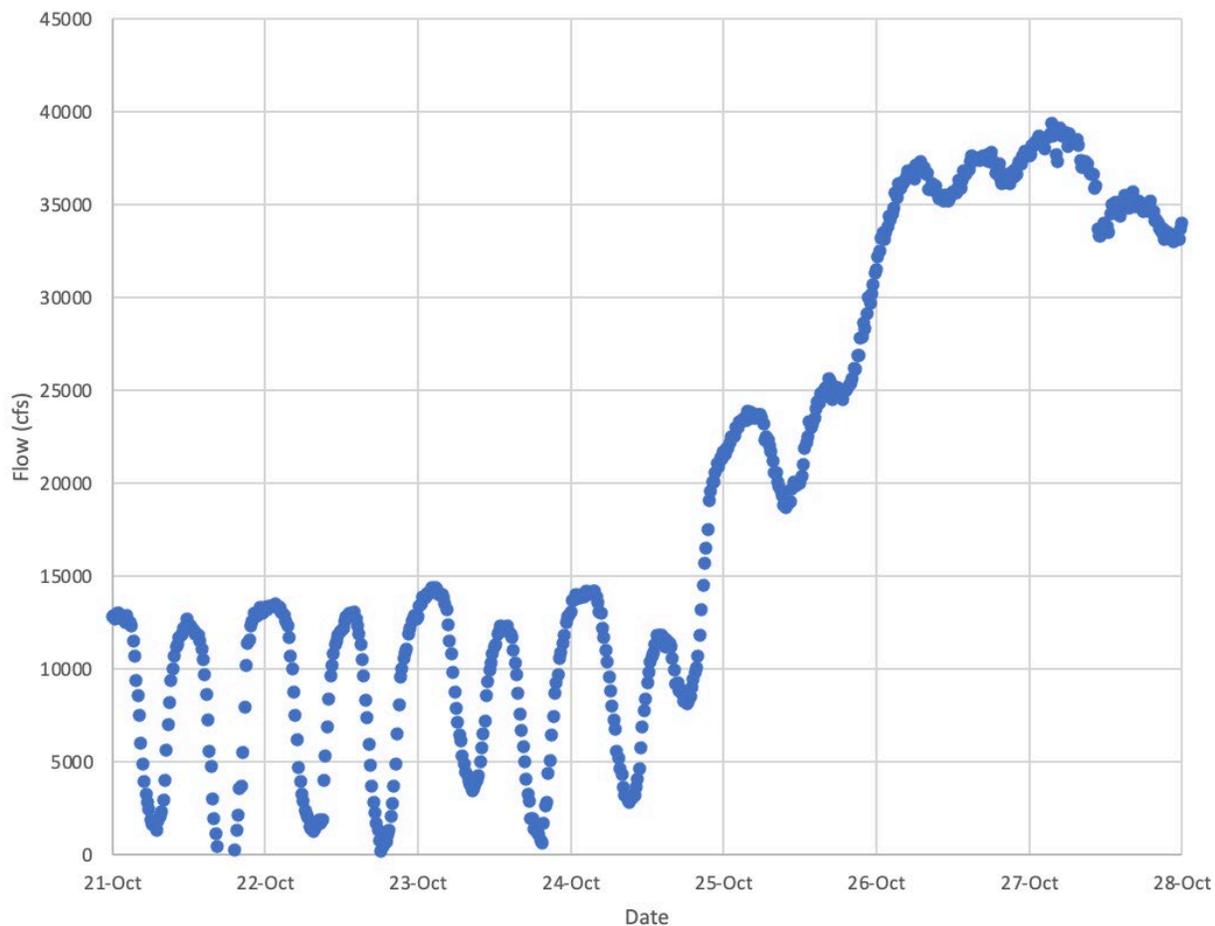
AMS staff collected water samples midchannel via a vessel operated by ICF on October 26, 2021 from the sampling sites located at the Sacramento River at Elkhorn Boat Launch Facility, Sacramento River at Freeport, Sacramento River at Hood Monitoring Station Platform, American River at Discovery Park, and San Joaquin River near Buckley Cove. Water samples collected at the remaining eight stations were collected by land. All sample collections were originally attempted on October 25, 2022, in an effort to follow to the guidance provided in the CEC QAPP which states the preference is to complete collections within 12 hours from last rainfall intensity of 0.1" per hour. Vessel-based sample collections were postponed to the following day (October 26, 2022) due to daylight restrictions and flooding that precluded the vessel launch. In addition, AMS field crews attempting land collections were unable to access the sites at Dry Creek at

Roseville WWTP and POTW Source No. 1 on October 25, 2021 due to flooding and unsafe weather conditions. MLJ staff were able to revisit these locations the following day on October 26, 2021 when there was no longer a risk of flooding and successfully collected the samples.

Flow measurements as reported at USGS sampling station 11447650 near Freeport, California are shown in **Figure 2**. Pre-storm flow measurements remained below 15,000 cfs before the rainfall. During sampling operations, flow rates ranged from 18,700 to 31,300 cfs on October 25, 2021, and 31,500 to 37,900 cfs on October 26, 2021. Elevated flow conditions continued throughout the duration of the sampling event and peaked several days after cessation of major rainfall (39,400 cfs on October 27, 2021, at 3:30 am), indicating the desire to capture the rising limb of the hydrograph was achieved for this storm event.

The QAPP states that “The strategy is to best capture the rising limb, or near the peak of the hydrograph, in safe conditions, while allowing reasonable mobilization times.” The intent of this targeting strategy is to more consistently characterize a specific condition particularly for the smaller drainages that may have more variable concentrations over the course of a runoff event. Logistical and safety considerations constrain sample collection timing. While the downstream river sites generally met this target, urban runoff samples collected for Event 2 were generally later in the hydrograph.

Figure 2. Flow measurements recorded at USGS Station 11447650 near Freepoint, California during Event 2 sample collections (October 25 and 26, 2021).



### Event 3

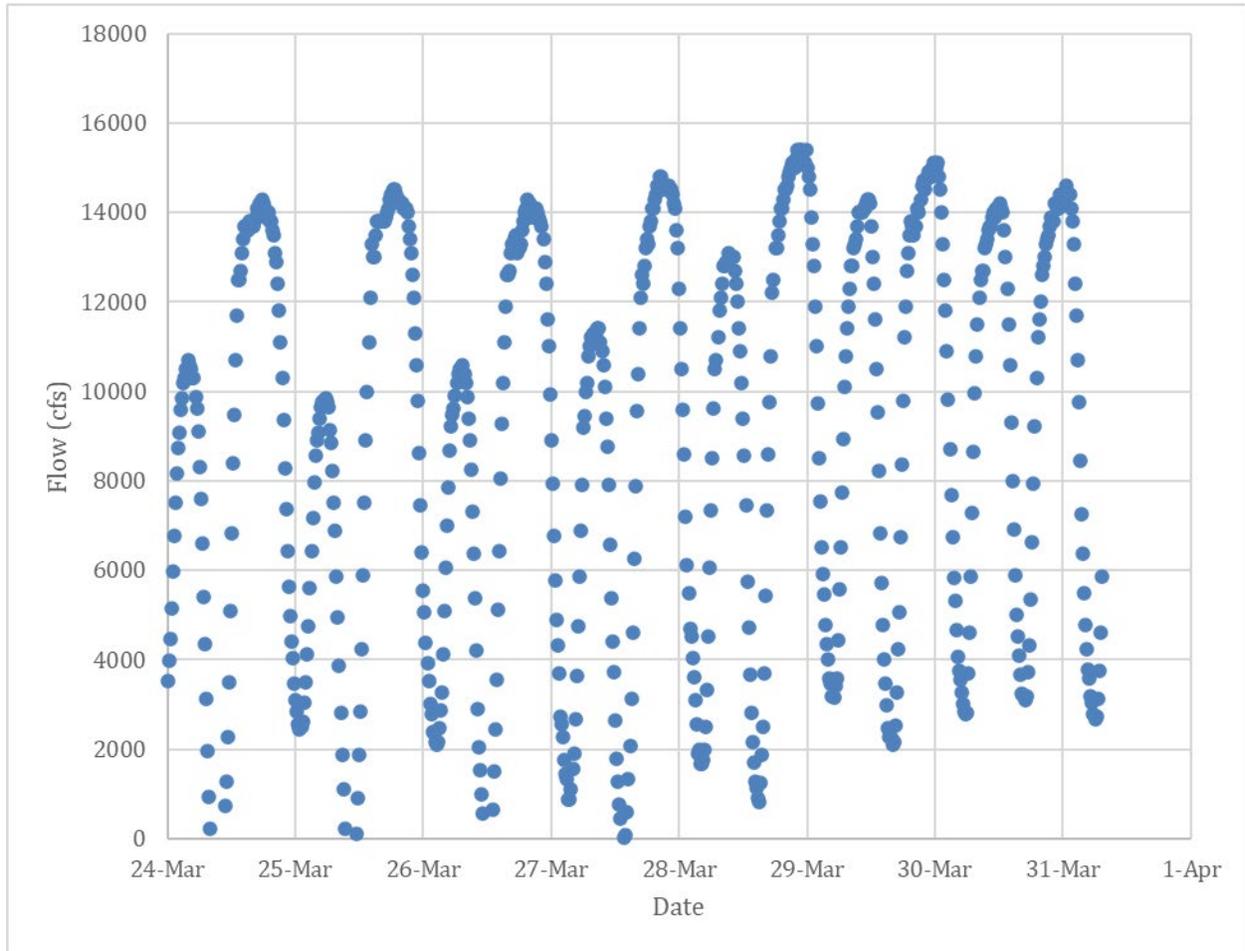
Event 3 water sampling was conducted during the second of two wet season sampling events on March 28, 2022. Sampling for this event was associated with a late season spring storm that produced approximately 1.2 inches of rainfall at the Sacramento International Airport and approximately 0.7 inches at the Stockton Airport between 10 pm on Sunday, March 27, 2022 and 6 pm on Monday, March 28, 2022. Monitoring activities were staggered over the course of the day, as well as geographically, and therefore rainfall totals varied by station. This storm event represented the first significant rainfall for 2022. The previous storm event that exceeded 0.25" occurred in late December of 2021, indicating over 90 days of antecedent dry condition prior to Event 3 sampling. Water quality collections were completed per the field SAP and the [CEC QAPP \(v2\)](#).

AMS staff collected water samples midchannel via a vessel operated by ICF from the sampling sites located at Sacramento River at Elkhorn Boat Launch Facility, Sacramento

River at Freeport, Sacramento River at Hood Monitoring Station Platform, and American River at Discovery Park. The San Joaquin River near Buckley Cove was not sampled at the target location because the marina was closed on the day of sampling. Instead, field crews collected water samples from the bank downstream of the target location. Water samples collected at the remaining eight stations were also collected from land. Sample collections from land occurred in the earlier part of the day during peak runoff and sample collection from a vessel occurred several hours after to allow runoff to have more time to reach the downstream receiving waters. All water samples and field measurements were successfully collected with the exceptions of dissolved oxygen as percent saturation, which was not recorded at San Joaquin River near Buckley Cove or San Joaquin River at Airport Way near Vernalis due to an oversight by sampling crews (see deviation **2021-06: Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported**).

Flow measurements as reported at USGS sampling station 11447650 near Freeport, California, are shown in **Figure 3**. Unlike the first flush event, a large difference in discharge between pre-storm and intra- and post-storm discharge was not easily observable, with patterns following typical diurnal patterns associated with tidal influence. Daily peak discharge results, coinciding with maximum ebb tides, ranged in the 14,000 to 14,500 cfs range before the rainfall. Discharge rates peaked at 15,400 during the peak ebb flow on March 28th and returned to pre-storm conditions approximately 1 day later.

**Figure 3. Flow measurements recorded at USGS Station 11447650 near Freeport, California. Event 3 monitoring occurred on March 28, 2022.**



### Event 4

Event 4 water sampling occurred on June 8, 2022 following antecedent dry conditions that lasted for a minimum 48 hours. Prior to this event, rainfall occurred the morning of June 5, 2022, with total precipitation for the date reported as 0.1” at the Sacramento Airport. Water quality collections were completed per the field SAP and [CEC QAPP \(v2\)](#).

AMS staff collected water samples midchannel via a vessel operated by ICF on June 8, 2022 from the sampling sites located at the Sacramento River at Elkhorn Boat Launch Facility, American River at Discovery Park, Sacramento River at Freeport, and Sacramento River at Hood Monitoring Station Platform. Water samples collected at the remaining eight stations were collected from land by MLJ and ICF field crews. All water samples and field measurements were successfully collected and delivered to MLJ Environmental. Dry weather sampling at storm runoff locations presented a challenge due to the lack of flows. Sampling crews recorded no observed flow at the Dry Creek at Roseville WWTP, Roseville Urban Runoff, and Sacramento Urban Runoff sites during this dry weather event. In addition, samplers also noted a fair amount of algae was present,

and emergent aquatic vegetation surrounded the small pool of stagnant water, where samples were collected at the Roseville Urban Runoff location during this dry-weather sampling.

# ANALYTICAL OVERVIEW

## FIELD MEASUREMENTS

During each of the four sampling events described in the **Sampling Overview**, field crews collected basic water-quality measurements (i.e., air temperature, water temperature, specific conductivity, DO, pH, and turbidity) at a depth of 0.5 m using either a Horiba or YSI ProDSS multi-parameter meter equipped with conductivity/temperature, DO, pH, and turbidity sensors. The meters were calibrated using appropriate procedures and standards before each sampling event as described in the [CEC QAPP \(v2\)](#). Three hundred and twenty of the scheduled 336 field measurements (95.2%) were successfully measured during the Year 2 CEC Monitoring (**Table C.3**).

## ANALYTICAL LABORATORY METHODS

The preparation and analytical methods applied to Delta RMP CEC samples are identified in **Table 5**.

**Table 5. Analytical laboratory methods for CEC Year 2 monitoring.**

MATRIX	ANALYTE	LABORATORY	PREPARATION METHOD	ANALYTICAL METHOD
Water	PPCPs - Hormones	Weck	EPA 3535	EPA 1694M
Water	PPCPs - Pharmaceuticals	Weck	EPA 3535	EPA 1694M
Water	PPCP - Galaxolide	Physis	None	EPA 625.1M
Water	PPCP - Triclocarbon	Physis	None	EPA 625.1M_MRM
Water	Suspended Sediment Concentration	Weck	None	ASTM D3977-97
Water	PFAS	Vista	None	EPA 537M
Sediment	Total Organic Carbon (TOC)	Weck	None	EPA 9060M
Sediment; Tissue - Fish, Bivalves	PBDEs	SGS-AXYS	None	SGS AXYS MLA-033 Rev 06
Sediment; Tissue - Fish only	PFAS	SGS-AXYS	None	SGS AXYS MLA-110 Rev 02

## **Analytical Methods – Physis Laboratories**

Physis analyzed PPCPs using a laboratory modification of EPA 625.1, for “Base/Neutrals and Acids by GC/MS.” Samples were serially extracted with methylene chloride at pH 11 - 13 and again at a pH less than 2. The extract was concentrated to a reduced volume and analyzed by GC/MS. Qualitative identification of an analyte was made using the retention time and the relative abundance of two or more characteristic masses (m/z’s) and quantified using an internal standard technique.

## **Analytical Methods – SGS-AXYS Laboratories**

SGS AXYS analyzed sediment samples for PBDEs using AXYS method MLA-033 Rev. 06 “Analytical Method for The Determination of Brominated Diphenyl Ethers (BDE) And Other Brominated Flame Retardants (BFR)”, a lab modification of EPA Method 1614A. Samples were spiked with <sup>13</sup>C-labelled isotopic standards before analysis, then the solvent was extracted. The extracts were cleaned up by column chromatography, reduced to a final extract, and analyzed by high-resolution gas chromatography with high-resolution mass spectrometric detection (HRGC-HRMS). Final sample concentrations were determined by isotope dilution/internal standard quantification.

SGS AXYS analyzed sediment samples for PFAS using AXYS method MLA-110 Rev. 02 “Analytical Procedure for the Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples, Solids, Tissues, AFFF Products and Solvent Extracts by LC-MS/MS.” After spiking with isotopically labeled surrogate standards, samples were solvent extracted and cleaned up by solid phase extraction (SPE). The extracts were then treated with carbon powder, spiked with recovery standards, and analyzed by liquid chromatography/mass spectrometry (LC-MS/MS). Final sample concentrations were determined by isotope dilution/internal standard quantification.

SGS AXYS received whole bivalves shipped frozen. Bivalves were removed from their shells and homogenized. Following homogenization, samples were analyzed for PBDEs using MLA-033 Rev. 06. Bivalve collection protocols are to collect 20 clams of varying sizes with the goal of having a composite of 12 grams of tissue for analysis. SGS AXYS reported to the Delta RMP on June 14, 2022 that three composites did not have enough tissue to conduct all requested analysis (one of the composites was a duplicate).

SGS AXYS received fish composites shipped frozen. Fish samples were placed in clean amber glass jars with screw caps and frozen to -20°C and stored in the dark prior to analysis. After samples were removed from frozen storage, they were thawed and processed using the same homogenization protocols as bivalve samples. Homogenized samples were analyzed for PBDEs (MLA-033 Rev. 06) and PFAS (MLA-110 Rev. 02) using the same methods as sediment sample analysis.

## **Analytical Methods – Vista Analytical Laboratories**

Vista analyzed samples for PFAS (PFOA and PFOS) in water using laboratory modification of EPA Method 537 for “Determination of PFAS in Drinking Water by 13 Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS).” Target analytes were loaded by passing the collected samples, spiked with internal standards, through a solid phase extraction cartridge, which was then eluted with methanol. The extract was concentrated to a reduced final volume, and the final extract analyzed on the ultra-performance liquid chromatography/tandem mass spectrometry (UPLC/MS/MS) system.

## **Analytical Methods – Weck Laboratories**

Weck analyzed water samples for PPCPs using their internal protocol for “Determination of Endocrine Disrupting Compounds, Pharmaceuticals, and Personal Care Products.” The method is a variant of EPA Method 1694. Solid phase extraction was used for aqueous samples, with the extract quantified by liquid chromatography and electrospray ionization tandem mass spectrometry (LC- ESI/MS/MS). Isotopic dilution was used as an attempt to account for effects from the analytical process and matrix interferences.

Weck analyzed water samples for SSC using a method derived from ASTM D3977. Suspended solids are separated from water samples, dried, and weighed.

Weck analyzed sediment samples for TOC using a modified version of EPA Method 9060. Organic carbon was measured using a carbonaceous analyzer, which converts the organic carbon in a sample to carbon dioxide which is then measured by a detector.

## **ANALYTICAL COMPLETENESS**

Analytical completeness is based on the number of constituents in each sample successfully analyzed and reported by the laboratory. Completeness is assessed as each analysis scheduled for each site over all events in the year; completeness counts by individual constituent are provided in Appendix **Table C.2**. For Year 2 monitoring, results from 1,273 of the total 1,282 constituents scheduled for analysis were successfully reported and the overall analytical completeness was therefore 99.3%.

## **Analysis Failures**

Four of the total nine missing analytical results were lipid analyses scheduled to be completed with each bivalve sample analyzed for PBDEs by SGS-AXYS. The lipid analysis was not completed due to a laboratory oversight, and after realizing the error, the laboratory analyzed two of the original six samples with available tissue remaining. See **Deviations and Corrective Actions** for further discussion.

The remaining five missing environmental analyses were rejected by the laboratory due to associated control sample failures. A total of 15 environmental and QC results were flagged as rejected by the laboratory and provided as informational value only for the Year 2 results. These records are provided below in **Table 6**. All 15 results were associated with analyses of PFAS in fish tissues by SGS-AXYS.

Results for two analytes were not reported in the fish tissue environmental samples, including a single result for N-Ethyl-perfluorooctanesulfonamidoethanol (N-EtFOSE) at Sacramento River at Veterans Bridge, and N-Methyl-perfluorooctanesulfonamidoethanol (N-MeFOSE) from all four sampling locations with fish tissue samples. In addition, N-MeFOSE results were not reported for the associated laboratory blank, laboratory duplicate, LCS and LCSD. The laboratory report notes that N-EtFOSE and N-MeFOSE typically perform poorly in tissue samples, and that the associated IDAs, D<sub>9</sub>-N-EtFOSE and D<sub>7</sub>-N-MeFOSE often show poor recoveries. For this reason, all N-MeFOSE results in tissues are for information only. Likewise, the laboratory notes that isotope dilution analogue (IDA) recoveries D<sub>9</sub>-N-EtFOSE in tissue samples may be low with increased uncertainty in the analyte concentration when the surrogate recovery is below 8%. Under these conditions, N-EtFOSE are for information only.

In addition, Fluorotelomer Carboxylic Acid, 3:3- (3:3 FTCA), Perfluoro-3-methoxypropanoate (PFMPA), Perfluoro-4-methoxybutanoate (PFMBA), Perfluorobutanoate (PFBA), and Perfluoropentanoate (PFPeA) in the fish tissue laboratory duplicate sample were also flagged as rejected by the laboratory.

For these results, the laboratory noted that the percent recovery for the surrogate compounds 13C<sub>4</sub>-PFBA and 13C<sub>5</sub>-PFPeA were below 10%. The results for the related target analytes PFBA, PFPeA, 3:3 FTCA, PFMBA and PFMPA, were flagged as laboratory rejected and reported for information only. In all other cases where the percent recovery for an IDA compound did not meet the MQO, the results were reported and flagged according to the Data Management SOP. As the isotope dilution method of quantification produces data that is recovery corrected, these variances from method criteria were deemed to not affect the quantification of the target analytes.

Percent surrogate recoveries that did not meet MQOs are provided in **Table 22**. A list of analytes with their associated IDA compounds is provided in Appendix **Table B.2**. All results reported as informational by the laboratory are additional analytes that are not required by the CEC Pilot Study Workplan.

**Table 6. Analytical results rejected by the laboratory for CEC Year 2 monitoring.**

SAMPLE TYPE	STATION CODE	MATRIX	ANALYTE	TISSUE RESULT COMMENTS	PROJECT QUALIFIER
Environmental	519ST1309	Fish Tissue	Ethyl-perfluorooctanesulfonamidoethanol, N-(N-EtFOSE)	information value only; result was 5.14 ng/g DNQ	Rejected
Environmental	519ST1309	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	information value only, not detected	Rejected
Environmental	510ST1317	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	information value only, not detected	Rejected
Environmental	544LSAC13	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	information value only, not detected	Rejected
Environmental	541SJC501	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	information value only, not detected	Rejected
Lab Blank	LABQA	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	information value only, not detected	Rejected
Lab Duplicate	510ST1317	Fish Tissue	Fluorotelomer Carboxylic Acid, 3:3-(3:3 FTCA)	RPD Not Calculable; IDA: Perfluoropentanoate-13C5(IsoDiIAnalogue); information value only, not detected	Rejected
Lab Duplicate	510ST1317	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	RPD Not Calculable; information value only, not detected	Rejected
Lab Duplicate	510ST1317	Fish Tissue	Perfluoro-3-methoxypropanoate (PFMPA)	RPD Not Calculable; IDA: Perfluoropentanoate-13C5(IsoDiIAnalogue); information value only, not detected	Rejected

SAMPLE TYPE	STATION CODE	MATRIX	ANALYTE	TISSUE RESULT COMMENTS	PROJECT QUALIFIER
Lab Duplicate	510ST1317	Fish Tissue	Perfluoro-4-methoxybutanoate (PFMBA)	RPD Not Calculable; IDA: Perfluoropentanoate-13C5(IsoDiIAnalogue); information value only, not detected	Rejected
Lab Duplicate	510ST1317	Fish Tissue	Perfluorobutanoate (PFBA)	RPD Not Calculable; information value only, result was 31.6 ng/g	Rejected
Lab Duplicate	510ST1317	Fish Tissue	Perfluoropentanoate (PFPeA)	RPD Not Calculable; information value only	Rejected
LCS	LABQA	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	PR 196; information value only; result was 49 ng/g	Rejected
LCS	LABQA	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	PR 231; information value only; result was 18.5 ng/g	Rejected
LCSD	LABQA	Fish Tissue	Methyl-perfluorooctanesulfonamidoethanol, N-(N-MeFOSE)	PR 237, RPD 19; information value only; result was 59.5 ng/g	Rejected

# DATA VERIFICATION OVERVIEW

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## VERIFICATION PROCESS

The US EPA defines data verification as the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications. Verification of Delta RMP CEC data was performed by MLJ and the Marine Pollution Studies Laboratory at Moss Landing Marine Laboratories (MPSL-MLML) based on the sample handling requirements and measurement quality objectives (MQOs) of the [CEC QAPP \(v2\)](#). Verification of instrument tuning, calibration standards, calibration verifications, and internal standards were the responsibility of the submitting laboratory.

Initial data verification by MLJ staff was conducted as individual electronic data deliverables (EDDs) received from the laboratories were processed and uploaded into the Central Valley Regional Data Center (CV RDC). These data processing steps occurred according to the procedures outlined in the [CEC QAPP \(v2\)](#). All project data underwent a secondary verification review by MPSL-MLML staff as a part of the data finalization process, at which point all verified data were assigned a classification and the corresponding California Environmental Data Exchange Network (CEDEN) compliance code described in the following sections.

### *Compliant*

Data classified as “Compliant” meet all requirements specified in the CEC QAPP. These data are considered usable for their intended purpose without additional assessment.

### *Qualified*

Data classified as “Qualified” do not meet one or more of the requirements specified in the CEC QAPP. These data are considered usable for their intended purpose following an additional assessment to determine the scope and impact of the deficiency.

### *Estimated*

Data classified as “Estimated” (i.e., EPA “J” flag) are assigned to data batches and sample results that are not considered quantifiable.

### *Screening*

Data classified as “Screening” are considered non-quantitative and may or may not meet the minimum requirements specified in the CEC QAPP. These data may not be usable for their intended purpose and require additional assessment.

### *Rejected*

Data classified as “Rejected” do not meet the minimum requirements specified in the CEC QAPP. These data are not considered usable for their intended purpose.

### *Not Applicable*

Data classified as “Not Applicable” were not verified since there were no CEC QAPP requirements for the specific parameter (e.g., oxygen saturation) or a failure was reported and could not be verified.

## **VERIFIED DATASETS**

This report details the above verification process as applied to the analytical batches appearing in **Table 7**. The findings of the data verification process are outlined in the sections below. A complete summary of the completeness and quality control (QC) sample acceptability for each analysis performed during Year 2 is provided in **Appendix D**.

**Table 7. Verified datasets (analytical batches) for CEC Year 2 monitoring.**

LAB	ANALYTICAL CATEGORY	MATRIX	DATASETS PRODUCED	DATASETS REVIEWED	REVIEWED DATASET (BATCH) IDs
Vista	PFAS	Water	4	4	VAL_DRMP_CEC_B1J0182_W_PFAS; VAL_DRMP_CEC_B1K0022_W_PFAS; VAL_DRMP_CEC_B22D021_W_PFAS VAL_DRMP_CEC_B22F131_W_PFAS;
Physis	PPCPs (Galaxolide and Triclocarban only)	Water	8	8	Physis_DRMP_CEC_O-33146_W_BNs; Physis_DRMP_CEC_O-33146b_W_BNs; Physis_DRMP_CEC_O-35002_W_BNs; Physis_DRMP_CEC_O-35002b_W_BNs; Physis_DRMP_CEC_O-35136_W_BNs; Physis_DRMP_CEC_O-35136b_W_BNs; Physis_DRMP_CEC_O-38036_W_BNs; Physis_DRMP_CEC_O-38036b_W_BNs
Weck	PPCPs	Water	9	9	WKL_DRMP_CEC_W2D0037_W_PPCP; WKL_DRMP_CEC_W2D0038_W_PPCP; WKL_DRMP_CEC_W2F1171_W_PPCP; WKL_DRMP_CEC_W2F1171b_W_PPCP WKL_DRMP_CEC_W2F1172_W_PPCP; WKL_DRMP_CEC_W1K1219_W_PPCP_Neg; WKL_DRMP_CEC_W1K1527_W_PPCP_Neg; WKL_DRMP_CEC_W1K1221_W_PPCP_Horm; WKL_DRMP_CEC_W1K1523_W_PPCP_Horm
Weck	SSC	Water	4	4	WKL_DRMP_CEC_W2D0661_W_SSC; WKL_DRMP_CEC_W2F1561_W_SSC; WKL_DRMP_CEC_W1K0517_W_SSC; WKL_DRMP_CEC_W1K0183_W_SSC
SGS-AXYS	PFAS	Sediment	1	1	AXYS_DRMP_CEC_WG81568_S_PFAS
SGS-AXYS	PBDEs	Sediment	1	1	AXYS_DRMP_CEC_WG81579_S_PBDE

LAB	ANALYTICAL CATEGORY	MATRIX	DATASETS PRODUCED	DATASETS REVIEWED	REVIEWED DATASET (BATCH) IDs
Weck	TOC	Sediment	2	2	WKL_DRMP_CEC_W1H1243_S_TOC; WKL_DRMP_CEC_W1K0706_S_TOC
SGS-AXYS	PFAS	Tissue	1	1	AXYS_DRMP_CEC_WG81677_T_PFAS
SGS-AXYS	PBDEs	Tissue	2	2	AXYS_DRMP_CEC_WG81851_T_PBDE; AXYS_DRMP_CEC_WG82732_T_Lipid

## DATA VERIFICATION: SAMPLE HANDLING

During data verification, storage and holding times of CEC Year 2 samples were evaluated to ensure the integrity of the target analyte(s) in each matrix. For consistency with the SWRCB SWAMP and the Code of Federal Regulations, Title 40 *Protection of the Environment*, Section 136 *Guidelines Establishing Test Procedures for the Analysis of Pollutants*, Delta RMP holding times are defined as follows:

- *Pre-Preservation/Extraction*: Required holding times for sample preservation or extraction begin at the time of sample collection and conclude when the sample is preserved or extracted, respectively.
- *Pre-Analysis*: Required holding times for sample analysis begin either at the time of sample collection, filtration or extraction and conclude when sample analysis is completed.

In Year 2, 70 Delta RMP CEC samples were verified against the sample handling requirements in **Table 8**.

**Table 8. Year 2 CEC QAPP sample handling requirements.**

MATRIX	PARAMETER GROUP	PRE-PRESERVATION/EXTRACTION		PRE-ANALYSIS
		Storage	Holding Time	Holding Time
Fish and Bivalve Tissue	PBDEs	<-10 °C, dark	365 days	40 days
	PFAS	<-10 °C, dark	NA	365 days
Sediment	PBDEs	<-10°C, dark	365 days	40 days (not to exceed 365 days from sample collection)
	PFAS	<-10 °C, dark	NA	365 days
	TOC	<6 °C, dark	NA	28 days
Water	PPCPs (Weck)	Preserve with sodium azide (200 mg) and Ascorbic acid (100 mg); store at <6 °C	28 days	40 days
	PPCPs (Galaxolide and Triclocarban only - Physis)	<6 °C	7 days	40 days
	PFAS	<10 °C	28 days	30 days
	SSC	<6 °C	NA	14 days

98.6% of verified samples (1480 of 1501) met these Delta RMP CEC requirements (**Table C.15**). Analyses resulting in a hold time qualification appear in **Table 9** and includes environmental samples analyzed for galaxolide (sample date = 10/26/21) and triclocarban (sample date = 3/28/22)

**Table 9. Sample handling qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: H. QA code definitions are provided in Appendix Table C.1.

DATASET ID	SAMPLE ID	SAMPLE DATE	MATRIX	ANALYTE	PROJECT QUALIFIER	QUALIFIER DESCRIPTION
Physis_DRMP_CEC_O-35002_W_BNs	510SACC3A	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	510SACC3A	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	510ST1301	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	510ST1301	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK (Fieldblank)	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK (Fieldblank)	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519POTW01	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519POTW01	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519SUT108	10/26/2021	Water	Galaxolide	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35002_W_BNs	519SUT108	10/26/2021	Water	Galaxolide-d6 (Surrogate)	Qualified	Hold time violation. Samples were analyzed 1 day past hold time

DATASET ID	SAMPLE ID	SAMPLE DATE	MATRIX	ANALYTE	PROJECT QUALIFIER	QUALIFIER DESCRIPTION
Physis_DRMP_CEC_O-35136b_W_BNs	510SACC3A	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	510ST1301	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	511POTW02	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	511SOL011	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519AMNDVY	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519DRYCRK	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519PGC010	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519POTW01	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SACUR3	3/28/2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108 (Fieldblank)	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108 (MS)	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108 (Rep1)	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108 (MS)	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108 (Lab Rep 2)	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time

DATASET ID	SAMPLE ID	SAMPLE DATE	MATRIX	ANALYTE	PROJECT QUALIFIER	QUALIFIER DESCRIPTION
Physis_DRMP_CEC_O-35136b_W_BNs	541SJC501	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	544SJRNBC	3/28/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were analyzed 2 days past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	96278-B1 (Labblank)	4/4/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were digested 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	96278-BS2 (LCS)	4/4/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were digested 1 day past hold time
Physis_DRMP_CEC_O-35136b_W_BNs	96278-BS1 (LCS)	4/4/ 2022	Water	Triclocarban	Qualified	Hold time violation. Samples were digested 1 day past hold time

## DATA VERIFICATION: FIELD MEASUREMENTS

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Equipment used to take field data measurements must be calibrated according to Table 14.1 of the [CEC QAPP \(v2\)](#). At a minimum, the following equipment must be calibrated:

- Thermometers
- DO meters
- pH meters
- Conductivity meters
- Multi-parameter field meters

After post-calibration checks are performed, the percent drift should be evaluated to confirm compliance with Table 14.1 of the [CEC QAPP \(v2\)](#). Non-compliant results should not be reported unless they have been flagged to indicate non-compliance.

A total of 320 (95.2%) field measurements were successfully collected for Year 2 monitoring (**Table C.3**). Of the 336 expected field measurement results reported, 274 results were classified as compliant. Fourteen air temperature results were classified as “Not Applicable” since the values were not reported by the field crew. None of the 48 oxygen saturation results were verified since no MQO exists for this field measurement. Affected oxygen saturation results were classified as “Not Applicable”.

## DATA VERIFICATION: CHEMISTRY

Delta RMP CEC chemistry data verification assesses QC samples associated with contamination, precision, and accuracy. For consistency with SWAMP, QC sample definitions are based on the January 2022 *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*.

### Contamination

For Physis, SGS-AXYS, Vista, and Weck, PBDE, PFAS, PPCP, SSC, and TOC analyses, contamination is assessed with the analysis of field blanks and laboratory blanks. Associated data verification results are detailed below.

### Field Blanks

A field blank is a sample of analyte-free media that is transported to the sampling site, exposed to the sampling conditions, returned to the laboratory, and treated as a routine environmental sample. Preservatives, if any, are added to the sample container in the same manner as the environmental sample. The field blank matrix should be comparable to the sample of interest. This blank is used to provide information about contaminants that may be introduced during sample collection, storage, and transport.

For Delta RMP CEC monitoring in Year 2, four field blanks were collected for PFAS, PPCP, and SSC analyses in water. 87.5% of these results (63 of 72, **Table C.5**) met the Delta RMP MQO by being below the method detection limit (MDL). Analyses resulting in qualification appear in **Table 10** and include galaxolide, salicylic acid, diclofenac, and bisphenol A.

**Table 10. Field blank qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: IP. QA code definitions are provided in Appendix **Table C.1**.

FIELD BLANK ID	SAMPLE DATE	MATRIX	ANALYTE	SAMPLE RESULT (ng/L)	MDL (ng/L)	PROJECT QUALIFIER
511SOL011	10/21/2021	Water	Galaxolide	148	0.1	Qualified
519DRYCRK	10/26/2021	Water	Galaxolide	216	0.1	Qualified
519SUT108	3/28/2022	Water	Galaxolide	162	0.1	Qualified
541SJC501	6/8/2022	Water	Galaxolide	120	0.1	Qualified
511SOL011	10/21/2021	Water	Salicylic Acid	100	100	Qualified
511SOL011	10/21/2021	Water	Diclofenac	40	4	Qualified
511SOL011	10/21/2021	Water	Bisphenol A	260	4	Qualified
519DRYCRK	10/26/2021	Water	Bisphenol A	84	4	Qualified

FIELD BLANK ID	SAMPLE DATE	MATRIX	ANALYTE	SAMPLE RESULT (ng/L)	MDL (ng/L)	PROJECT QUALIFIER
541SJC501	6/8/2022	Water	Bisphenol A	26	4	Qualified

The Delta RMP qualifies only the field blank sample itself when contamination is detected, and the data qualifiers are not propagated to the affected environmental samples. Data users must cross reference environmental sample batch numbers with the associated field blank. In the case of bisphenol A, systematic contamination was reported in the laboratory blanks for the first three Year 2 events. The fourth Year 2 bisphenol A field blank sample was detected at concentrations near to the environmental concentrations. For these reasons, the Delta RMP recommends that data users do not use Year 2 bisphenol A data for characterization or assessment purposes.

### Laboratory Blanks

A laboratory blank is free from the target analyte(s) and is used to represent the environmental sample matrix as closely as possible. The laboratory blank is processed simultaneously with and under the same conditions and steps of the analytical procedures (e.g., including exposure to all glassware, equipment, solvents, reagents, labeled compounds, internal standards, and surrogates that are used with samples) as all samples in the analytical batch (including other QC samples). The laboratory blank is used to determine if target analytes or interferences are present in the laboratory environment, reagents, or instruments. Results of laboratory blanks provide a measurement of bias introduced by the analytical procedure.

For Delta RMP CEC monitoring in Year 2, laboratory blanks were prepared and analyzed for all PBDE, PFAS, PPCP (including galaxolide and triclocarban), SSC, and TOC batches. Laboratory blanks were analyzed at the required frequency of one per 20 samples or per batch (whichever is more frequent). 91.8% of these results (156 of 170) met the Delta RMP MQO by being below the MDL (**Table C.7**). If a laboratory blank is flagged, the associated results in the same batch are also flagged. Analyses resulting in qualification appear in **Table 11** (laboratory blank results with concentrations above the MDL) and **Table 12** (results associated with the laboratory blank contamination that were flagged).

**Table 11. Laboratory blank qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: IP. QA code definitions are provided in Appendix Table C.1.

DATASET ID	LAB BLANK ID	MATRIX	ANALYTE	BLANK RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG8157 9_S_PBDE	WG81579-101 i	Sediment	PBDE 154	0.000160	0.000144	ng/g dw	Qualified
AXYS_DRMP_CEC_WG8157 9_S_PBDE	WG81579-101 i	Sediment	PBDE 047	0.00212	0.000193	ng/g dw	Qualified
AXYS_DRMP_CEC_WG8157 9_S_PBDE	WG81579-101 i	Sediment	PBDE 100	0.000245	0.0001	ng/g dw	Qualified
AXYS_DRMP_CEC_WG8157 9_S_PBDE	WG81579-101 i	Sediment	PBDE 099	0.00110	0.000116	ng/g dw	Qualified
Physis_DRMP_CEC_O- 33146_W_BNs	91542-B1	Water	Galaxolide	65.19999	0.1	ng/L	Qualified
Physis_DRMP_CEC_O- 35002_W_BNs	92110-B1	Water	Galaxolide	67.8	0.1	ng/L	Qualified
Physis_DRMP_CEC_O- 35136_W_BNs	96278-B1	Water	Galaxolide	126	0.1	ng/L	Qualified
Physis_DRMP_CEC_O- 38036_W_BNs	97455-B1	Water	Galaxolide	105	0.1	ng/L	Qualified
WKL_DRMP_CEC_W1K121 9_W_PPCP_Neg	W1K1219-BLK1	Water	Bisphenol A	67.7	4	ng/L	Qualified
WKL_DRMP_CEC_W1K152 7_W_PPCP_Neg	W1K1527-BLK1	Water	Bisphenol A	63.4	4	ng/L	Qualified
AXYS_DRMP_CEC_WG8185 1_T_PBDE	LabBlank_WG81851 -AXYS	Tissue	PBDE 100	0.00294	0.00116	ng/g dw	Qualified
AXYS_DRMP_CEC_WG8185 1_T_PBDE	LabBlank_WG81851 -AXYS	Tissue	PBDE 099	0.00946	0.00183	ng/g dw	Qualified

DATASET ID	LAB BLANK ID	MATRIX	ANALYTE	BLANK RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81851_T_PBDE	LabBlank_WG81851-AXYS	Tissue	PBDE 209	0.331	0.0287	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAAS	LabBlank_WG81677-AXYS	Tissue	Perfluoro-3,6-dioxaheptanoate	0.383	0.300	ng/g dw	Qualified

**Table 12. Laboratory blank qualification for CEC Year 2 monitoring: associated samples.**

Results appearing in this table were all flagged with the CEDEN QA code: FI. QA code definitions are provided in Appendix Table C.1.

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 047	5.25	0.000211	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 047	3.24	0.000111	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 099	4.76	0.00303	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 099	3.32	0.00201	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 100	0.960	0.00154	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 100	1.45	0.00233	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 154	0.403	0.000232	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 154	0.539	0.000438	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 047	0.126	0.000214	ng/g dw	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 047	0.0942	0.00020 3	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 099	0.0885	0.00047 7	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 099	0.125	0.00047 1	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 100	0.0267	0.00030 9	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 100	0.0340	0.00031 2	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 154	0.0141	0.00015 4	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519AMNDVY	Sediment	7/22/2021	PBDE 154	0.0130	0.00015 1	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519DRYCRK	Sediment	10/20/2021	PBDE 047	0.190	0.00014 2	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519DRYCRK	Sediment	10/20/2021	PBDE 099	0.274	0.00067 3	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519DRYCRK	Sediment	10/20/2021	PBDE 100	0.0717	0.00047 5	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 579_S_PBDE	519DRYCRK	Sediment	10/20/2021	PBDE 154	0.0457	0.00010 5	ng/g dw	Qualified
Physis_DRMP_CEC_O- 33146_W_BNs	510SACC3A	Water	10/21/2021	Galaxolide	647	0.1	ng/L	Qualified
Physis_DRMP_CEC_O- 33146_W_BNs	510ST1301	Water	10/21/2021	Galaxolide	114	0.1	ng/L	Qualified
Physis_DRMP_CEC_O- 33146_W_BNs	511POTW02	Water	10/21/2021	Galaxolide	44300	0.1	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
Physis_DRMP_CEC_O-33146_W_BNs	511SOL011	Water	10/21/2021	Galaxolide	25000	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	511SOL011	Water	10/21/2021	Galaxolide	25900	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519AMNDVY	Water	10/21/2021	Galaxolide	94.4	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519DRYCRK	Water	10/20/2021	Galaxolide	326	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519PGC010	Water	10/20/2021	Galaxolide	506	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519POTW01	Water	10/20/2021	Galaxolide	32000	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519SACUR3	Water	10/20/2021	Galaxolide	490	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	519SUT108	Water	10/21/2021	Galaxolide	300	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	541SJC501	Water	10/20/2021	Galaxolide	82.5	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-33146_W_BNs	544SJRNBC	Water	10/21/2021	Galaxolide	658	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	510SACC3A	Water	10/26/2021	Galaxolide	658	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	510ST1301	Water	10/26/2021	Galaxolide	177	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	511POTW02	Water	10/25/2021	Galaxolide	41500	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	511SOL011	Water	10/25/2021	Galaxolide	25500	0.1	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
Physis_DRMP_CEC_O-35002_W_BNs	519AMNDVY	Water	10/26/2021	Galaxolide	126	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	Water	10/26/2021	Galaxolide	125	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	Water	10/26/2021	Galaxolide	229	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519PGC010	Water	10/25/2021	Galaxolide	170	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519POTW01	Water	10/26/2021	Galaxolide	37900	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519SACUR3	Water	10/25/2021	Galaxolide	210	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519SUT108	Water	10/26/2021	Galaxolide	157	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	541SJC501	Water	10/25/2021	Galaxolide	97.7	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	544SJRNBC	Water	10/25/2021	Galaxolide	915	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	510SACC3A	Water	3/28/2022	Galaxolide	508	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	510ST1301	Water	3/28/2022	Galaxolide	236	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	511POTW02	Water	3/28/2022	Galaxolide	17100	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	511SOL011	Water	3/28/2022	Galaxolide	14300	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519AMNDVY	Water	3/28/2022	Galaxolide	229	0.1	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
Physis_DRMP_CEC_O-35136_W_BNs	519DRYCRK	Water	3/28/2022	Galaxolide	219	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519PGC010	Water	3/28/2022	Galaxolide	217	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519POTW01	Water	3/28/2022	Galaxolide	16000	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519SACUR3	Water	3/28/2022	Galaxolide	217	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519SUT108	Water	3/28/2022	Galaxolide	126	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	519SUT108	Water	3/28/2022	Galaxolide	255	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	541SJC501	Water	3/28/2022	Galaxolide	261	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-35136_W_BNs	544SJRNBC	Water	3/28/2022	Galaxolide	776	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	510SACC3A	Water	6/8/2022	Galaxolide	766	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	510ST1301	Water	6/8/2022	Galaxolide	97.2	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	511POTW02	Water	6/8/2022	Galaxolide	16800	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	511SOL011	Water	6/8/2022	Galaxolide	22000	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	519AMNDVY	Water	6/8/2022	Galaxolide	272	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	519DRYCRK	Water	6/8/2022	Galaxolide	86.8	0.1	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
Physis_DRMP_CEC_O-38036_W_BNs	519PGC010	Water	6/8/2022	Galaxolide	135	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	519POTW01	Water	6/8/2022	Galaxolide	21200	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	519SACUR3	Water	6/8/2022	Galaxolide	158	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	519SUT108	Water	6/8/2022	Galaxolide	120	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	541SJC501	Water	6/8/2022	Galaxolide	92.2	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	541SJC501	Water	6/8/2022	Galaxolide	76.7	0.1	ng/L	Qualified
Physis_DRMP_CEC_O-38036_W_BNs	544SJRNBC	Water	6/8/2022	Galaxolide	564	0.1	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	510SACC3A	Water	10/21/2021	Bisphenol A	75	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	510ST1301	Water	10/21/2021	Bisphenol A	140	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Bisphenol A	94	4.4	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	511SOL011	Water	10/21/2021	Bisphenol A	81	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	511SOL011	Water	10/21/2021	Bisphenol A	130	4.6	ng/L	Qualified
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	519AMNDVY	Water	10/21/2021	Bisphenol A	670	4.5	ng/L	Estimated <sup>1</sup>
WKL_DRMP_CEC_W1K1_219_W_PPCP_Neg	519DRYCRK	Water	10/20/2021	Bisphenol A	150	4.7	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	519PGC010	Water	10/20/2021	Bisphenol A	330	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	519POTW01	Water	10/20/2021	Bisphenol A	80	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	519SACUR3	Water	10/20/2021	Bisphenol A	67	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	519SUT108	Water	10/21/2021	Bisphenol A	80	4.7	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	541SJC501	Water	10/20/2021	Bisphenol A	370	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	544SJRNBC	Water	10/21/2021	Bisphenol A	110	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 219_W_PPCP_Neg	544SJRNBC	Water	10/21/2021	Bisphenol A	1280	4	ng/L	Estimated <sup>1</sup>
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Bisphenol A	60	8	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Bisphenol A	20	7	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	511POTW02	Water	10/25/2021	Bisphenol A	39	5.1	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Bisphenol A	1500	4.9	ng/L	Estimated <sup>1</sup>
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519AMNDVY	Water	10/26/2021	Bisphenol A	25	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519DRYCRK	Water	10/26/2021	Bisphenol A	310	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519DRYCRK	Water	10/26/2021	Bisphenol A	13	4	ng/L	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519PGC010	Water	10/25/2021	Bisphenol A	55	4.6	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519POTW01	Water	10/26/2021	Bisphenol A	81	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519DRYCRK	Water	10/26/2021	Bisphenol A	11.9	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519SACUR3	Water	10/25/2021	Bisphenol A	160	4.5	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	519SUT108	Water	10/26/2021	Bisphenol A	8	4	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	541SJC501	Water	10/25/2021	Bisphenol A	51	4.7	ng/L	Qualified
WKL_DRMP_CEC_W1K1 527_W_PPCP_Neg	544SJRNBC	Water	10/25/2021	Bisphenol A	38	4	ng/L	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510SACC3A- 2021-10-21	Tissue	10/21/2021	PBDE 099	15.1	0.0306	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510SACC3A- 2021-10-21	Tissue	10/21/2021	PBDE 100	31.6	0.0194	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510SACC3A- 2021-10-21	Tissue	10/21/2021	PBDE 209	0.404	0.0354	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510ST1301- 2021-10-21	Tissue	10/21/2021	PBDE 099	4.29	0.0123	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510ST1301- 2021-10-21	Tissue	10/21/2021	PBDE 100	11.1	0.00712	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510ST1301- 2021-10-21	Tissue	10/21/2021	PBDE 209	0.209	0.0284	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81 851_T_PBDE	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	PBDE 099	2.34	0.00328	ng/g dw	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	10/18/2021	PBDE 100	1.42	0.00210	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	10/18/2021	PBDE 209	0.0233	0.0163	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519AMNDVY-2021-10-21	Tissue	10/21/2021	PBDE 099	1.84	0.00891	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519AMNDVY-2021-10-21	Tissue	10/21/2021	PBDE 100	3.31	0.00507	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519AMNDVY-2021-10-21	Tissue	10/21/2021	PBDE 209	1.21	0.122	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	10/18/2021	PBDE 099	0.00515	0.00242	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	10/18/2021	PBDE 100	4.68	0.00153	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	10/18/2021	PBDE 209	0.107	0.0179	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519SUT108-2021-10-21	Tissue	10/21/2021	PBDE 099	1.31	0.00451	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-519SUT108-2021-10-21	Tissue	10/21/2021	PBDE 100	4.07	0.00252	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-541SJC501-2021-10-20	Tissue	10/20/2021	PBDE 099	0.439	0.00588	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-541SJC501-2021-10-20	Tissue	10/20/2021	PBDE 100	0.817	0.00346	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-541SJC501-2021-10-20	Tissue	10/20/2021	PBDE 209	0.532	0.0909	ng/g dw	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	SAMPLE RESULT	MDL	UNITS	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-541SJC501-2021-10-20-CAR	Tissue	10/20/2021	PBDE 099	0.0095 2	0.00433	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-541SJC501-2021-10-20-CAR	Tissue	10/20/2021	PBDE 100	4.53	0.00259	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544LSAC13-2021-10-18-WHC	Tissue	10/18/2021	PBDE 099	1.72	0.00187	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544LSAC13-2021-10-18-WHC	Tissue	10/18/2021	PBDE 100	1.25	0.00134	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544LSAC13-2021-10-18-WHC	Tissue	10/18/2021	PBDE 209	0.0671	0.0166	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 099	1.47	0.00928	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 099	1.53	0.00941	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 100	4.70	0.00527	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 100	5.06	0.00521	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 209	0.572	0.0442	ng/g dw	Qualified
AXYS_DRMP_CEC_WG81_851_T_PBDE	DRMP-CEC-544SJRNBC-2021-10-21	Tissue	10/21/2021	PBDE 209	0.615	0.0689	ng/g dw	Qualified

<sup>1</sup> Estimated compliance codes applied by laboratory due to application of CJ QA Code: analyte concentration in excess of the instrument calibration; considered estimated. See Table 24.

Galaxolide and bisphenol A had contamination in both field blanks and laboratory blanks in both Year 1 and Year 2 data. Field samplers were reminded about sampling procedures to reduce contamination and the laboratory was also communicated with regarding contamination concerns. Weck confirmed that there was not contamination coming from the instrument itself but rather during the extraction process and they continue to try and minimize contamination during the process. However, both galaxolide and bisphenol A are present in most materials and is difficult to avoid contamination.

Bisphenol A field and laboratory blank concentrations were distributionally similar to the observed environmental data (median blank concentration = 66.35 ng/L, median environmental concentration = 26 ng/L, rank sum test p-value = 0.277). It is therefore difficult to distinguish concentration differences between blanks and environmental samples. For these reasons, the Delta RMP recommends that data users do not use Year 2 bisphenol A data for characterization or assessment purposes. The Delta RMP also recommends collection of additional QC samples in Year 3 for bisphenol A to assess laboratory variability (split sample to another laboratory) and better establish baseline contamination in transit and laboratory methods (trip blank).

Galaxolide contamination was persistent in field (percent detected = 100%, median = 145 ng/L) and laboratory (percent detected = 88%, median = 66.5 ng/L) blanks. However, some site environmental concentrations were significantly greater than the observed contamination. The Delta RMP recommends that data users consider the associated field and laboratory blank concentrations relative to the environmental concentrations before using galaxolide data for characterization or assessment purposes.

## Precision

For SGS-AXYS, Physis, Vista, and Weck Delta RMP CEC analyses, precision is studied with field duplicates, laboratory duplicates, matrix spike (MS) duplicates (MSDs), and/or laboratory control spike duplicates (LCSDs). Associated data verification results are detailed below.

### *Field Duplicates*

A field duplicate is an independent sample that, as closely as possible, utilizes the same sampling location, time, and methodology as the field sample.

For Delta RMP CEC monitoring in Year 2, field duplicates collected and analyzed for PFAS, PBDEs, PPCPs, SCC, and TOC appear in **Table 13**.

**Table 13. Field duplicates for CEC Year 2 monitoring.**

<b>DUPLICATE ID</b>	<b>SAMPLE DATE</b>	<b>MATRIX</b>	<b>ANALYTE</b>
511SOL011	10/21/2021	Sediment, Water	PBDEs, PFAS, PPCPs, SSC, TOC
519DRYCRK	10/26/2021	Water	PFAS, PPCPs, SSC
519SUT108	3/28/2022	Water	PFAS, PPCPs, SSC
541SJC501	6/8/2022	Water	PFAS, PPCPs, SSC

90.2% of field duplicate results (111 of 123, **Table C.6**) met the Delta RMP MQO by having a relative percent difference (RPD) <35% (n/a if concentration of either sample <MDL). Analyses resulting in qualification appear in **Table 14**.

**Table 14. Field duplicate qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: FDP. QA code definitions are provided in Appendix Table C.1.

DATASET ID	DUPLICATE ID	ANALYTE	MATRIX	UNITS	SAMPLE RESULT	DUPLICATE RESULT	RPD	PROJECT QUALIFIER
Physis_DRMP_CEC_O-35136_W_BNs	519SUT108	Galaxolide	Water	ng/L	255	126	68	Qualified
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	Galaxolide	Water	ng/L	125	229	59	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511SOL011	Bisphenol A	Water	ng/L	130	81	46	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511SOL011	Diclofenac	Water	ng/L	12	34	96	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519DRYCRK	Bisphenol A	Water	ng/L	310	13	184	Qualified
WKL_DRMP_CEC_W2F1171b_W_PPCP	541SJC501	Bisphenol A	Water	ng/L	23	10	79	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 028/33	Sediment	ng/g dw	0.0573	0.0339	51	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 047	Sediment	ng/g dw	5.25	3.24	47	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 099	Sediment	ng/g dw	4.76	3.32	36	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 100	Sediment	ng/g dw	1.45	0.960	41	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 153	Sediment	ng/g dw	0.563	0.456	153	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	PBDE 209	Sediment	ng/g dw	1.91	0.753	87	Qualified

### Laboratory Duplicates

A laboratory duplicate is an analysis or measurement of the target analyte(s) performed identically on two sub-samples of the same sample, usually taken from the same container. The results from laboratory duplicate analyses are used to evaluate analytical or measurement precision, and include variability associated with sub-sampling and the matrix (not the precision of field sampling, preservation, or storage internal to the laboratory).

For Delta RMP CEC Year 2 monitoring, PBDE, PFAS, and TOC sediment laboratory duplicates were analyzed at the required frequency of one per 20 samples or per batch (whichever is more frequent) with the exception of the batch identified in **Table 15**. Laboratory duplicates were not required for water samples.

**Table 15. Laboratory duplicate frequency qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN Lab Submission Code: QI (Incomplete QC).

DATASET ID	MATRIX	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W1H1243_S_TOC	Sediment	TOC	Qualified

94.8% of laboratory duplicate results (110 of 116) met the Delta RMP MQO by having an RPD <35% (n/a if concentration of either sample <MDL) for PBDE, PFAS and total organic carbon (**Table C.8**). Laboratory duplicate analyses resulting in qualification appear in **Table 16**.

**Table 16. Laboratory duplicate precision qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: IL. QA code definitions are provided in Appendix Table C.1.

DATASET ID	DUPLICATE ID	ANALYTE	MATRIX	SAMPLE RESULT (ng/g dw)	DUPLICATE RESULT (ng/g dw)	RPD	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81568_S_PFAS	519DRYCRK	Perfluorodecanoate	Sediment	0.069	0.048	35.9	Qualified
AXYS_DRMP_CEC_WG81568_S_PFAS	519DRYCRK	Perfluorododecanoate	Sediment	0.151	0.061	84.9	Qualified
AXYS_DRMP_CEC_WG81568_S_PFAS	519DRYCRK	Perfluorooctanesulfonate	Sediment	0.226	0.153	38.5	Qualified
AXYS_DRMP_CEC_WG81568_S_PFAS	519DRYCRK	Perfluorooctanoate	Sediment	0.039	0.057	37.5	Qualified
AXYS_DRMP_CEC_WG81568_S_PFAS	519DRYCRK	Perfluorotetradecanoate	Sediment	0.166	0.056	99.1	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	519AMNDVY	PBDE 209	Sediment	0.839	3.92	129	Qualified

### Matrix Spike Duplicates

An MSD is prepared with an MS. Both the MS and MSD samples are analyzed exactly like an environmental sample within the laboratory batch. The purpose of analyzing the MS and MSD samples is to determine whether the sample matrix contributes bias to the analytical results, and to measure precision of the duplicate analysis.

For Delta RMP CEC monitoring in Year 2, four matrix spike duplicate pairs were prepared and analyzed for PPCPs in water (including galaxolide and triclocarban) and TOC in sediment at the required frequency of one per 20 samples or per batch (whichever is more frequent). In addition, though not required by the CEC QAPP (v2), two MS duplicate pairs were provided by Weck for PPCPs analyzed by EPA 1694M. 100% of the MSD results (36 of 36) met the MQO (Table C.12).

### Laboratory Control Spike Duplicates

An LCSD is prepared with a laboratory control spike (LCS). The LCS and LCSD are a sample matrix representative of the environmental sample (e.g., water, sand) that is prepared in the laboratory and is free from the analytes of interest. The LCSD is spiked with verified amounts of analytes or a material containing known and verified amounts of analytes. It is either used to establish intra-laboratory or analyst-specific precision and bias, or to assess the performance of a portion of the measurement system.

For Delta RMP CEC monitoring in Year 2, 21 LCSD pairs were prepared and analyzed for PBDEs, PFAS, and PPCPs at the required frequency of one per 20 samples or per batch (whichever is more frequent) with the exception of those batches listed in Table 17.

**Table 17. Laboratory control spike duplicate frequency qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN Lab Submission Code: QI (Incomplete QC).

DATASET ID	MATRIX	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W2D0037_W_PPCP	Water	PPCPs	Qualified
WKL_DRMP_CEC_W2D0038_W_PPCP	Water	PPCPs	Qualified
WKL_DRMP_CEC_W2F1171_W_PPCP	Water	PPCPs	Qualified
WKL_DRMP_CEC_W2F1171b_W_PPCP	Water	PPCPs	Qualified
WKL_DRMP_CEC_W2F1172_W_PPCP	Water	PPCPs	Qualified

Weck analyzed an MS/MSD to evaluate precision in these batches. However, since there is no existing Delta RMP MS/MSD MQO for these analyses, RPDs were not evaluated.

94.9% of LCSD results (131 of 138) met the Delta RMP MQO by having an RPD <35% (n/a if concentration of either sample <MDL) for PBDEs, <30% (n/a if concentration of either sample <MDL) for PFAS and <25% (n/a if concentration of either sample <MDL) for

PPCPs (Table C.10). Laboratory control spike duplicate analyses resulting in qualification appear in Table 18.

**Table 18. Laboratory control spike duplicate precision qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: IL. QA code definitions are provided in Appendix Table C.1.

DATASET ID	LCSD ID	MATRIX	ANALYTE	RPD	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K12 19_W_PPCP_Neg	W1K1219-BSD1	Water	Ibuprofen	27	Qualified
WKL_DRMP_CEC_W1K12 19_W_PPCP_Neg	W1K1219-BSD1	Water	Bisphenol A	126	Qualified
WKL_DRMP_CEC_W1K12 21_W_PPCP_Horm	W1K1221-BSD1	Water	Ethinylestradiol, 17alpha-	40	Qualified
WKL_DRMP_CEC_W1K12 21_W_PPCP_Horm	W1K1221-BSD1	Water	Estrone	27	Qualified
WKL_DRMP_CEC_W1K15 27_W_PPCP_Neg	W1K1527-BSD1	Water	Bisphenol A	49	Qualified
AXYS_DRMP_CEC_WG815 68_S_PFAAS	WG81568-103	Sediment	Perfluoro-3,6- dioxahheptanoate	41.1	Qualified
AXYS_DRMP_CEC_WG816 77_T_PFAAS	LCS_WG81677	Tissue	Perfluoro-3,6- dioxahheptanoate	37.6	Qualified

## Accuracy

For SGS-AXYS, Physis, Vista, and Weck DRMP analyses, accuracy is studied with the analysis of MSs, LCSs, surrogates, and isotope dilution analogues (IDAs). Associated data verification results are detailed below.

### Matrix Spikes

An MS is a sample prepared by adding a known amount of the target analyte to an environmental sample in order to increase the concentration of the target analyte. The MS is used to determine the effect of the matrix on a method's recovery efficiency and is a measure of accuracy. The MS is analyzed exactly like an environmental sample within the laboratory batch. The purpose of analyzing the MS is to determine whether the sample matrix contributes bias to the analytical results.

For Delta RMP CEC monitoring in Year 2, 14 matrix spikes (i.e., seven MSD pairs) were prepared and analyzed for PPCPs in water (including galaxolide and triclocarban) and TOC in sediment at the required frequency of 1 per 20 samples. In addition, though not required by the CEC QAPP (v2), four MS samples were provided by Weck for PPCPs

analyzed by EPA 1694M. 91.7% of these results (66 of 72) met the recovery MQO (Table C.11). Matrix spike analyses resulting in qualification appear in Table 19.

**Table 19. Matrix spike qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: GB. QA code definitions are provided in Appendix Table C.1.

DATASET ID	MS ID	ANALYTE	MATRIX	UNIT S	MS PR	MSD PR	RPD	PROJECT QUALIFIER
Physis_DRMP_CEC_O-33146_W_BNs	511SOL011	Galaxolide	Water	ng/L	574 <sup>1</sup>	463 <sup>1</sup>	3	Compliant
Physis_DRMP_CEC_O-35002_W_BNs	519DRYCRK	Galaxolide	Water	ng/L	219	221	3	Qualified
Physis_DRMP_CEC_O-35136b_W_BNs	519SUT108	Triclocarban	Water	ng/L	175	196	7	Qualified
WKL_DRMP_CEC_W1K0706_S_TOC	000NONPJ	TOC	Sediment	ng/g dw	157	163	24	Qualified

<sup>1</sup>Since the native concentration was >4x the spike concentration the percent recovery (PR) cannot be evaluated and therefore the project qualifier remains Compliant.

### Laboratory Control Spike

An LCS is a sample matrix representative of the environmental sample (e.g., water, sand) that is prepared in the laboratory and is free from the analytes of interest. The LCS is spiked with verified amounts of analytes or a material containing known and verified amounts of analytes. It is either used to establish intra-laboratory or analyst-specific precision and bias, or to assess the performance of a portion of the measurement system.

For Delta RMP CEC monitoring in Year 2, 54 LCSs were prepared and analyzed for all PBDE, PFAS, PPCP, and SSC in water and TOC in sediment batches at the required frequency of one per 20 samples or per batch (whichever is more frequent). 96.4% of these results (378 of 392) met the 50-150% recovery MQO (Table C.9). LCS analyses resulting in qualification appear in Table 20.

**Table 20. Laboratory control spike qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: EUM. QA code definitions are provided in Appendix Table C.1.

DATASET ID	LCS ID	MATRIX	ANALYTE	LCS PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	W1K1219-BS1	Water	Bisphenol A	204	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	W1K1219-BS1	Water	Naproxen	151	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	W1K1219-BSD1	Water	Bisphenol A	899	Qualified

DATASET ID	LCS ID	MATRIX	ANALYTE	LCS PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	W1K1219-BSD1	Water	Ibuprofen	186	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	W1K1219-BSD1	Water	Naproxen	159	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BS1	Water	Bisphenol A	317	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BS1	Water	Diclofenac	155	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BS1	Water	Ibuprofen	190	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BS1	Water	Iopromide	544	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BS1	Water	Naproxen	189	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BSD1	Water	Bisphenol A	191	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BSD1	Water	Ibuprofen	161	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BSD1	Water	Iopromide	614	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	W1K1527-BSD1	Water	Naproxen	172	Qualified

### Surrogates

A surrogate is a non-target analyte that has similar chemical properties to the analyte of interest. The surrogate standard is added to the sample in a known amount and used to evaluate the response (i.e., loss) of the analyte to sample preparation and analysis procedures.

Although there is no existing Delta RMP MQO for surrogates, they are required by Method EPA 625.1 (galaxolide and triclocarban in water). Percent recoveries were evaluated using the laboratory recovery control limits. For Delta RMP CEC monitoring in Year 2, surrogate galaxolide-d<sub>6</sub> was added to all environmental and QC samples analyzed for galaxolide. Surrogates were not added for those analyzed for triclocarban for Events 1, 2, and 3, as the method was still under development by the laboratory (**Table 21**). The surrogate triclocarban-13C<sub>6</sub> was added to all environmental and QC samples analyzed for triclocarban associated with Event 4. One hundred percent (100%, 97 of 97) of surrogate results met the laboratory recovery MQO (**Table C.13**).

**Table 21. Surrogate qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN Batch Verification Code: VQI (Incomplete QC, Flagged by QAO).

DATASET ID	ANALYTE	PROJECT QUALIFIER
Physis_DRMP_CEC_O-33146b_W_BNs	Triclocarban	Qualified
Physis_DRMP_CEC_O-35002b_W_BNs	Triclocarban	Qualified
Physis_DRMP_CEC_O-35136b_W_BNs	Triclocarban	Qualified

### *Isotope Dilution Analogues*

Isotope dilution analogues are isotopically labeled versions of the target analytes (or chemicals similar to the target analytes) that are added to each environmental and QC sample prior to extraction and are used to quantify the result concentrations of the unlabeled analytes present in the sample matrix.

For Delta RMP CEC monitoring in Year 2, IDAs were added to all environmental and QC water, sediment, and tissue samples analyzed for PFAS, PBDEs, and the PPCPs by Weck. 94.6% of these results (1421 of 1502) met the laboratory recovery MQO (**Table C.14**). Qualified IDAs appear in **Table 22**.

For each IDA that recovers outside of the MQOs, the target analyte result which the IDA was used to quantify is also flagged to indicate a poor recovery of the associated labeled compound. Analytical results flagged in association with IDA recoveries outside of MQOs are provided in **Table 23**.

**Table 22. Isotope dilution analogue qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: GIDA. QA code definitions are provided in Appendix Table C.1.

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	PBDE 209-13C12(IsoDilAnalogue)	12.2	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511POTW02	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	246	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511POTW02	Water	Gemfibrozil-d6(IsoDilAnalogue)	245	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511POTW02	Water	Salicylic Acid-d4(IsoDilAnalogue)	206	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	511POTW02	Water	Triclosan-d3(IsoDilAnalogue)	215	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	519AMNDVY	Water	Triclosan-d3(IsoDilAnalogue)	37	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	519SACUR3	Water	Bisphenol A-d16(IsoDilAnalogue)	46	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	519SACUR3	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	25	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	519SACUR3	Water	Ibuprofen-d3(IsoDilAnalogue)	43	Qualified
WKL_DRMP_CEC_W1K1219_W_PPCP_Neg	519SACUR3	Water	Naproxen-d3(IsoDilAnalogue)	29	Qualified
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	511POTW02	Water	Progesterone-d9(IsoDilAnalogue)	285	Qualified
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	511POTW02	Water	Testosterone-d3(IsoDilAnalogue)	234	Qualified

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	519SACUR3	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	33	Qualified
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	519SACUR3	Water	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	31	Qualified
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	519SACUR3	Water	Progesterone-d9(IsoDilAnalogue)	24	Qualified
WKL_DRMP_CEC_W1K1221_W_PPCP_Horm	519SACUR3	Water	Testosterone-d3(IsoDilAnalogue)	14	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510SACC3A	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	31	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510SACC3A	Water	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	26	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510SACC3A	Water	Progesterone-d9(IsoDilAnalogue)	24	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510SACC3A	Water	Testosterone-d3(IsoDilAnalogue)	24	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510ST1301	Water	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	42	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510ST1301	Water	Progesterone-d9(IsoDilAnalogue)	47	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	510ST1301	Water	Testosterone-d3(IsoDilAnalogue)	43	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	511SOL011	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	511SOL011	Water	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	511SOL011	Water	Progesterone-d9(IsoDilAnalogue)	3	Qualified

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	511SOL011	Water	Testosterone-d3(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1523_W_PPCP_Horm	519SACUR3	Water	Testosterone-d3(IsoDilAnalogue)	47	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Bisphenol A-d16(IsoDilAnalogue)	25	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	31	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Gemfibrozil-d6(IsoDilAnalogue)	24	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Ibuprofen-d3(IsoDilAnalogue)	20	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Naproxen-d3(IsoDilAnalogue)	23	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510SACC3A	Water	Triclosan-d3(IsoDilAnalogue)	12	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510ST1301	Water	Bisphenol A-d16(IsoDilAnalogue)	47	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510ST1301	Water	Gemfibrozil-d6(IsoDilAnalogue)	41	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510ST1301	Water	Ibuprofen-d3(IsoDilAnalogue)	40	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510ST1301	Water	Naproxen-d3(IsoDilAnalogue)	41	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	510ST1301	Water	Triclosan-d3(IsoDilAnalogue)	16	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511POTW02	Water	Salicylic Acid-d4(IsoDilAnalogue)	224	Qualified

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Bisphenol A-d16(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Estradiol-d3, 17beta-(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Gemfibrozil-d6(IsoDilAnalogue)	3	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Ibuprofen-d3(IsoDilAnalogue)	3	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Naproxen-d3(IsoDilAnalogue)	2	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Salicylic Acid-d4(IsoDilAnalogue)	1	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	511SOL011	Water	Triclosan-d3(IsoDilAnalogue)	9	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519AMNDVY	Water	Salicylic Acid-d4(IsoDilAnalogue)	531	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519DRYCRK	Water	Salicylic Acid-d4(IsoDilAnalogue)	391	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519DRYCRK	Water	Salicylic Acid-d4(IsoDilAnalogue)	538	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519DRYCRK	Water	Salicylic Acid-d4(IsoDilAnalogue)	540	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519PGC010	Water	Salicylic Acid-d4(IsoDilAnalogue)	345	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519DRYCRK	Water	Salicylic Acid-d4(IsoDilAnalogue)	604	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519POTW01	Water	Salicylic Acid-d4(IsoDilAnalogue)	317	Qualified

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	519SACUR3	Water	Salicylic Acid-d4(IsoDilAnalogue)	457	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	541SJC501	Water	Salicylic Acid-d4(IsoDilAnalogue)	312	Qualified
WKL_DRMP_CEC_W1K1527_W_PPCP_Neg	544SJRNBC	Water	Salicylic Acid-d4(IsoDilAnalogue)	259	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	511SOL011	Water	Gemfibrozil-d6(IsoDilAnalogue)	220	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519AMNDVY	Water	Gemfibrozil-d6(IsoDilAnalogue)	207	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519DRYCRK	Water	Gemfibrozil-d6(IsoDilAnalogue)	239	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519PGC010	Water	Gemfibrozil-d6(IsoDilAnalogue)	267	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519POTW01	Water	Gemfibrozil-d6(IsoDilAnalogue)	284	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519SACUR3	Water	Ethinylestradiol-d4, 17alpha-(IsoDilAnalogue)	228	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519SACUR3	Water	Gemfibrozil-d6(IsoDilAnalogue)	592	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519SACUR3	Water	Triclosan-d3(IsoDilAnalogue)	305	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519SUT108	Water	Gemfibrozil-d6(IsoDilAnalogue)	203	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	519SUT108	Water	Gemfibrozil-d6(IsoDilAnalogue)	239	Qualified
WKL_DRMP_CEC_W2D0037_W_PPCP	544SJRNBC	Water	Gemfibrozil-d6(IsoDilAnalogue)	204	Qualified

DATASET ID	SAMPLE ID	MATRIX	ISOTOPE DILUTION ANALOGUE	IDA PR	PROJECT QUALIFIER
WKL_DRMP_CEC_W2F1171_W_PPCP	519SACUR3	Water	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	260	Qualified
WKL_DRMP_CEC_W2F1171_W_PPCP	519SACUR3	Water	Gemfibrozil-d6(IsoDilAnalogue)	315	Qualified
WKL_DRMP_CEC_W2F1171_W_PPCP	519SACUR3	Water	Triclosan-d3(IsoDilAnalogue)	429	Qualified
WKL_DRMP_CEC_W2F1171b_W_PPCP	519SACUR3	Water	Bisphenol A-d16(IsoDilAnalogue)	207	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	Perfluorotetradecanoate-13C2(IsoDilAnalogue)	32.6	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	Ethyl-perfluorooctanesulfonamidoethanol-d9, N-(IsoDilAnalogue)	7.91	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-519ST1309-2021-10-18-SAS	Tissue	Ethyl-perfluorooctanesulfonamide-d5, N-(IsoDilAnalogue)	11.0	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Perfluorohexanoate-13C5(IsoDilAnalogue)	38.7	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Fluorotelomer Sulfonate-13C2, 4:2-(IsoDilAnalogue)	38.6	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Perfluorotetradecanoate-13C2(IsoDilAnalogue)	33.7	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Perfluoro-2-Propoxypropanoic Acid-13C3(IsoDilAnalogue)	33.6	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Perfluorobutanoate-13C4(IsoDilAnalogue)	1.31	Qualified
AXYS_DRMP_CEC_WG81677_T_PFAS	DRMP-CEC-510ST1317-2021-10-18-WHC	Tissue	Perfluoropentanoate-13C5(IsoDilAnalogue)	5.17	Qualified

**Table 23. Isotope dilution analogue qualification for CEC Year 2 monitoring: associated samples.**

Results appearing in this table were all flagged with the CEDEN QA code: GIDA. QA code definitions are provided in Appendix Table C.1.

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG 81579_S_PBDE	511SOL011	Water	10/21/2021	PBDE 209	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Diclofenac	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Gemfibrozil	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	511POTW02	Water	10/21/2021	Triclosan	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	519AMNDVY	Water	10/21/2021	Triclosan	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	519SACUR3	Water	10/20/2021	Bisphenol A	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	519SACUR3	Water	10/20/2021	Diclofenac	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	519SACUR3	Water	10/20/2021	Ibuprofen	Qualified
WKL_DRMP_CEC_W1 K1219_W_PPCP_Neg	519SACUR3	Water	10/20/2021	Naproxen	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	511POTW02	Water	10/21/2021	Progesterone	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	511POTW02	Water	10/21/2021	Testosterone	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	519SACUR3	Water	10/20/2021	Estradiol, 17beta-	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	519SACUR3	Water	10/20/2021	Estrone	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	519SACUR3	Water	10/20/2021	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	519SACUR3	Water	10/20/2021	Progesterone	Qualified
WKL_DRMP_CEC_W1 K1221_W_PPCP_Horm	519SACUR3	Water	10/20/2021	Testosterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510SACC3A	Water	10/26/2021	Estradiol, 17beta-	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510SACC3A	Water	10/26/2021	Estrone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510SACC3A	Water	10/26/2021	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510SACC3A	Water	10/26/2021	Progesterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510SACC3A	Water	10/26/2021	Testosterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510ST1301	Water	10/26/2021	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510ST1301	Water	10/26/2021	Progesterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	510ST1301	Water	10/26/2021	Testosterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	511SOL011	Water	10/25/2021	Estradiol, 17beta-	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	511SOL011	Water	10/25/2021	Estrone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	511SOL011	Water	10/25/2021	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	511SOL011	Water	10/25/2021	Progesterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	511SOL011	Water	10/25/2021	Testosterone	Qualified
WKL_DRMP_CEC_W1 K1523_W_PPCP_Horm	519SACUR3	Water	10/25/2021	Testosterone	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Bisphenol A	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Diclofenac	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Gemfibrozil	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Ibuprofen	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Naproxen	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510SACC3A	Water	10/26/2021	Triclosan	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Bisphenol A	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Gemfibrozil	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Ibuprofen	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Naproxen	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	510ST1301	Water	10/26/2021	Triclosan	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511POTW02	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511POTW02	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Bisphenol A	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Diclofenac	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Gemfibrozil	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Ibuprofen	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Naproxen	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	511SOL011	Water	10/25/2021	Triclosan	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519AMNDVY	Water	10/26/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519AMNDVY	Water	10/26/2021	Salicylic Acid	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519DRYCRK	Water	10/26/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519DRYCRK	Water	10/26/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519PGC010	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519PGC010	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519POTW01	Water	10/26/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519POTW01	Water	10/26/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519SACUR3	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	519SACUR3	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	541SJC501	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	541SJC501	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	544SJRNBC	Water	10/25/2021	Iopromide	Qualified
WKL_DRMP_CEC_W1 K1527_W_PPCP_Neg	544SJRNBC	Water	10/25/2021	Salicylic Acid	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	511SOL011	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519AMNDVY	Water	3/28/2022	Gemfibrozil	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
WKL_DRMP_CEC_W2 D0037_W_PPCP	519DRYCRK	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519PGC010	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519POTW01	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519SACUR3	Water	3/28/2022	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519SACUR3	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519SACUR3	Water	3/28/2022	Triclosan	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	519SUT108	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 D0037_W_PPCP	544SJRNBC	Water	3/28/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 F1171_W_PPCP	519SACUR3	Water	6/8/2022	Ethinylestradiol, 17alpha-	Qualified
WKL_DRMP_CEC_W2 F1171_W_PPCP	519SACUR3	Water	6/8/2022	Gemfibrozil	Qualified
WKL_DRMP_CEC_W2 F1171_W_PPCP	519SACUR3	Water	6/8/2022	Triclosan	Qualified
WKL_DRMP_CEC_W2 F1171b_W_PPCP	519SACUR3	Water	6/8/2022	Bisphenol A	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Fluorotelomer Carboxylic Acid, 3:3-	Rejected <sup>1</sup>
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Fluorotelomer Carboxylic Acid, 5:3-	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Fluorotelomer Carboxylic Acid, 7:3-	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Fluorotelomer Sulfonate, 4:2-	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoro(2- ethoxyethane)sulfonic acid	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoro-2-Propoxypropanoic Acid	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoro-3,6-dioxaheptanoate	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoro-3- methoxypropanoate	Rejected <sup>1</sup>
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoro-4-methoxybutanoate	Rejected <sup>1</sup>
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluorobutanoate	Rejected <sup>1</sup>
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluorohexanoate	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluoropentanoate	Rejected <sup>1</sup>
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluorotetradecanoate	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-510ST1317- 2021-10-18-WHC	Tissue	10/18/2021	Perfluorotridecanoate	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-519ST1309- 2021-10-18-SAS	Tissue	10/18/2021	Ethyl- perfluorooctanesulfonamide, N-	Qualified
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-519ST1309- 2021-10-18-SAS	Tissue	10/18/2021	Ethyl- perfluorooctanesulfonamidoeth anol, N-	Rejected <sup>1</sup>

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE	ANALYTE	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG 81677_T_PFAS	DRMP-CEC-519ST1309- 2021-10-18-SAS	Tissue	10/18/2021	Perfluorotetradecanoate	Qualified

<sup>1</sup>Details regarding sample results rejected by the laboratory due to poor IDA recoveries are provided in **Analysis Failures** and in **Table 6**.

### Additional Qualification

Sample results in **Table 24** were estimated for exceeding the instrument calibration range. Affected analytes include salicylic acid, bisphenol A, and naproxen.

**Table 24. Calibration-related qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: CJ. QA code definitions are provided in Appendix **Table C.1**.

DATASET ID	SAMPLE ID	SAMPLE DATE	ANALYTE	RESULT (ng/L)	PROJECT QUALIFIER
WKL_DRMP_CEC_W1K121_9_W_PPCP_Neg	511SOL011	10/21/2021	Salicylic Acid	18000	Estimated
WKL_DRMP_CEC_W1K121_9_W_PPCP_Neg	511SOL011	10/21/2021	Salicylic Acid	22000	Estimated
WKL_DRMP_CEC_W1K121_9_W_PPCP_Neg	519AMNDVY	10/21/2021	Bisphenol A	670	Estimated
WKL_DRMP_CEC_W1K121_9_W_PPCP_Neg	544SJRNBC	10/21/2021	Bisphenol A	1280	Estimated
WKL_DRMP_CEC_W1K152_7_W_PPCP_Neg	511SOL011	10/25/2021	Bisphenol A	1500	Estimated
WKL_DRMP_CEC_W1K152_7_W_PPCP_Neg	519SACUR3	10/25/2021	Naproxen	890	Compliant

Sample results in **Table 25** were qualified due to lock mass interference. Three of the five samples qualified due to lock mass interference were laboratory quality control samples. Lock mass is a mass peak in a spectrum that corresponds to a compound of known mass (mass standard). It is used post-acquisition to adjust the mass calibration for the scan so that other mass peaks may be accurately measured. The data were flagged due to disturbance of the mass ion used to monitor instrument performance (lock-mass) present.

**Table 25. Interference-related qualification for CEC Year 2 monitoring.**

Results appearing in this table were all flagged with the CEDEN QA code: UKM. QA code definitions are provided in Appendix **Table C.1**.

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE <sup>1</sup>	ANALYTE	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 154-13C12 (IsoDilAnalogue)	Qualified
AXYS_DRMP_CEC_WG81579_S_PBDE	511SOL011	Sediment	10/21/2021	PBDE 154	Qualified
AXYS_DRMP_CEC_WG81851_T_PBDE	LabBlank_WG81851-AXYS	Tissue	NA	PBDE 154	Qualified

DATASET ID	SAMPLE ID	MATRIX	SAMPLE DATE <sup>1</sup>	ANALYTE	PROJECT QUALIFIER
AXYS_DRMP_CEC_WG81851_T_PBDE	LCS_WG81851	Tissue	NA	PBDE 154	Qualified
AXYS_DRMP_CEC_WG81851_T_PBDE	LCS_WG81851	Tissue	NA	PBDE 154	Qualified

<sup>1</sup> NA (Not Applicable) is listed when sample date is not applicable. The date of 1/1/1950 is used in CEDEN when there is not an applicable sample date; this value is treated as a null value in those situations.

# SUMMARY

## CHEMISTRY RESULTS

A total of 61 environmental samples were collected and analyzed for the CEC Year 2 monitoring as outlined in **Table 26**. These samples consisted of 48 water, three sediment, and ten tissue environmental samples that were analyzed by SGS-AXYS, Weck, and Vista for PBDEs, PFAS, PPCPs (including galaxolide and triclocarban), SSC, and TOC. In addition, four water field duplicates, four water field blanks, and one sediment field duplicate were analyzed with each set environmental samples; no field QC samples were required for bivalve or fish tissues collections. A total of 70 samples were submitted to the laboratories for analysis.

**Table 26. Summary of field sample collections for CEC Year 2 monitoring.**

CONSTITUENT GROUP	LABORATORY	MATRIX	ENVIRONMENTAL SAMPLES	FIELD DUPLICATE	FIELD BLANK	TOTAL SAMPLES
PFAS	Vista	Water	48	4	4	56
PPCPs <sup>1</sup>	Physis					
PPCPs <sup>2</sup>	Weck					
SSC	Weck					
PBDEs	SGS-AXYS	Sediment	3	1	0	4
PFAS	SGS-AXYS					
TOC	Weck					
PBDEs	SGS-AXYS	Bivalves Tissue	6	0	0	6
PBDEs	SGS-AXYS	Fish Tissue	4	0	0	4
PFAS	SGS-AXYS					
<b>Total</b>			<b>61</b>	<b>5</b>	<b>4</b>	<b>70</b>

<sup>1</sup> PPCP constituents analyzed by Physis include galaxolide and triclocarban only

<sup>2</sup> PPCP constituents analyzed by Weck include hormones and pharmaceuticals, excluding galaxolide and triclocarban.

A total of 3,834 (tissue, sediment, and water) environmental and QC sample results for PBDEs, PFAS, PPCPs (including Galaxolide and Triclocarban), SSC, and TOC were verified as a part of the Year 2 dataset (**Table 27**). Of those 2,557 met DRMP QAPP requirements and are considered “Compliant”. A total of 1257 environmental and QC (tissue, sediment and water) sample results presented in **Table 9** through **Table 25** did not meet DRMP QAPP requirements and are considered “Qualified”.

Five environmental and QC samples (water) presented in **Table 24** are considered “Estimated,” and 15 environmental and QC samples (tissue) presented in **Table 6** are considered “Rejected”

**Table 27. Summary of verified results for CEC Year 2 monitoring.**

Counts of results include all environmental and QC sample results. Percentage of total for each count by constituent group, laboratory, and matrix in parenthesis next to sample count.

CONSTITUENT GROUP	LABORATORY	MATRIX	COMPLIANT	QUALIFIED	ESTIMATED	REJECTED	NA	TOTAL
PFAS	Vista	Water	272 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	272
PPCPs <sup>1</sup>	Physis	Water	126 (50%)	127 (50%)	0 (0%)	0 (0%)	0 (0%)	253
PPCPs <sup>2</sup>	Weck	Water	683 (40%)	1,008 (59%)	5 (0.29%)	0 (0%)	0 (0%)	1,696
SSC	Weck	Water	64 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	64
PBDEs	SGS-AXYS	Sediment	100 (75%)	33 (25%)	0 (0%)	0 (0%)	0 (0%)	133
PFAS	SGS-AXYS	Sediment	569 (98%)	12 (2%)	0 (0%)	0 (0%)	0 (0%)	581
TOC	Weck	Sediment	7 (47%)	8 (53%)	0 (0%)	0 (0%)	0 (0%)	15
PBDEs	SGS-AXYS	Tissue	199 (81%)	44 (18%)	0 (0%)	0 (0%)	2 (0.82%)	245
PFAS	SGS-AXYS	Tissue	538 (93%)	27 (5%)	0 (0%)	15 (2.6%)	0 (0%)	580
<b>Total Verified Results</b>			<b>2,558 (66.6%)</b>	<b>1,259 (32.8%)</b>	<b>5 (0.13%)</b>	<b>15 (0.39%)</b>	<b>2 (0.05%)</b>	<b>3,839</b>

<sup>1</sup> PPCP constituents analyzed by Physis include galaxolide and triclocarban only.

<sup>2</sup> PPCP constituents analyzed by Weck include hormones and pharmaceuticals, excluding galaxolide and triclocarban.

## Water Quality Analysis Results

### PFAS in Water

PFOS and PFOA were detected consistently at all sites throughout the year except at American River at Discovery Park (all samples were non detect for PFOS), Sacramento River at Freeport (all samples were non detect for PFOS), and San Joaquin River at Airport Way near Vernalis (all samples were non detect for PFOA; **Table 28** and **Figure 4**).

PFOA concentrations were higher than PFOS at most locations for most events.

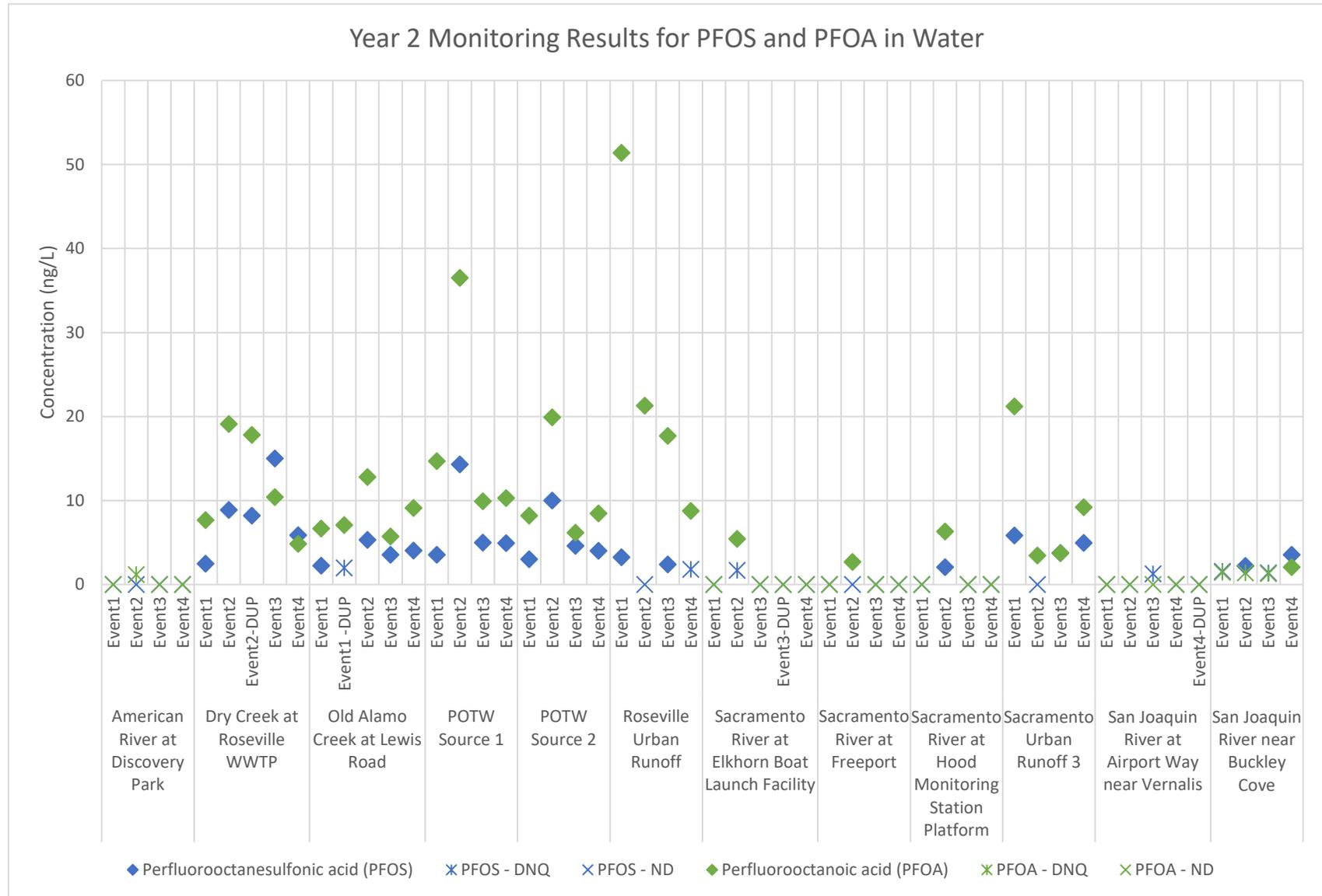
**Table 28. PFOS and PFOA concentrations in environmental samples (water, ng/L).**

STATION	EVENT	PFOS	PFOA
American River at Discovery Park	Event1	ND	ND

STATION	EVENT	PFOS	PFOA
	Event2	ND	1.17 (DNQ)
	Event3	ND	ND
	Event4	ND	ND
Dry Creek at Roseville WWTP	Event1	2.49	7.66
	Event2	8.87	19.1
	Event2-DUP	8.2	17.8
	Event3	15	10.4
	Event4	5.86	4.83
Old Alamo Creek at Lewis Road	Event1	2.23	6.68
	Event1-DUP	1.98 (DNQ)	7.08
	Event2	5.31	12.8
	Event3	3.54	5.72
	Event4	4.05	9.12
POTW Source 1	Event1	3.54	14.7
	Event2	14.3	36.5
	Event3	5	9.91
	Event4	4.94	10.3
POTW Source 2	Event1	3	8.19
	Event2	10	19.9
	Event3	4.61	6.17
	Event4	4.02	8.46
Roseville Urban Runoff	Event1	3.26	51.4
	Event2	ND	21.3
	Event3	2.38	17.7
	Event4	1.81 (DNQ)	8.76
Sacramento River at Elkhorn Boat Launch Facility	Event1	ND	ND
	Event2	1.69 (DNQ)	5.44
	Event3	ND	ND
	Event3-DUP	ND	ND
	Event4	ND	ND
Sacramento River at Freeport	Event1	ND	ND
	Event2	ND	2.69
	Event3	ND	ND
	Event4	ND	ND
Sacramento River at Hood Monitoring Station Platform	Event1	ND	ND
	Event2	2.06	6.32
	Event3	ND	ND
	Event4	ND	ND
Sacramento Urban Runoff 3	Event1	5.84	21.2
	Event2	ND	3.46
	Event3	3.75	3.74

STATION	EVENT	PFOS	PFOA
	Event4	4.96	9.21
San Joaquin River at Airport Way near Vernalis	Event1	ND	ND
	Event2	ND	ND
	Event3	1.26 (DNQ)	ND
	Event4	ND	ND
	Event4-DUP	ND	ND
San Joaquin River near Buckley Cove	Event1	1.58 (DNQ)	1.44 (DNQ)
	Event2	2.21	1.39 (DNQ)
	Event3	1.38 (DNQ)	1.3 (DNQ)
	Event4	3.53	2.06

Figure 4. PFOS and PFOA concentrations in environmental samples (water, ng/L).



## *PPCPs in Water*

There were eight required PPCPs analyzed in water during Year 2; all analytes had at least one detection. Galaxolide was detected above the RL in all samples, and both BPA and triclocarban were consistently detected at all sites during all events (**Table 29, Figure 5**). However, triclosan was only detected at one location during one event (Old Alamo Creek at Lewis Road, Event 1). Ibuprofen was detected at all sites at least once except in samples from Sacramento River at Elkhorn Boat Launch Facility and San Joaquin River at Airport Way near Vernalis. Diclofenac was present at the source sites and the ambient sites located on smaller water bodies but was not detected at any of the river sites. Estradiol, estrone, and triclosan were not detected above their respective RLs, and were not detected consistently at any site over all four sampling events (**Table 29, Figure 5**).

Galaxolide and BPA both had detections in field blanks (**Table 10**) and laboratory blanks (**Table 11**). The laboratory analyzing BPA believes the laboratory blank contamination is coming from the extraction process since the system blanks are non-detect down to the minimum detection level and therefore the contamination is not coming from the instrument itself. Regarding galaxolide, the laboratory spent additional time investigating the contamination including reviewing several chromatograms from different extraction batches. Their conclusion is that the galaxolide contamination is likely coming from the solvents since galaxolide is present in all the laboratory blanks at various concentrations. The laboratory purchases ultra-clean solvents; however, there is still some level of contamination present since the sample is concentrated down to a small volume and the instrumentation is extremely sensitive. The laboratory confirmed that all glassware used for extracting and analyzing samples is baked at 550°C for 4 hours. To better determine the cause of the contamination, the laboratory indicated it could perform a significant experimental study to determine if it is the solvent as suspected; if it is the solvent, a second step would be to evaluate solvents from different manufacturers to try and find one without galaxolide.

Any batches with laboratory blank contamination have all results in the batch flagged; these results should be used with caution due to the known contamination. A discussion occurred with the Regional Board QA Representative and the State Board QA Officer regarding whether the contamination would result in rejection of these data; it was determined that the data would not be rejected but will remain flagged.

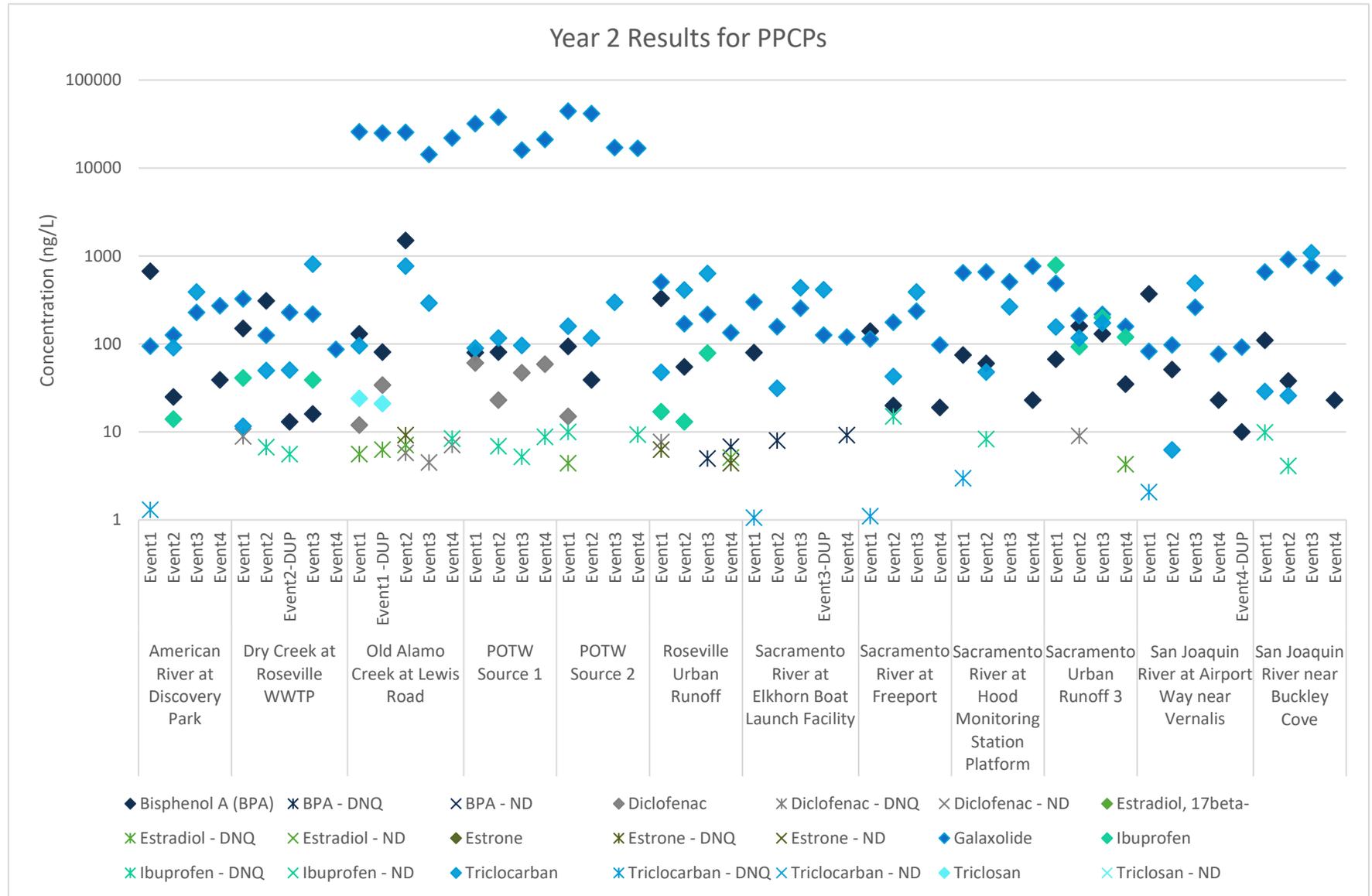
**Table 29. PPCP concentrations in environmental samples (water, ng/L).**

STATION	EVENT	BISPHENOLA	DICLOFENAC	ESTRADIOL, 17BETA-	ESTRONE	GALAXOLIDE	IBUPROFEN	TRICLOCARBAN	TRICLOSAN
American River at Discovery Park	Event1	670	ND	ND	ND	94.4	ND	1.3 (DNQ)	ND
	Event2	25	ND	ND	ND	126	14	90.8	ND
	Event3	ND	ND	ND	ND	229	ND	390	ND
	Event4	39	ND	ND	ND	272	ND	ND	ND
Dry Creek at Roseville WWTP	Event1	150	8.9 (DNQ)	ND	ND	326	41	11.6	ND
	Event2	310	ND	ND	ND	125	6.7 (DNQ)	49.9	ND
	Event2-DUP	13	ND	ND	ND	229	5.6 (DNQ)	50.6	ND
	Event3	16	ND	ND	ND	219	39	807	ND
	Event4	ND	ND	ND	ND	86.8	ND	ND	ND
Old Alamo Creek at Lewis Road	Event1	130	12	5.6 (DNQ)	ND	25900	ND	95.4	24
	Event1-DUP	81	34	6.3 (DNQ)	ND	25000	ND	--	21
	Event2	1500	5.8 (DNQ)	7.1 (DNQ)	9.2 (DNQ)	25500	ND	769	ND
	Event3	ND	4.5 (DNQ)	ND	ND	14300	ND	292	ND
	Event4	ND	7.1 (DNQ)	ND	ND	22000	8.4 (DNQ)	ND	ND
POTW Source 1	Event1	80	61	ND	ND	32000	ND	89.9	ND
	Event2	81	23	ND	ND	37900	6.9 (DNQ)	117	ND
	Event3	ND	47	ND	ND	16000	5.2 (DNQ)	96.2	ND
	Event4	ND	59	ND	ND	21200	8.8 (DNQ)	ND	ND
POTW Source 2	Event1	94	15	4.4 (DNQ)	ND	44300	10 (DNQ)	159	ND
	Event2	39	ND	ND	ND	41500	ND	117	ND
	Event3	ND	ND	ND	ND	17100	ND	298	ND

STATION	EVENT	BISPHENOLA	DICLOFENAC	ESTRADIOL, 17BETA-	ESTRONE	GALAXOLIDE	IBUPROFEN	TRICLOCARBAN	TRICLOSAN
	Event4	ND	ND	ND	ND	16800	9.3 (DNQ)	ND	ND
Roseville Urban Runoff	Event1	330	7.7 (DNQ)	ND	6.3 (DNQ)	506	17	47.8	ND
	Event2	55	ND	ND	ND	170	13	410	ND
	Event3	5 (DNQ)	ND	ND	ND	217	79	632	ND
	Event4	6.8 (DNQ)	ND	5.1 (DNQ)	4.4 (DNQ)	135	ND	ND	ND
Sacramento River at Elkhorn Boat Launch Facility	Event1	80	ND	ND	ND	300	ND	1.06 (DNQ)	ND
	Event2	8 (DNQ)	ND	ND	ND	157	ND	31.4	ND
	Event3	ND	ND	ND	ND	255	ND	435	ND
	Event3- DUP	ND	ND	ND	ND	126	ND	414	ND
	Event4	9.2 (DNQ)	ND	ND	ND	120	ND	ND	ND
Sacramento River at Freeport	Event1	140	ND	ND	ND	114	ND	1.1 (DNQ)	ND
	Event2	20	ND	ND	ND	177	15 (DNQ)	42.6	ND
	Event3	ND	ND	ND	ND	236	ND	389	ND
	Event4	19	ND	ND	ND	97.2	ND	ND	ND
Sacramento River at Hood Monitoring Station Platform	Event1	75	ND	ND	ND	647	ND	2.98 (DNQ)	ND
	Event2	60	ND	ND	ND	658	8.3 (DNQ)	48.1	ND
	Event3	ND	ND	ND	ND	508	ND	265	ND
	Event4	23	ND	ND	ND	766	ND	ND	ND
Sacramento Urban Runoff 3	Event1	67	ND	ND	ND	490	790	156	ND
	Event2	160	9 (DNQ)	ND	ND	210	93	117	ND
	Event3	130	ND	ND	ND	217	200	173	ND
	Event4	35	ND	4.3 (DNQ)	ND	158	120	ND	ND
	Event1	370	ND	ND	ND	82.5	ND	2.08 (DNQ)	ND
	Event2	51	ND	ND	ND	97.7	ND	6.26	ND

STATION	EVENT	BISPHENOLA	DICLOFENAC	ESTRADIOL, 17BETA-	ESTRONE	GALAXOLIDE	IBUPROFEN	TRICLOCARBAN	TRICLOSAN
San Joaquin River at Airport Way near Vernalis	Event3	ND	ND	ND	ND	261	ND	491	ND
	Event4	23	ND	ND	ND	76.7	ND	ND	ND
	Event4- DUP	10	ND	ND	ND	92.2	ND	ND	ND
San Joaquin River near Buckley Cove	Event1	110	ND	ND	ND	658	9.9 (DNQ)	28.9	ND
	Event2	38	ND	ND	ND	915	4.1 (DNQ)	25.9	ND
	Event3	ND	ND	ND	ND	776	ND	1090	ND
	Event4	23	ND	ND	ND	564	ND	ND	ND

Figure 5. PPCP concentrations in environmental samples (water, ng/L).



## Sediment Analysis Results

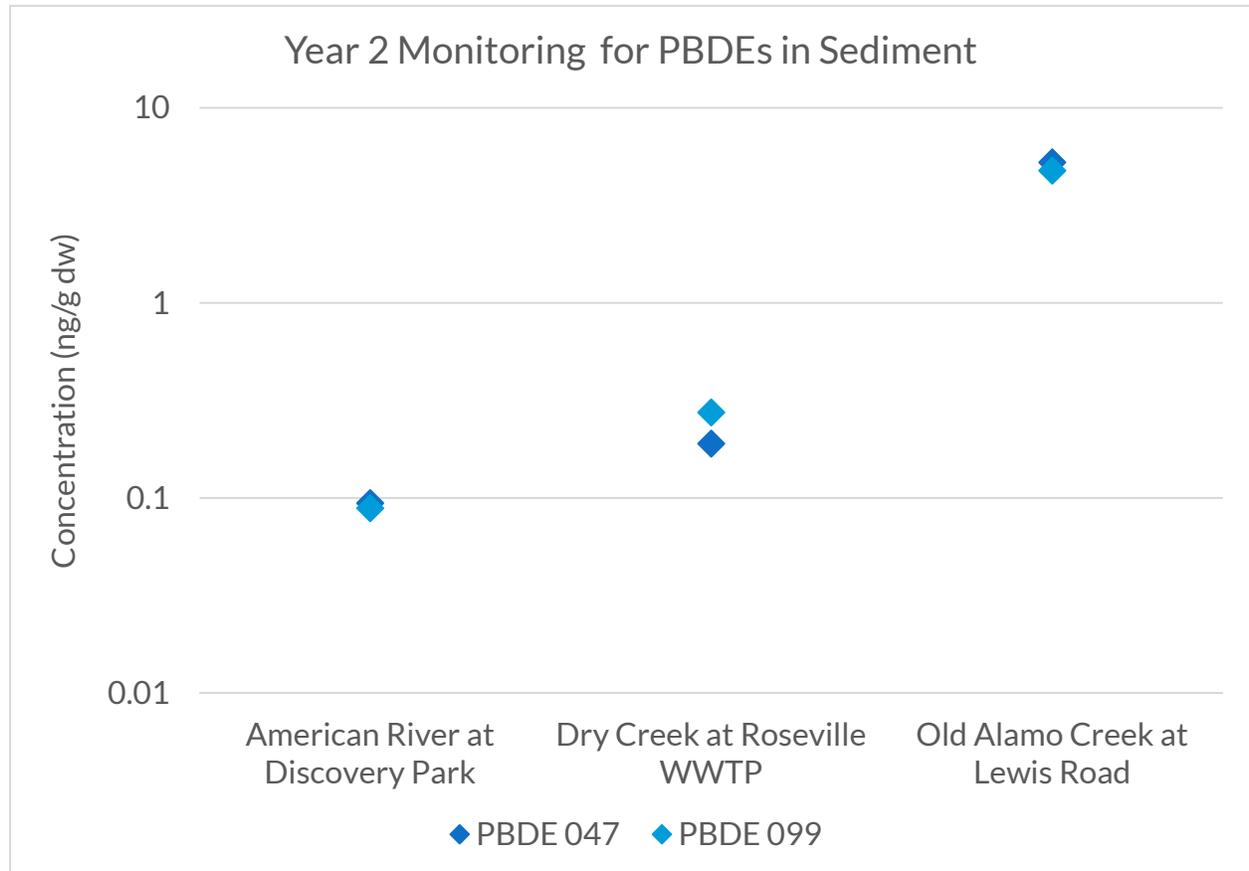
### PBDEs in Sediment

Both required PBDEs were detected in all three sediment samples collected in Year 2 during Event 1. The two required PBDE congeners, PBDE 47 and PBDE 99, were detected at consistent concentrations at each site, with the lowest concentrations observed at the American River at Discovery Park and the highest at Old Alamo Creek at Lewis Road (Table 30, Figure 6).

**Table 30. PBDE concentrations in environmental samples (sediment, ng/g dw).**

STATION	EVENT	PBDE 047	PBDE 099
American River at Discovery Park	Event 1	0.0942	0.0885
Dry Creek at Roseville WWTP	Event 1	0.19	0.274
Old Alamo Creek at Lewis Road	Event 1	5.25	4.76

**Figure 6. PBDE concentrations in environmental samples (sediment, ng/g dw).**



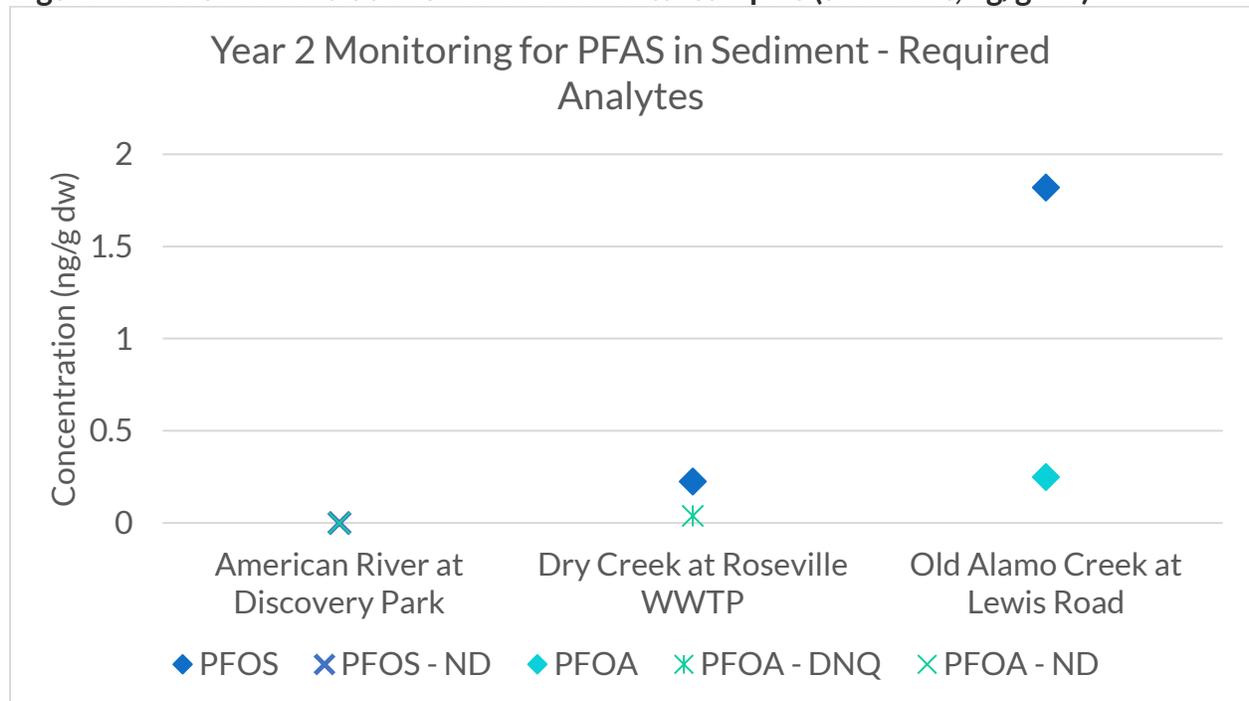
### PFAS in Sediment

Neither PFOS nor PFOA were detected in sediment collected at American River at Discovery Park. PFOS was detected at higher concentrations than PFOA in sediment collected from the other two locations with the highest detection for PFOS at Old Alamo Creek at Lewis Road at 1.82 ng/g dw (Table 31, Figure 7).

**Table 31. PFAS concentrations in environmental samples (sediment, ng/g dw).**

STATION	EVENT	PFOS	PFOA
American River at Discovery Park	Event 1	ND	ND
Dry Creek at Roseville WWTP	Event 1	0.226	0.039 (DNQ)
Old Alamo Creek at Lewis Road	Event 1	1.82	0.25

**Figure 7. PFAS concentrations in environmental samples (sediment, ng/g dw).**



## Tissue Analysis Results

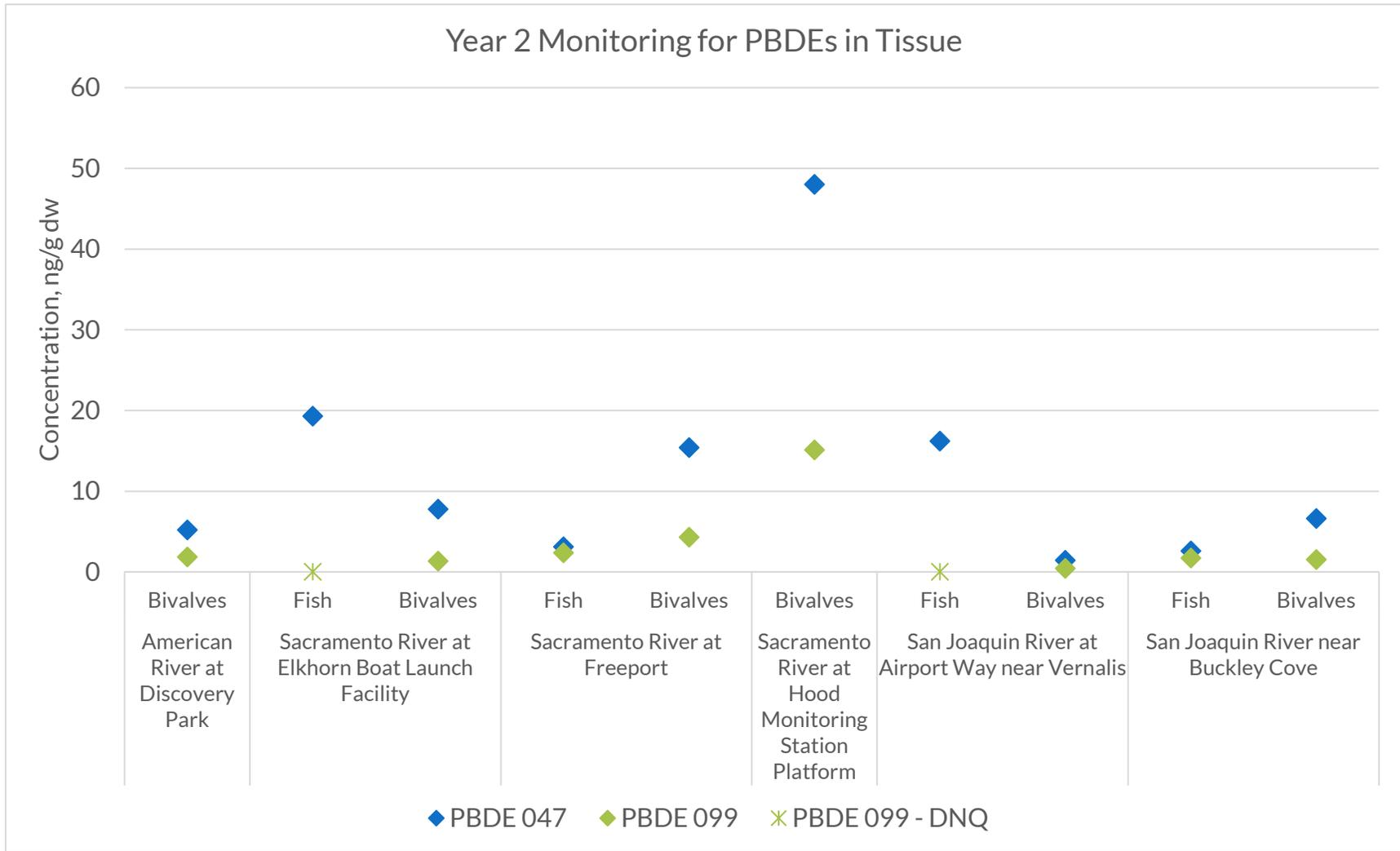
### *PBDEs in Fish and Bivalve Tissue*

PBDEs were detected in all Year 2 tissue samples (both fish and bivalve tissue). PBDE 47 was consistently detected at a higher concentration than PBDE 099 in samples collected at the same site for both bivalves and fish tissue (Table 32, Figure 8).

**Table 32. PBDE concentrations in environmental samples (fish and bivalve tissue, ng/g dw).**

STATION	EVENT	ORGANISM GROUP	ORGANISM NAME	PBDE 047	PBDE 099
American River at Discovery Park	Event 1	Bivalves	Freshwater Clam	5.2	1.84
Sacramento River at Elkhorn Boat Launch Facility	Event 1	Fish	Sacramento Sucker	19.3	0.00515 (DNQ)
	Event 1	Bivalves	Freshwater Clam	7.77	1.31
Sacramento River at Freeport	Event 1	Fish	White Catfish	3.1	2.34
	Event 1	Bivalves	Freshwater Clam	15.4	4.29
Sacramento River at Hood Monitoring Station Platform	Event 1	Bivalves	Freshwater Clam	48	15.1
San Joaquin River at Airport Way near Vernalis	Event 1	Fish	Common Carp	16.2	0.00952 (DNQ)
	Event 1	Bivalves	Freshwater Clam	1.41	0.439
San Joaquin River near Buckley Cove	Event 1	Fish	White Catfish	2.59	1.72
	Event 1	Bivalves	Freshwater Clam	6.61	1.53

Figure 8. PBDE concentrations in environmental samples (fish and bivalve tissue, ng/g dw).



### PFAS in Fish Tissue

PFOS was detected in all fish tissue samples whereas PFOA was non-detect in all four samples (Table 33).

**Table 33. PFAS concentrations in environmental samples (fish tissue, ng/g dw).**

STATION	EVENT	ORGANISM GROUP	ORGANISM NAME	PFOS	PFOA
Sacramento River at Elkhorn Boat Launch Facility	Event 1	Fish	Sacramento Sucker	1.64	ND
Sacramento River at Freeport	Event 1	Fish	White Catfish	0.705	ND
San Joaquin River at Airport Way near Vernalis	Event 1	Fish	Common Carp	4.31	ND
San Joaquin River near Buckley Cove	Event 1	Fish	White Catfish	8.25	ND

### DATA AVAILABILITY

CEC Year 2 data will be published to CEDEN for ambient locations and can be accessed through the Advance Query Tool

(<https://ceden.waterboards.ca.gov/AdvancedQueryTool>) under the project name “2021 Delta RMP Constituents of Emerging Concern” (21DRMP5CEC).

**Table 34. CEC Year 2 station names and associated sample matrices available on CEDEN. Locations associated with CEDEN Project Code “21DRMP5CEC” will have data available on CEDEN.**

STATION NAME	STATION CODE	MATRIX	CECEN PROJECT CODE
American River at Discovery Park	519AMNDVY	Water, Bivalves, Sediment	21DRMP5CEC
Dry Creek at Roseville WWTP	519DRYCRK	Water, Sediment	21DRMP5CEC
Old Alamo Creek at Lewis Road	511SOL011	Water, Sediment	21DRMP5CEC
POTW Source 1	519POTW01	Water	NA
POTW Source 2	511POTW02	Water	NA
Roseville Urban Runoff	519PGC010	Water	NA
Sacramento River at Elkhorn Boat Launch Facility	519SUT108	Water, Bivalves	21DRMP5CEC
Sacramento River at Freeport, CA-510ST1301	510ST1301	Water, Bivalves	21DRMP5CEC
Sacramento River at Hood Monitoring Station Platform	510SACC3A	Water, Bivalves	21DRMP5CEC
Sacramento River at Veterans Bridge-03SWSBIO-519ST1309	519ST1309	Fish	21DRMP5CEC
Sacramento River/Freeport-510ST1317	510ST1317	Fish	21DRMP5CEC

STATION NAME	STATION CODE	MATRIX	CEDEN PROJECT CODE
Sacramento Urban Runoff 3; Sump 111	519SACUR3	Water	NA
San Joaquin R at Buckley Cove	544LSAC13	Fish	21DRMP5CEC
San Joaquin River at Airport Way near Vernalis	541SJC501	Water, Bivalves, Fish	21DRMP5CEC
San Joaquin River near Buckley Cove	544SJRNBC	Water, Bivalves	21DRMP5CEC

## DEVIATIONS AND CORRECTIVE ACTIONS

Relevant DRMP QAPP deviation forms are outlined in and a summary for each are provided below. These forms have been drafted and are waiting on final reviews from the CVRWQCB staff and are included in **Appendix D**.

### *2021-01: Year 2 Clam Tissue Collection*

On October 21, 2021, clams were collected at San Joaquin River at Airport Way near Vernalis during the late summer/early fall sampling Event 1. DRMP deviation form **2021-01** was initiated to document the potential for insufficient tissue for PBDE analysis for this site based on the number of clams found at the site. Field crews attempted for three hours to manually collect a sufficient number of organisms with an even distribution of various size classes; however, the final sample was made up of predominantly individuals in the smallest size classes. After the 11/15/2022 TAC Meeting, it was agreed that the Delta RMP would follow up with SGS-AXYS to ensure that the Delta RMP was informed within 5 business days of compositing and weighing the samples to communicate the amount of tissue available for analysis.

The clams were homogenized by SGS-AXYS on 06/08/2022 and the composited tissue amounts were reported to the CV RDC on June 14, 2022 prior to sample analysis. SGS-AXYS informed the Delta RMP that there were three composites that were below the desired 12 grams of wet weight tissue. The composite from San Joaquin River at Airport Way near Vernalis contained 3.77 grams, and, despite being collected according to the protocols outlined in the CEC QAPP v2 and the SAP, the composites for American River at Discovery Park and Sacramento River at Hood Monitoring Station Platform contained 6.58 grams and 9.05 grams, respectively. The final tissue masses and makeup of the sample composites as reported by the laboratory are provided in **Table 35** and **Figure 9**.

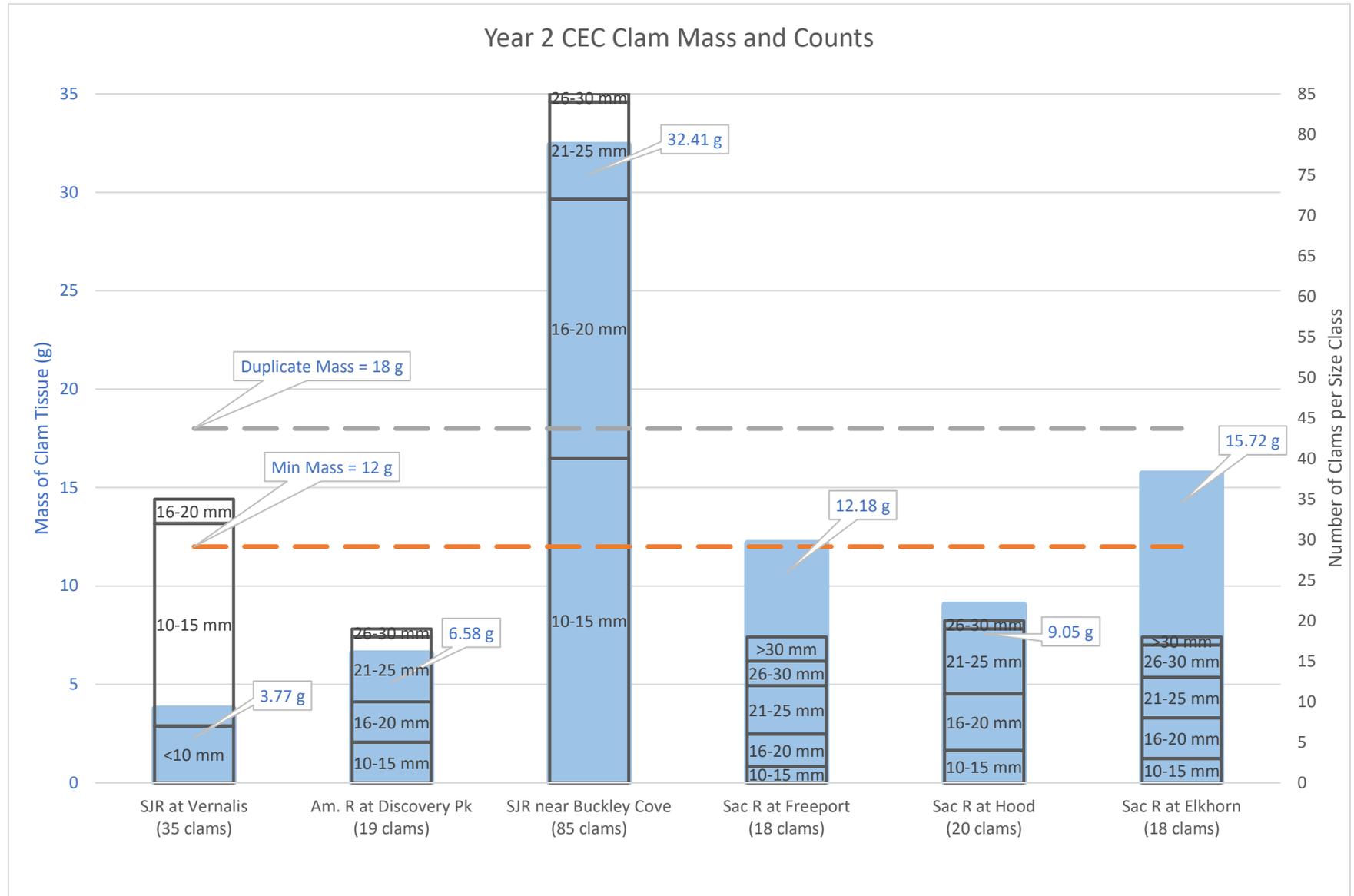
The laboratory was informed to proceed with analysis from all 6 sites on June 15, 2022. SGS-AXYS confirmed that the RLs would be higher in these three samples based on the amount of tissue available. The required PBDE constituents were detected in the quantifiable range for all bivalve samples, indicating that despite being raised from the original level, the RLs reported were of a sufficient resolution for the study goals.

**Table 35. Bivalve composite sample masses and size class distributions of individual organisms for Year 2 CEC Monitoring.**

The target minimum sample size is 12g for a single sample and 18g for a sample being used as a laboratory duplicate.

STATION	TISSUE MASS	TOTAL INDIVIDUALS	CLAM SIZE CLASSES					
			< 10 mm	10-15 mm	16-20 mm	21-25 mm	26-30 mm	>30 mm
San Joaquin River at Airport Way near Vernalis	3.77	35	7	25	3	--	--	--
American River at Discovery Park	6.58	19	--	5	5	8	1	--
San Joaquin River near Buckley Cove	32.41	85	--	40	32	12	--	--
Sacramento River at Freeport	12.18	18	--	2	4	6	3	3
Sacramento River at Hood Monitoring Station Platform	9.05	20	--	5	14	1	--	--
Sacramento River at Elkhorn Boat Launch	15.72	18	--	3	5	5	4	1

Figure 9. Bivalve composite sample masses and size class distributions of individual organisms for Year 2 CEC Monitoring.



### *2021-02: Buckley Cove Location Offset*

On October 25, 2021 (Event 2), samplers collected water samples for CEC analysis from San Joaquin River at Buckley Cove approximately 350 meters downstream of target coordinates due to a locked gate preventing access to the target location. DRMP deviation form **2021-02** was initiated to document the location from which samples were collected and to outline procedures to prevent future sample collection location deviations. The CEC QAPP v2 indicates that samples must be collected within 100 meters of the target coordinate for any samples collected from the bank/shore. Despite being outside of the acceptable range specified in the QAPP, it is expected that the impact of sampling 350 meters downstream of the target location is minimal due to the size of the waterbody and the fact that no additional inputs are present between the target location and the Event 2 sampling location. The Year 2 Event 2 collection location was also similar to the Year 1 water collection location accessed by DWR.

Corrective actions for this deviation included adding a comment to the CV RDC identifying that the collection occurred 350 meters from target and specifying that field crews should contact the Program Manager and receive approval from the CVRWQCB QA Representative prior to attempting to sample outside of the acceptable distance from the target location. Nevertheless, due to continued sample collections from the secondary location, the CEC QAPP (v2) was amended later in the year to update the sampling location near Buckley Cove to the location from which samples were collected during Event 2 – see deviation **2021-06: Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported** below for further discussion.

### *2021-03: TOC Missing Lab Duplicate Event 1 July*

On September 8, 2021, Weck Laboratories informed the CV RDC that the analyst ran a LCSD for TOC in sediment instead of the unspiked laboratory duplicate that was requested and was required by the CEC QAPP v2. Sediment samples in this batch were collected by University of California -Granite Canyon on July 22, 2021 as part of the SPoT program and as a collaborator on this project. DRMP deviation form **2021-03** was initiated to document the missing QC samples and outline protocols to prevent similar deviations during the October sediment sampling event.

In response to this deviation, the associated TOC results were flagged as having incomplete QC (**Table 15**) and CV RDC staff followed up with Weck laboratory to clarify that the sediment samples that were scheduled to be collected in the upcoming October event would include an unspiked laboratory duplicate with the TOC analyses. Per this communication, all sediment TOC samples for the following event were successfully analyzed with all laboratory QC samples required by the CEC QAPP (v2).

### *2021-04: Missing Laboratory Duplicate for SSC Analysis*

Weck informed the CV RDC on December 22, 2021 that given the constraints of the ASTM method and the procedure for preparing LCS samples, they were unable to generate a duplicate sample (e.g., an LCSD) that could be used to assess laboratory precision for the analysis of SSC for samples collected during Event 1 (October 20-21) and Event 2 (October 25-26). DRMP deviation form **2021-04** was initiated to document the missing laboratory QC and reasons for Weck being unable to generate a duplicate sample.

The situation was discussed with Selina Cole, the CVRWQCB QA Representative, and it was agreed that given the constraints of the analytical method and SWAMP guidance, an amendment to the CEC QAPP v2 should be submitted to revise the quality control requirements for SSC. An amendment to the QAPP was submitted for signatures on January 20, 2022.

### *2021-05: Weck MDLs and RL elevated for some Analytes*

Weck Laboratories provided results for Event 1 (October 20-21) and Event 2 (October 25-26) on January 7 and 10, 2022, respectively. While performing data verification in February, CV RDC staff noted that the reported MDLs and one RL did not match the CEC QAPP v2. On February 14, 2022, CV RDC staff emailed Weck to verify that the limits were reported correctly. On February 28, 2022, the Weck Project Manager informed CV RDC staff that the MDLs had been updated during a recent MDL study and were reported correctly; the limits originally included in the CEC QAPP (v2) were no longer valid. In addition, the RL for triclosan was also elevated, which the laboratory indicated was an oversight that was not noticed during their review of the CEC QAPP v2. DRMP deviation form **2021-05** was initiated to document that seven MDLs and one RL were higher than what was approved in the CEC QAPP v2. A QAPP amendment was also created to update the MDLs and RLs in accordance with the laboratory capabilities; this amendment was finalized and submitted for signatures on June 2, 2022.

### *2021-06: Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported*

On March 28, 2022, the Delta RMP conducted sampling activities at San Joaquin River at Buckley Cove (Station Code 544LSAC13) for Event 3 (Wet Season 2) where two deviations occurred.

The first deviation that occurred was a sampling offset from the target coordinates at this location. Field crews collected samples from the incorrect location without contacting the Delta RMP Program Manager or receiving approval from the CVRWQCB QA Representative, as was agreed upon following the similar deviation that was identified following Event 2 (see **2021-02: Buckley Cove Location Offset**).

The second deviation that occurred during Event 3 consisted of sampling personnel not recording dissolved oxygen as percent saturation at two locations, San Joaquin River at Buckley Cove and San Joaquin River at Airport Way near Vernalis; dissolved oxygen as a concentration in mg/L was successfully collected and recorded at all sample locations. The omission of these results was identified when the data sheets were being reviewed and DRMP deviation form **2021-06** was initiated to document both deviations for Event 3.

A meeting occurred with Selina Cole and Melissa Turner on May 18, 2022 to discuss whether a new station code to reflect the location where water quality samples were collected for Event 2 and 3 and determine from which location samples should be collected during the subsequent Event 4. It was agreed that a new station code would be created, and the existing data will be updated to the new station code. An amendment to the CEC QAPP v2 was approved on June 8, 2022. To address the second deviation, MLJ confirmed, prior to the next sampling event, that all field measures listed in the QAPP would be reported from all field crews and instruments.

### *2021-08: Weck Event 3 Missed Resolution Reporting Timeline*

During a conference call with Weck, the Delta RMP Program Manager (Melissa Turner), the Regional Board QA Representative (Selina Cole), the State Board QA Officer (Andrew Hamilton), and CV RDC data management staff (Lisa McCrink and Cassandra Lamerdin) on March 22, 2022, Weck agreed to update their reporting system to allow for the reporting of IDA standard results as percent recoveries. Due to these updates to the analysis and laboratory reporting system, PPCP results for the samples collected on March 28, 2022, for Event 3 were not provided until July 21, 2022, exceeding the 60-calendar day requirement for the Delta RMP to provide preliminary results according to R5-2021-0054 by 51 days. DRMP deviation form **2021-08** was initiated to document the missed reporting deadline. This deviation only affected the timing for when preliminary results were received; there were no hold time violations associated with these results. Event 4 data were reported within the 60-day timeframe and included the percent recoveries as requested. In addition, it was agreed that the CEC QAPP should be amended to clarify the requirement that IDA percent recoveries be reported with any results quantified using an isotopic dilution method. The QAPP amendment was submitted for signatures on May 27, 2022 and approved on June 2, 2022.

### *2021-09: CEC Year 2 Tissue RLs and Missing Lipids and Moisture Results*

On September 2, 2022, the CV RDC reviewed the EDD for clams and fish sampled on October 2021 (received from SGS-AXYS on August 19, 2022) and identified three potential deviations:

- The RLs in the EDD were higher than the RLs the CEC QAPP v2.

- The lab did not complete the required laboratory duplicates for lipid and moisture in each batch. In addition,
  - Lipids could not be analyzed with the PFAS batch as required by the CEC QAPP v2, and,
  - Clams were not analyzed for lipids with the PBDE batch due to laboratory oversight.

DRMP deviation form **2021-09** has been drafted to document these deviations. With respect to the difference in method RLs, SGS-AXYS cited that these differences are due to a conversion issue specifically between dry weight (dw) units required by the CEC QAPP v2 and the wet weight (ww) units reported in the EDD. With respect to the moisture and lipid reporting, SGS-AXYS reported that for the PFAS batch, the method extraction technique does not allow for a lipid analysis, and it was incorrectly identified in the QAPP as an analyte to be analyzed by this method; however, lipids were analyzed with the PBDE batch for fish. It was laboratory oversight that a moisture split was not analyzed on one of the four composites in the PFAS batch. In the PBDE batch, the laboratory confirmed it was an oversight to not include lipid analysis for the clams in the batch, and a laboratory duplicate was not run on the fish that did have lipids reported. The data are flagged as missing the required QC. SGS-AXYS conducted additional analysis and reported lipids for the two clam samples with sufficient remaining tissue mass; results were reported on 10/14/2022. The two clam samples with enough remaining tissue to conduct the lipid analysis were collected from San Joaquin River Near Buckley Cove and Sacramento River at Elkhorn Boat Launch Facility on 10/21/2021. A laboratory duplicate has also been run as a part of the additional analysis in accordance with batch requirements outlined in the CEC QAPP v2. The laboratory reported two additional quality control results (a blank and a reference material) with this additional lipid analysis that were not required and for which no criteria exist in the QAPP. These results are reported with the results in the CV RDC but are not evaluated in this report.

Future QAPPs will include language clarifying discrepancies in RL values that occur when converting between wet and dry weight concentrations.

### *2021-10: CEC Year 2 Clam Laboratory Measurements*

On September 7, 2022, CV RDC data management staff used the laboratory report to populate the bivalve composite EDD and noted a discrepancy with the clam widths recorded on the bench sheets during laboratory dissections prior to homogenization. The laboratory was contacted to verify if the measurements were taken according to the definition of shell length and width provided in the CEC QAPP v2. The original analyst who recorded the measurements was eventually contacted, who was able to confirm that the measurements were not taken in a manner consistent with the QAPP definitions.

Deviation form **2021-10** was drafted to document the incorrect measurements recorded by the laboratory. The values originally recorded as “width” were updated in the CV RDC to the length values. The values originally recorded as “length” were confirmed to be shell height (which is not required measurement for completing the bivalve composite information in the database); these values were added to the comment field as height measurements. The shell width field was not populated in the CV RDC as these values were not recorded.

**Table 36. Referenced deviations from the Delta RMP CEC QAPP.**

DEVIATION NUMBER	STATUS	DEVIATION DATE	TITLE	DESCRIPTION	CORRECTIVE ACTIONS	RESOLUTION
2021-01	Final	10/21/2022	Year 2 Clam Tissue Collection	Field crews could not collect the desired number and sizes of clams at San Joaquin River at Airport Way near Vernalis during Event 1, causing a potential for insufficient tissue for PBDE analysis.	AXYS to inform the DRMP Program Manager if there will be impacts on the analysis once it is known how much tissue is available.	Clam samples from three sites did not reach the 12g goal for a complete sample aliquot, resulting in raised RLs. All clam tissue samples reported PBDE detections in the quantifiable range, indicating that all RLs were at an appropriate resolution.
2021-02	Final	10/25/2021	Buckley Cove Location Offset	San Joaquin River at Buckley Cove was sampled approximately 350 meters downstream of target coordinates for Event 2.	Sampling crews were instructed to contact the Program Manager and obtain approval from the CVRWQCB QA Representative prior to collecting samples from non-target location.	Sample location issues persisted at Buckley Cove in the subsequent events (see deviation 2021-06); the site location was eventually updated in the QAPP.
2021-03	Final	9/8/2021	TOC Missing Lab Duplicate Event 1 July	Weck Laboratories informed CV RDC staff that the analyst ran an LCSD instead of an unspiked laboratory duplicate as requested and required by the CEC QAPP v2.	The analytical batch missing the lab duplicate will be flagged with a Lab Submission Code of QI and a Lab Batch Comment. Weck was reminded of the QC requirements for sediment TOC analysis.	All required laboratory QC samples (including an unspiked duplicate) were included with sediment TOC analysis associated with the subsequent sampling event.

DEVIATION NUMBER	STATUS	DEVIATION DATE	TITLE	DESCRIPTION	CORRECTIVE ACTIONS	RESOLUTION
2021-04	Final	12/21/2022	Missing Laboratory Duplicate for SSC Analysis	Weck informed CV RDC staff they were unable to generate an LCSD for the batches analyzed for SCC with the Events 1 and 2 samples.	Submit a deviation form to document missed QC sample and a QAPP amendment form to remove duplicate requirement.	An amendment to the CEC QAPP was submitted for signatures on 01/20/2022
2021-05	In Review	1/7/2022	Weck MDLs and RL elevated for some Analytes	CV RDC staff performing verification on PPCP results provided by Weck for Events 1 and 2 noted a discrepancy between the reported MDLs and RLs and the expected values in the CEC QAPP. Weck staff noted the values had been updated since QAPP approval.	Submit a QAPP Amendment to reflect update MDLs and RL.	An amendment to the CEC QAPP was submitted for signatures on 06/02/2022
2021-06	In Review	3/28/2022	Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported	Samples for Event 3 were again collected offset from the target location at San Joaquin R at Buckley Cove. Also, sampling personnel did not record DO as % saturation at San Joaquin R at Buckley Cove and San Joaquin River at Airport Way near Vernalis.	The new CEC station code was updated to 544SJRNBC, San Joaquin River near Buckley Cove. MLJ will ensure, prior to next sampling event, that all field measures listed in the QAPP are able to be reported from all field crews and instruments.	An amendment to the CEC QAPP v2 was signed on June 8, 2022. All required field parameters were collected during Event 4.

DEVIATION NUMBER	STATUS	DEVIATION DATE	TITLE	DESCRIPTION	CORRECTIVE ACTIONS	RESOLUTION
2021-08	In Review	7/21/2022	Weck Event 3 Missed Resolution Reporting Timeline	Weck reported Event 3 results 51 days past the R5-2021-0054 deadline for providing preliminary data due to new IDA reporting formats causing reporting delays.	Amend the CEC QAPP (v2) to include language requiring IDAs be reported as percent recoveries with all isotope dilution analyses.	An amendment to the CEC QAPP was approved on 06/02/2022. Event 4 data were reported within the 60-day timeframe and included the percent recoveries as requested.
2021-09	Final	9/2/2022	CEC Year 2 Tissue RLs and Missing Lipids and Moisture Results	Tissue RLs were generated from wet weight and do not match the QAPP units of dry weight. The lab did not analyze for the correct frequency of duplicates in the PBDE lipid batch and clams did not have lipid reported.	Future QAPPs will include language to clarify the reporting limits for wet weight vs dry weight. Additional lipid analyses will be conducted on remaining tissue and- any batches missing lab duplicates will be flagged with QI.	The Delta RMP has received the results of the additional lipid analyses; all other data are reported as indicated.
2021-10	In Prep	9/7/2022	CEC Year 2 Clam Laboratory Measurements	Bivalve shell measurements taken by the laboratory were not recorded according to the definitions provided in the QAPP.	Clam measurements considered suspect were verified with SGS-AXYS.	The CV RDC was updated to have the correct length values; height was included in the comments field and no widths were reported.

## REFERENCES

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## **Appendix A. Field Reports for Year 2 Monitoring for Constituents of Emerging Concern**

***Event 1 – October 18, 20 and 21, 2021***

**AMS Field Report – Event 1 Water, Sediment, and Bivalve Tissue Samples**

# Field Report

## Delta RMP CECs Year 2 Monitoring

Event 1 – Late Summer / Early Fall Season Water, Sediment, and Biota

November 10, 2021 Final

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# 1. Introduction

This field report summarizes activities associated with implementation of the Delta Regional Monitoring Program (Delta RMP) Constituents of Emerging Concern (CEC) monitoring performed by the combined AMS, ICF, and MLJ team during the Year 2 implementation. This report covers dry season sampling conducted for the water quality, sediment quality, and bioaccumulation components. All sampling and analysis was conducted under the dictates of the Delta RMP CECs Pilot Project Quality Assurance Project Plan version 2 (QAPP, v2) [ASC 2021].

## 1.1. Objectives

The objectives of the sampling effort were as follows:

1. Collect water quality measurements (pH, temperature, dissolved oxygen, specific conductance, and turbidity) and ambient/outflow water samples from twelve sites for analysis of Galaxolide and Triclocarban by Physis, PFAS (PFOS, PFOA) by Vista Labs; hormones (estrone, estradiol), pharmaceuticals (Ibuprofen, Diclofenac, Triclosan, Bisphenol A), and SSC by Weck Labs.
2. Collect depositional sediment samples from two sites for analysis of PBDEs (PBDE 047, PBDE 099, and moisture) and PFAS (PFOS, PFOA, and moisture) by SGS Axys and TOC by Weck.
3. Collect a minimum mass of the clam, *Corbicula fluminea*, from six sites for analysis of PBDEs (PBDE 047, PBDE 099, moisture, and lipids) by SGS Axys.

## 1.2. Sampling Sites

Collection information for Event 1 sampling sites is summarized in Table 1.

**Table 1. Sampling Activities for Delta RMP CECs Year 2 Monitoring Event 1, Dry Season Late Summer / Early Fall, October 2021**

Station Code	Sample Date	Actual Latitude	Actual Longitude	Depth (m)	Water	Sed	Biota
519SUT108	10/21/21	38.67208	-121.62501	5.2	x		x
510ST1301	10/21/21	38.45541	-121.50193	8.0	x		x
510SACC3A	10/21/21	38.36774	-121.52122	8.0	x		x
519AMNDVY	10/21/21	38.60083	-121.50458	3.4	x		x
541SJC501	10/20/21	37.67571	-121.26490	1	x		x
544LSAC13	10/21/21	37.97124	-121.37426	12.9	x		x
519DRYCRK	10/20/21	38.7342	-121.31444	1.5	x	x	
511SOL011	10/21/21	38.34649	-121.89686	0.5	x	x	
519POTW01	10/20/21	38.73404	-121.32186	1	x		
519POTW02	10/21/21	38.34660	-121.90160	0.8	x		
519SACUR3	10/20/21	38.60127	-121.49299	0.5	x		
519PGC010	10/20/21	38.80474	-121.32738	0.1	x		

### 1.3. Sampling Event Selection

Initial sampling was conducted as part of a two-day event during the dry season, and with the goal of achieving at least 48 hours of antecedent dry weather. The sampling event was scheduled at the tail end of the expected dry season, allowing sufficient time to compile staffing and complete training, secure sampling materials and equipment, and finalize the Project QAPP. A small amount of rainfall was recorded in the project vicinity over the 48-hr period covering October 20 and 21, 2021<sup>1</sup>: 0.07” at the Sacramento International Airport and 0.02” at the Stockton Airport. There was no measurable rainfall prior to initiation of sampling, nor was there observable flow into the channels from stormwater sources.

### 1.4. Sampling Procedures

Sampling sites 519SUT108, 510ST1301, 510SACC3A, 519AMNDVY, and 544LSAC13 were sampled midchannel via a vessel operated by ICF. All other sampling locations were sampled from land. Per the field Sampling and Analysis Plan (SAP), stations with multiple sampling media, water quality collections were completed first, followed by water quality measurements, then sediment or biota collections.

In most cases, collections were completed in accordance with the project SAP (AMS 2021) and QAPP (ASC 2021). At most biota stations, a sufficient number of clams were collected to support all analyses. After retrieval of the clam dredge, all *Corbicula fluminea* were placed into a metal bucket for sorting (e.g., Figure 1). At stations where a large number of clams were collected (i.e., several hundred), sampling personnel selected a manageable subsample of live specimens for measurement and processing.

The sole deviation from protocol occurred at site 541SJC501, where field staff were unable to collect the desired number of clams or specimens of sufficient size. At this location, clam collections were conducted manually using rakes and shovels in lieu of the dredge dragged behind a vessel due to shallow water depth and a lack of nearby vessel launch facilities. Three field staff attempted collections for approximately 3 hours and found a low abundance of clams, of mostly smaller size classes (10-15 mm), resulting in an estimated 5 g of tissue sample mass. Some prioritization of laboratory analyses may be required for samples collected at this location. A deviation form will be created to document this situation.

For future efforts at this location, AMS will attempt to construct handheld dredges using rake heads and net/basket combinations. However, due to the small size of clams observed at this location and unknown density, it is unknown if this step will increase the collected tissue mass.

Clam collections easily achieved laboratory minimum requirements at all other locations and typically included a broader range of sizes (Table 2).

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<sup>1</sup> Reported via Weather Underground, for Sacramento (<https://www.wunderground.com/history/daily/us/ca/sacramento/KSMF>) and Stockton (<https://www.wunderground.com/history/daily/us/ca/stockton/KSCK>), downloaded October 28<sup>th</sup>, 2021.



**Figure 1. *Corbicula fluminea* harvested at 519SUT108.**

**Table 2. Dry Season Clam Composite Make-up by Station**

Station	Total #	Shell Length (mm)					
		<10	10-15	16-20 m	21-25	26-30	>30mm
541SJC501	25	1	21	3			
544LSAC13	20		5	6	6	3	
519AMNDVY	20		6	6	8		
519SUT108	20		4	4	3	8	1
510ST1301	20		3	5	6	4	2
510SACC3A	20		4	5	10	1	

### 1.5. Sample Handling

All samples were delivered to MLJ Environmental at the conclusion of sampling efforts under standard Chain of Custody protocols. All water quality and sediment samples were stored on double-bagged wet ice from time of collection until delivery. All clam samples were individually wrapped in aluminum foil, compiled in a zip-top bag, and kept frozen on dry ice until time of delivery.

### 1.6. Quality Assurance

QA samples collected for this event are described below, by media:

*Water Quality* – Field blank, field duplicate, and MS/MSD samples were collected at site 511SOL011.

*Sediment Quality* – Field duplicate samples were collected at site 511SOL011.

*Biota* – There are no requirements for field blanks or duplicates, but an additional volume of clams was included within the composite for site 519AMNDVY to support additional lab analyses as required.

## 2. References

AMS 2021. *Sampling and Analysis Plan for the Delta RMP CECs Pilot Study*. Prepared for MLJ Environmental. August 10, 2021.

Aquatic Science Center, 2021. *Quality Assurance Project Plan for the Pilot Study of Constituents of Emerging Concern in the Sacramento – San Joaquin Delta, Version 2*. Prepared by the Aquatic Science Center, updated by MLJ Environmental. October 2021.

## **MPSL-DFW Cruise Report – Event 1 Fish Tissue Samples**

**Appendix 1**  
**Cruise Report for the**  
**Delta Regional Monitoring Program (Delta RMP)**  
**Pilot Study Work Plan**  
**Monitoring For Constituents of Emerging Concern**

**Year 2 FY21/22**

**Sampling Dates: October 18, 2021 – October 20, 2021**

**Prepared by Marine Pollution Studies Laboratory Staff ([MPSL-DFW](#))  
at Moss Landing Marine Laboratories; San Jose State University**

**Introduction**

This report describes the sampling activities in the Delta region of California as the second of three years in the Pilot Study Work Plan for Constituents of Emerging Concern (CEC) monitoring. This sampling effort focuses on preliminary monitoring of targeted CECs in fish tissue in the Delta. Results from this study will evaluate and identify potentially problematic CECs, which can then be targeted in future studies and monitoring efforts. Sampling activities included the collection of fish tissue (benthivorous species) and basic field parameters. Samples were collected by Marine Pollution Studies Laboratory (MPSL-DFW) at Moss Landing Marine Laboratories (MLML).

**1.0 Cruise Report**

**1.1 Objectives**

The objectives were to collect Benthivorous fish at four (4) selected stations. The target was to collect five (5) individuals at each station and composite into a single sample for analysis. The fish in each composite were to be within 75% of the total length of each other.

**1.2 MPSL Sampling personnel**

Wesley Heim  
Chris Beebe  
Scot Lucas

Project Director  
Research Technician  
Research Technician

**1.3 Authorization to collect samples**

All sampling personnel are MPSL staff (San Jose State University Foundation) contracted through MLJ Environmental to conduct the sample collection activities listed herein.

## **1.4 Station selection**

Based upon the recommendations of the Delta RMP Steering Committee and Technical Advisory Committee with representatives from the Central Valley Regional Water Quality Control Board, State Water Resources Control Board (State Water Board), the Central Valley Clean Water Association (CVCWA) and several Central Valley Municipal Separate Storm Sewer System (MS4) representatives, stations were selected at entry points into the Delta, in-Delta waters, and ambient locations in the vicinity of POTW discharges and within the influence from urban runoff. When applicable, existing sampling stations and efforts were utilized to minimize project costs.

## **1.5 Summary of types of samples authorized to be collected**

Up to five (5) benthivorous fish of the same species were collected using an electrofisher boat for each of the four (4) stations. Upon collection, each fish was tagged with a unique ID that corresponded to the location it was collected. Physical parameters were collected for each individual fish, which included: weight, total length, fork length, and presence of any abnormalities. Fish samples were stored on ice until returned to the laboratory. Large fish were partially dissected in the field using the following protocol: fish were placed on a cutting board covered with a clean plastic bag where the head, tail, and guts were removed using a clean (laboratory detergent, DI) cleaver. The sex of the fish was noted. The fish were then wrapped in tin foil, with the dull side inward, and double-bagged in zipper-closure bags with other fish from the same location. All equipment was re-cleaned between stations.

At the laboratory, samples were stored in a freezer until they were processed for authorized dissection and analysis.

Basic station information (station depth, location, weather, hydromodifications and habitat) were noted. All collections and sample processing for fish followed the Delta RMP QAPP, version 2 (approved October 11, 2021).

## **1.6 Results**

A detailed fish catch, fish total length, descriptions and maps of sample collection for all stations can be found below. Table 1 indicates on which page collection details for each station can be found.

**Table 1.** Delta RMP CEC Pilot Study Collection Sites 2021

<b>Station Code</b>	<b>Station Name</b>	<b>Page Number</b>
544LSAC13	San Joaquin River at Buckley Cove	<a href="#"><u>5</u></a>
519ST1309	Sacramento River at Veterans Bridge	<a href="#"><u>6</u></a>
510ST1317	Sacramento River at Freeport	<a href="#"><u>7</u></a>
541SJC501	San Joaquin River at Vernalis/Airport	<a href="#"><u>8</u></a>

## San Joaquin River at Buckley Cove (544LSAC13)

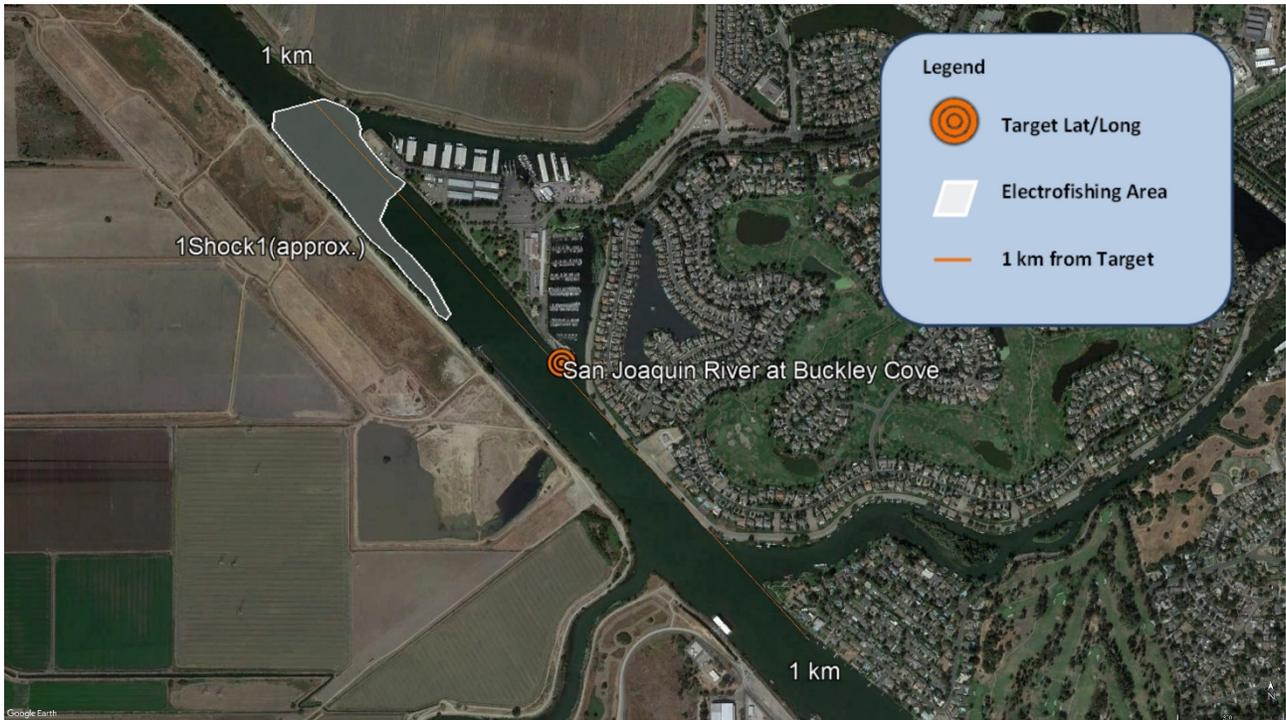
**Latitude:** 37.971833

**Longitude:** -121.373619

**Collection Method:** Electroshock

**Date(s) of Fish Collection:** 10/18/21

**Samplers:** Chris Beebe, Scot Lucas



White Catfish, TL (mm)				
210	239	230	250	264
234	221	260	270	305

**Comments:** The sampling vessel was launched from Buckley Cove Park in Stockton, CA. Due to the size of Catfish seen an additional 5 Catfish were collected to ensure enough tissue for analysis.

[Back to Table 1](#)

## Sacramento River at Veterans Bridge (519ST1309)

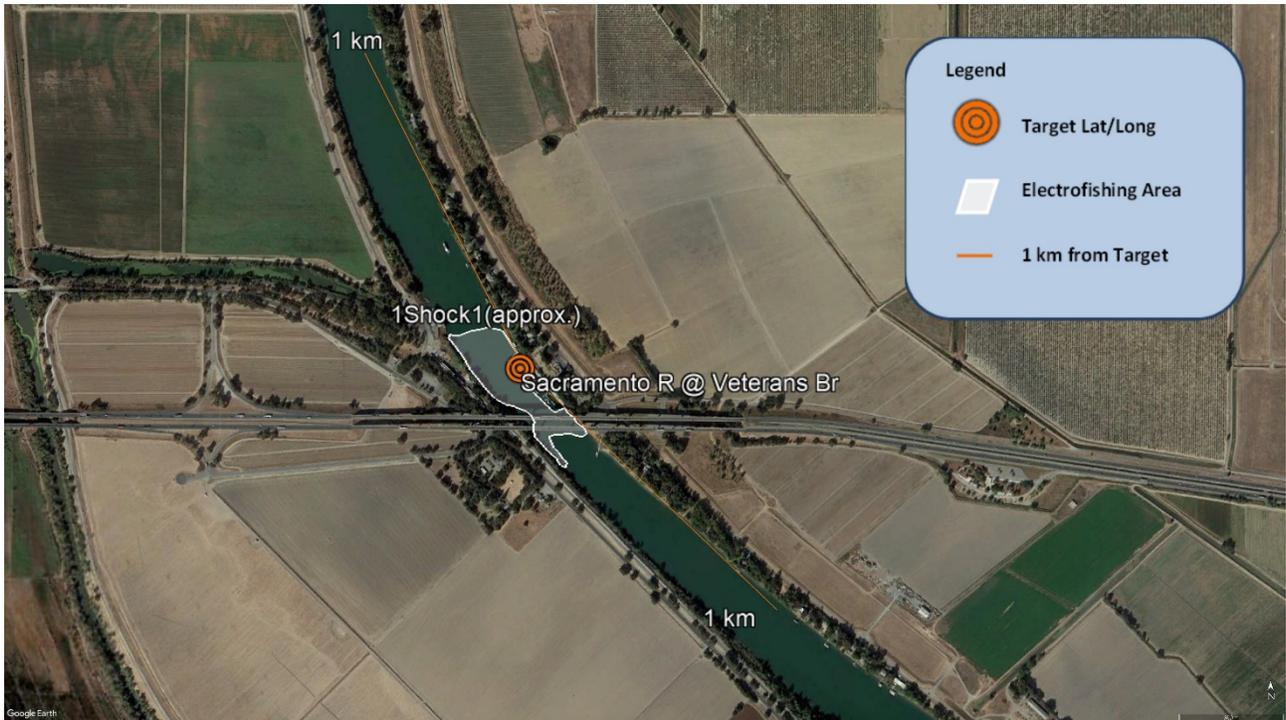
**Latitude:** 38.674679

**Longitude:** -121.62751

**Collection Method:** Electroshock

**Date(s) of Fish Collection:** 10/18/21

**Samplers:** Chris Beebe, Scot Lucas



Sacramento Sucker, TL (mm)				
381	466	483	478	469

**Comments:** The sampling vessel was launched from the Elkhorn Boat Launch Facility in Sacramento, CA. Five (5) Sacramento suckers were sampled along the transect adjacent to the target station.

[Back to Table 1](#)

## Sacramento River at Freeport (510ST1317)

**Latitude:** 38.45556

**Longitude:** -121.50189

**Collection Method:** Electroshock

**Date(s) of Fish Collection:** 10/18/2021

**Samplers:** Chris Beebe, Scot Lucas



White Catfish, TL (mm)				
310	320	372	355	339

Sacramento Sucker, TL (mm)	
382	435

**Comments:** The sampling vessel was launched from Garcia-Bend Park in Sacramento, CA. Five (5) White Catfish were sampled along the transect adjacent to the target station. An additional two (2) Sacramento Suckers were collected within the sampling reach.

[Back to Table 1](#)

## San Joaquin River at Vernalis/Airport (541SJC501)

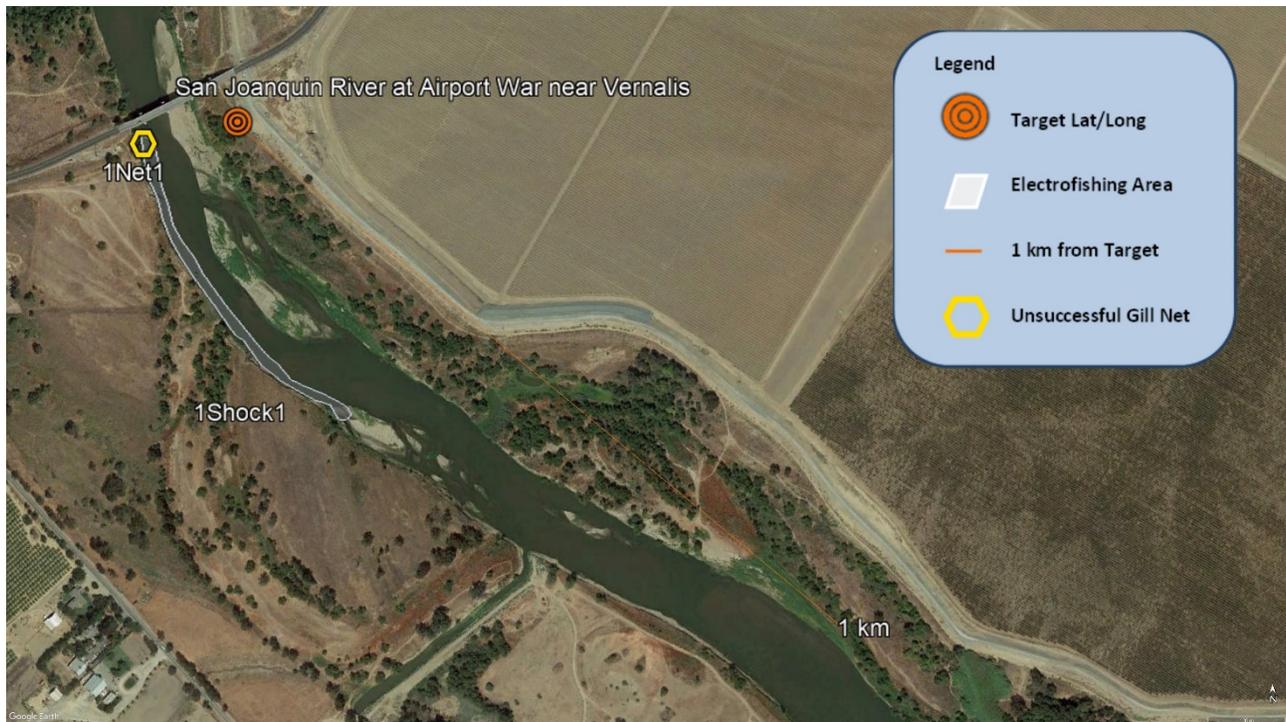
**Latitude:** 37.67556

**Longitude:** -121.26417

**Collection Method:** Electroshock, Cast Net

**Date(s) of Fish Collection:** 10/19/21, 10/20/21

**Samplers:** Chris Beebe, Scot Lucas



Common Carp, TL (mm)				
718	655	549	584	561

**Comments:** Due to low water levels samplers initially attempted to sample using gill nets but were unsuccessful. Returning the following day, a small electrofishing vessel was launched along the bank. Five (5) Common Carp were sampled along the bank adjacent to the target station.

[Back to Table 1](#)

## **1.7 Discussion**

A total of four (4) stations were successfully sampled for fish tissue using a large dedicated electrofishing vessel as well as a smaller vessel outfitted with electrofishing equipment.

***Event 2 – October 25 and 26, 2021***

**AMS Field Report – Event 2 Water Samples**

# Field Report

## Delta RMP CECs Year 2 Monitoring Event 2 – Wet Season Water (1 of 2)

November 10, 2021 Final

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**Submitted by:**

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## 1. Introduction

This field report summarizes activities associated with implementation of the Delta Regional Monitoring Program (Delta RMP) Constituents of Emerging Concern (CEC) monitoring performed by the combined AMS, ICF, and MLJ team during the Year 2 implementation. This report covers first flush, wet season sampling conducted for the water quality component. All sampling and analysis was conducted under the dictates of the Delta RMP CECs Pilot Project Quality Assurance Project Plan version 2 (QAPP, v2) [ASC 2021].

### 1.1. Objectives

The objectives of the sampling effort were as follows:

1. Collect water quality measurements (pH, temperature, dissolved oxygen, specific conductance, and turbidity) and ambient / outflow water samples from twelve sites for analysis of Galaxolide and Triclocarban by Physis, PFAS (PFOS, PFOA) by Vista Labs; hormones (estrone, estradiol), pharmaceuticals (Ibuprofen, Diclofenac, Triclosan, Bisphenol A), and SSC by Weck Labs.

### 1.2. Sampling Sites

Collection information for Event 1 sampling sites is summarized in in Table 1.

**Table 1. Sampling Activities for Delta RMP CECs Year 2 Monitoring Event 2, Wet Season Water Event 1 of 2, October 2021**

Station Code	Sample Date	Actual Latitude	Actual Longitude	Depth (m)	Water	Sed	Biota
519SUT108	10/26/21	38.67177	-121.62465	7.6	x		
510ST1301	10/26/21	38.45541	-121.50195	9.6	x		
510SACC3A	10/26/21	38.36729	-121.52130	9.2	x		
519AMNDVY	10/26/21	38.60080	-121.50475	5.2	x		
541SJC501	10/25/21	37.67565	-121.26484	1	x		
544LSAC13	10/25/21	37.97417	-121.37601	1	x		
519DRYCRK	10/26/21	38.73423	-121.31445	NR	x		
511SOL011	10/25/21	38.34649	-121.89685	1	x		
519POTW01	10/26/21	38.73405	-121.32187	NR	x		
519POTW02	10/25/21	38.34658	-121.90162	1.5	x		
519SACUR3	10/25/21	38.60130	-121.49298	2	x		
519PGC010	10/25/21	38.80470	-121.32730	0.5	x		



## 1.4. Sampling Procedures

Sites 519SUT108, 510ST1301, 510SACC3A, 519AMNDVY, and 544LSAC13 were sampled midchannel via an ICF operated vessel. All other sampling locations were accessed from land.

In general, all collections were completed in accordance with the project SAP (AMS 2021) and QAPP (ASC 2021). All sampling was conducted on October 25 and 26, 2021 (Table 1). The identified goals of the QAPP to sample the rising hydrograph and complete collections within 12 hours of last rainfall intensity of 0.1” per hour were not possible at all locations due to daylight restrictions and flooding that precluded vessel launch and created unsafe driving conditions.

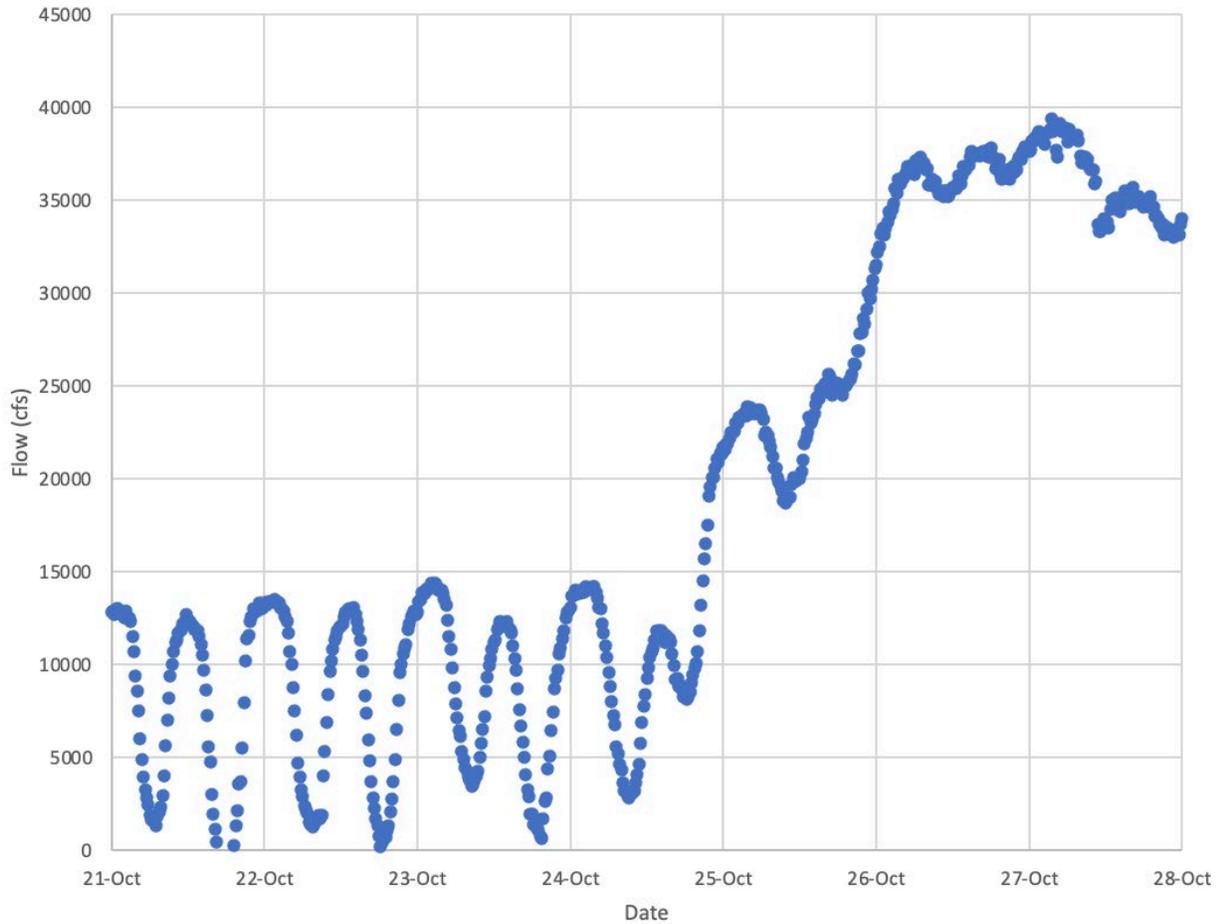
In the Sacramento area, predicted afternoon thunderstorms and wind gusts above 30 knots cancelled vessel-based sampling on October 25, 2021. Additionally, flooding in the Roseville POTW prevented field staff from accessing sites 519DRYCRK and 519POTW01 on October 25, 2021; these two sites were sampled by MLJ staff on October 26, 2021.

All vessel-based sampling was completed on October 26, 2021. Field staff noted large numbers of downed trees, vegetation, trash, and other hazards floating downriver (e.g., Figure 1), but daylight conditions allowed vessel operator to avoid major hazards and complete sampling safely.



**Figure 2. A partially submerged log on the Sacramento River.**

Flow measurements as reported at USGS sampling station 11447650 near Freeport, California are shown in Figure 3. Pre-storm flow remained below 15,000 cfs before the rainfall. During sampling operations, flow rates ranged from 18,700 to 31,300 cfs on October 25, 2021 and 31,500 to 37,900 cfs on October 26, 2021. Elevated flow conditions continued throughout the duration of the sampling event and peaked several days after cessation of major rainfall (39,400 cfs on October 27, 2021 at 3:30 am).



**Figure 3. Flow measurements recorded at USGS Station 11447650 near Freepoint, California.**

A slight variation from protocol occurred at site 544LSAC13. The associated marina was temporarily closed, and field staff were unable to sample at the target coordinates. After discussion with Project staff, sampling personnel identified a nearby publicly accessible sampling location, approximately 325 m from the target coordinates (Figure 4). It was determined that this location was appropriate for collecting the sample due to issues with accessing the marina; there were not any additional inputs or influences between the actual sample location and the target sample location. A deviation form will be created to document this situation.

In addition to high wet season flows, field staff noted several instances of active discharges into the creek that were not present during the dry weather sampling. In some cases, outflow had observable negative effects (e.g., foam observed in Figure 5).

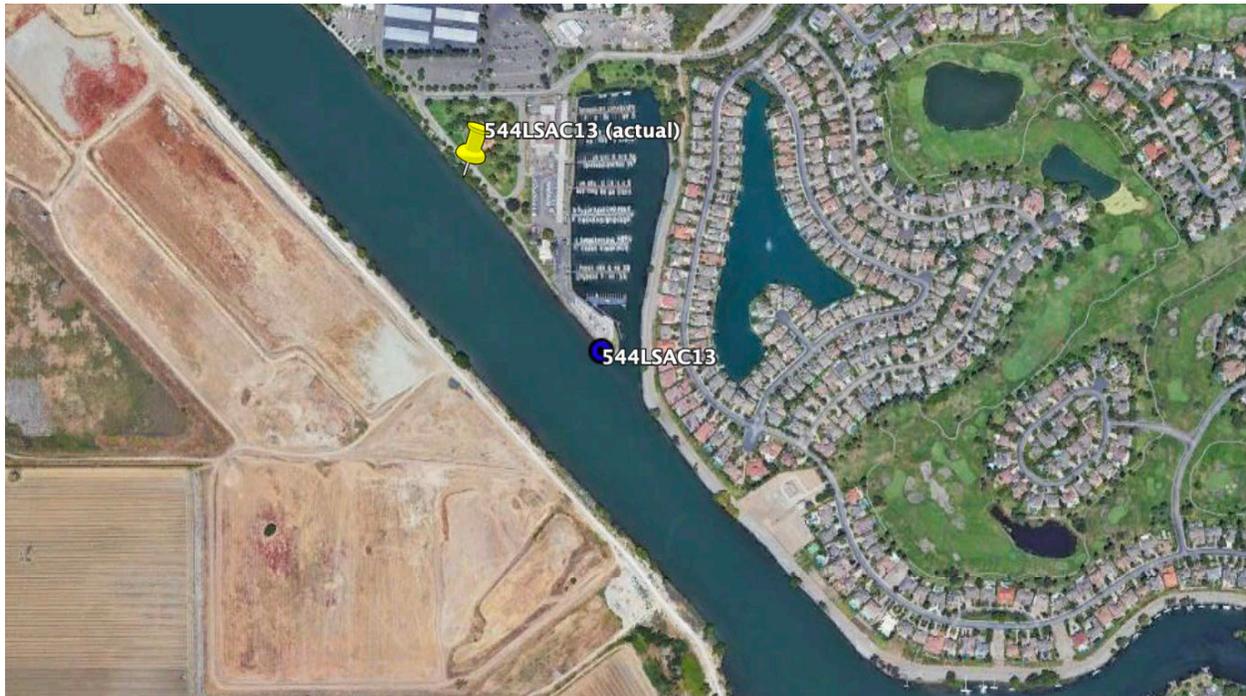


Figure 4. Location of target and actual coordinates for 544LSAC13, sampled Oct 25, 2021.



Figure 5. Foam emanating from outfall downstream of 519SUT108.

### **1.5. Sample Handling**

All samples were delivered to MLJ Environmental under standard Chain of Custody protocols. All water quality samples were stored on double-bagged wet ice from time of collection until delivery.

### **1.6. Quality Assurance**

QA samples collected for this event are described below, by media:

*Water Quality* – Field blank, field duplicate, and MS/MSD samples were collected at site 519DRYCRK.

## **2. References**

AMS 2021. *Sampling and Analysis Plan for the Delta RMP CECs Pilot Study*. Prepared for MLJ Environmental. August 10, 2021.

Aquatic Science Center, 2021. *Quality Assurance Project Plan for the Pilot Study of Constituents of Emerging Concern in the Sacramento – San Joaquin Delta, Version 2*. Prepared by the Aquatic Science Center, updated by MLJ Environmental. October 2021.

***Event 3 – March 28, 2022***

**AMS Field Report – Event 3 Water Samples**

# Field Report

## Delta RMP CECs Year 2 Monitoring Event 2 – Wet Season Water (2 of 2)

March 31, 2022 Draft

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# 1. Introduction

This field report summarizes activities associated with implementation of the Delta Regional Monitoring Program (Delta RMP) Constituents of Emerging Concern (CEC) monitoring performed by the combined AMS, ICF, and MLJ team during the Year 2 implementation. This report covers the second of two wet season sampling events conducted for the water quality component. All monitoring was conducted under the dictates of the Delta RMP CECs Pilot Project Quality Assurance Project Plan version 2 (QAPP, v2) [ASC 2021].

## 1.1. Objectives

The objectives of the sampling effort were as follows:

1. Collect water quality measurements (pH, temperature, dissolved oxygen, specific conductance, and turbidity) and ambient / outflow water samples from twelve sites for analysis of Galaxolide and Triclocarban by Physis, PFAS (PFOS, PFOA) by Vista Labs; hormones (estrone, estradiol), pharmaceuticals (Ibuprofen, Diclofenac, Triclosan, Bisphenol A), and SSC by Weck Labs.

## 1.2. Sampling Sites

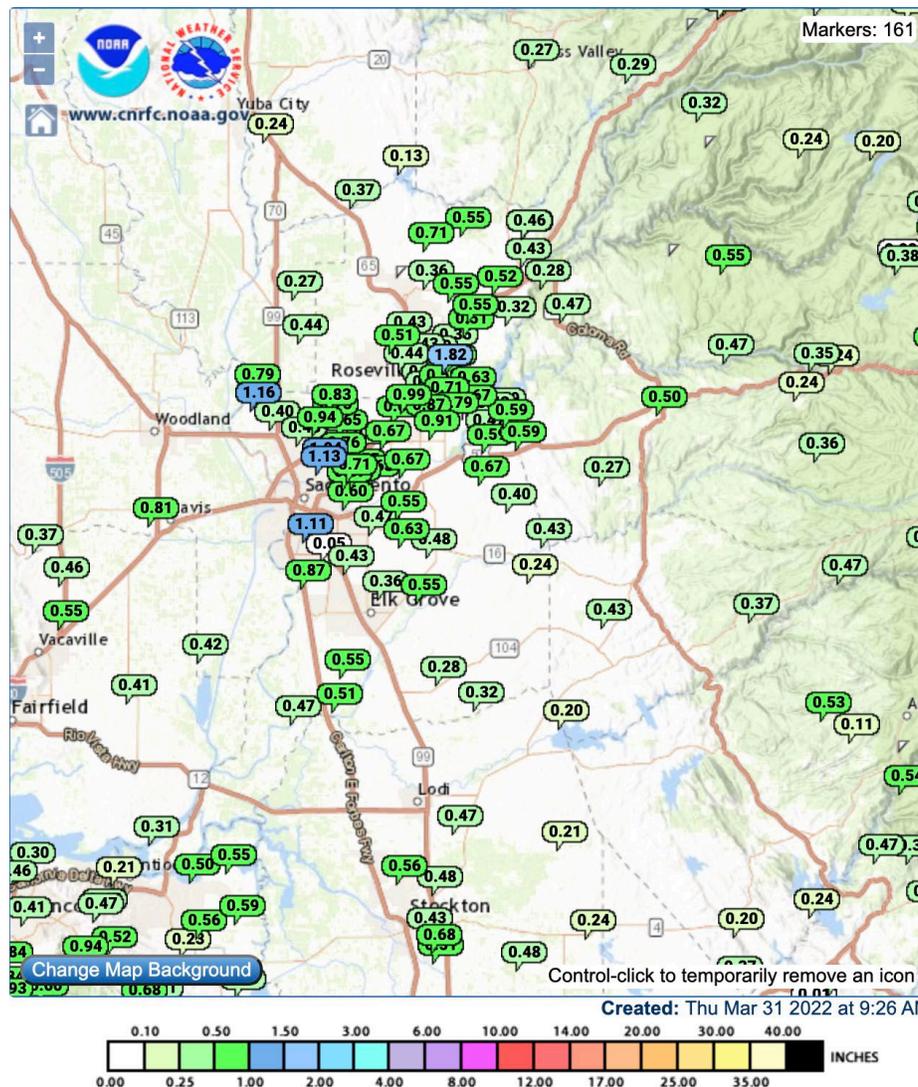
Collection information for Event 1 sampling sites is summarized in in Table 1.

**Table 1. Sampling Activities for Delta RMP CECs Year 2 Monitoring Event 4, Wet Season Water Event 2 of 2, March 2022.**

Station Code	Sample Date	Actual Latitude	Actual Longitude	Depth (m)	Water	Sed	Biota
519SUT108	3/28/22	38.67173	-121.62488	4.5	x		
510ST1301	3/28/22	38.45552	-121.50189	8.5	x		
510SACC3A	3/28/22	38.36715	-121.52088	8.9	x		
519AMNDVY	3/28/22	38.60085	-121.50462	2.0	x		
541SJC501	3/28/22	37.67539	-121.26468	0.5	x		
544LSAC13	3/28/22	37.97420	-121.37600	1	x		
519DRYCRK	3/28/22	38.73422	-121.31445	NR	x		
511SOL011	3/28/22	38.34642	-121.89709	1.5	x		
519POTW01	3/28/22	38.73401	-121.32188	NR	x		
511POTW02	3/28/22	38.34666	-121.90160	1	x		
519SACUR3	3/28/22	38.60122	-121.49307	NR	x		
519PGC010	3/28/22	38.80475	-121.32735	NR	x		

### 1.3. Sampling Event Selection

Sampling was conducted associated with a late season storm event that produced approximately 1.2 inches of rainfall at the Sacramento International Airport and approximately 0.7 inches at the Stockton Airport between 10pm on Sunday, March 27 and 6pm on Monday, March 28.<sup>1,2</sup> Other locations in the vicinity of Sacramento reported significantly higher precipitation levels (Figure 1). Monitoring activities were staggered over the course of the day, as well as geographically, so rainfall totals experienced will vary by station.



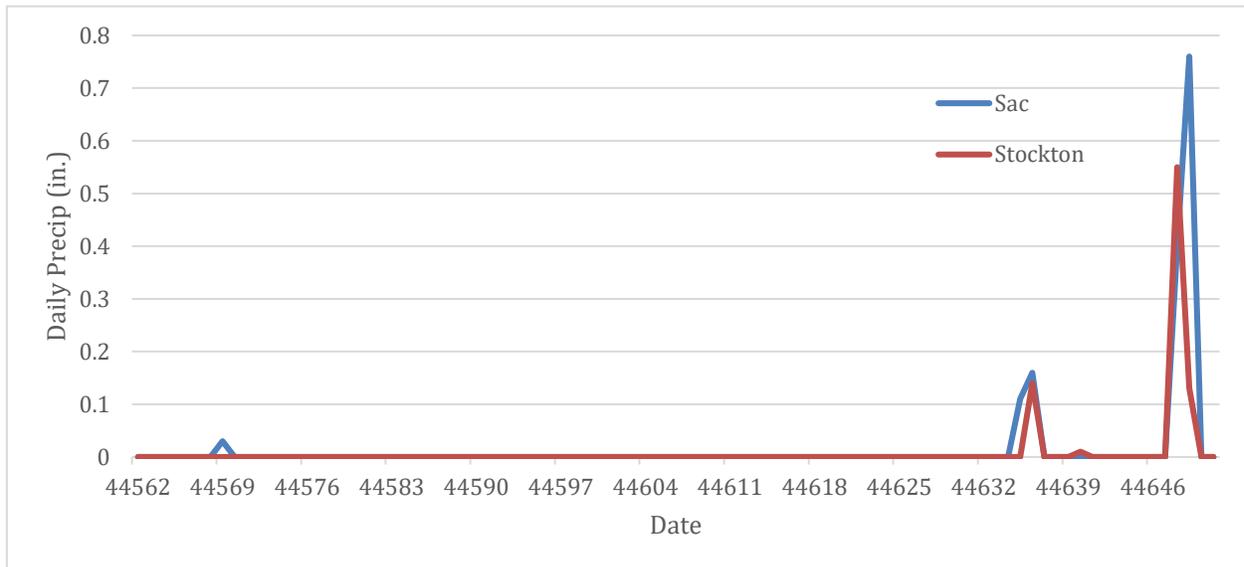
**Figure 1-1. Observed Precipitation Levels Reported by NOAA California Nevada River Forecast Center for the March 27 through March 28 storm event.**

<sup>1</sup> Reported via Weather Underground, for Sacramento Airport (<https://www.wunderground.com/history/daily/us/ca/sacramento/KSMF>) downloaded March 31<sup>st</sup>, 2022.

<sup>2</sup> Reported via Weather Underground, for Stockton Airport (<https://www.wunderground.com/history/daily/us/ca/stockton/KSCK>), downloaded March 31<sup>st</sup>, 2022.

### 1.4. Sampling Procedures

The late March storm event represented the first significant rainfall of the calendar year (Figure 1-2). The previous storm event that exceeded the 0.25” planning target occurred in late December 2021, indicating over 90 days of antecedent dry condition prior to the sampling event.

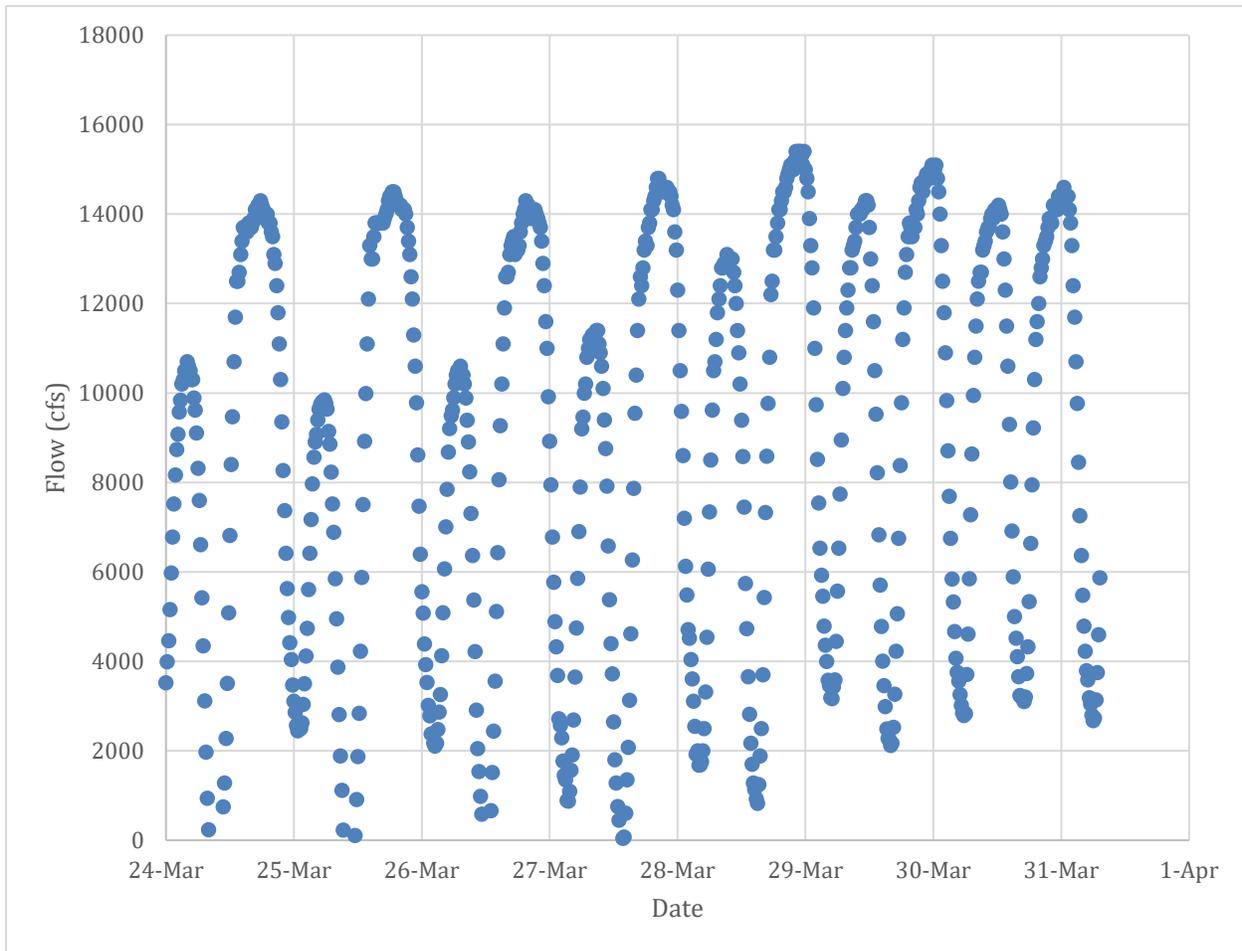


**Figure 1-2. Daily precipitation measurements recorded at Sacramento and Stockton airports, January 1, 2022 – March 31, 2022.**

The sampling achieved the QAPP sampling trigger of a minimum 0.25” rainfall at targeted precipitation gauges. Land-based collections were scheduled earlier in the day as peak runoff was expected to more closely follow onset of precipitation in the smaller drainage areas. Vessel-based sampling was initiated several hours after start of land-based efforts to allow for runoff to have more time to reach the downstream receiving waters. All sampling was scheduled to allow completion within daylight hours.

In general, all collections were completed in accordance with the project SAP (AMS 2021) and QAPP (ASC 2021). All sampling was conducted on March 28, 2022 (Table 1). Sites 519SUT108, 519AMNDVY, 510ST1301, 510SACC3A were sampled midchannel via an ICF operated vessel. All other sampling locations were accessed from land.

Flow measurements as reported at USGS sampling station 11447650 near Freeport, California, are shown in Figure 1-3. Unlike the first flush event, a large difference in discharge between pre-storm and intra- and post-storm discharge was not easily observable, with patterns following typical diurnal patterns associated with tidal influence. Daily peak discharge results, coinciding with maximum ebb tides, ranged in the 14,000 to 14,500 cfs range before the rainfall. Discharge rates peaked at 15,400 during the peak ebb flow on March 28<sup>th</sup> and returned to pre-storm condition approximately 1 day later.



**Figure 1-3. Flow measurements recorded at USGS Station 11447650 near Freeport, California.**

There were two deviations identified for this event. First, as was the case for prior wet season monitoring conducted at the target sampling site near Buckley Cove (site 544LSAC13), closure of the marina adjacent to the sampling site precluded sample collection at the target coordinates. Samples were again collected at a publicly-accessible location nearby and upstream of the target coordinates. Second, sampling personnel did not record dissolved oxygen percent saturation at two locations, 544LSAC13 and 541SJC501.

### **1.5. Sample Handling**

All samples were delivered to MLJ Environmental under standard Chain of Custody protocols. All water quality samples were stored on double-bagged wet ice from time of collection until delivery.

### **1.6. Quality Assurance**

QA samples collected for this event are described below, by media:

*Water Quality* – Field blank, field duplicate, and MS/MSD samples were collected at site 510SUT108.

## 2. References

AMS 2021. *Sampling and Analysis Plan for the Delta RMP CECs Pilot Study*. Prepared for MLJ Environmental. August 10, 2021.

Aquatic Science Center, 2021. *Quality Assurance Project Plan for the Pilot Study of Constituents of Emerging Concern in the Sacramento – San Joaquin Delta, Version 2*. Prepared by the Aquatic Science Center, updated by MLJ Environmental. October 2021.

***Event 4 – June 8, 2022***

**AMS Field Report – Event 4 Water Samples**

# Field Report

## Delta RMP CECs Year 2 Monitoring Event 4 – Dry Season Water

June 10, 2022

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## 1. Introduction

This field report summarizes activities associated with implementation of the Delta Regional Monitoring Program (Delta RMP) Constituents of Emerging Concern (CEC) monitoring performed by the combined AMS, ICF, and MLJ team during the Year 2 implementation. This report covers the dry season sampling event conducted for the water quality component. All monitoring was conducted under the dictates of the Delta RMP CECs Pilot Project Quality Assurance Project Plan version 2 (QAPP, v2) [ASC 2021].

### 1.1. Objectives

The objectives of the sampling effort were as follows:

1. Collect water quality measurements (pH, temperature, dissolved oxygen, specific conductance, and turbidity) and ambient / outflow water samples from twelve sites for analysis of Galaxolide and Triclocarban by Physis, PFAS (PFOS, PFOA) by Vista Labs; hormones (estrone, estradiol), pharmaceuticals (Ibuprofen, Diclofenac, Triclosan, Bisphenol A), and SSC by Weck Labs.

### 1.2. Sampling Sites

Collection information for Event 1 sampling sites is summarized in in Table 1.

**Table 1. Sampling Activities for Delta RMP CECs Year 2 Monitoring Event 4, Dry Season Water Quality, June 2022.**

Station Code	Sample Date	Actual Latitude	Actual Longitude	Depth (m)	Water	Sed	Biota
519SUT108	6/8/22	38.67191	-121.62515	5.2	x		
510ST1301	6/8/22	38.45545	-121.50199	8	x		
510SACC3A	6/8/22	38.36769	-121.52079	9	x		
519AMNDVY	6/8/22	38.60102	-121.50454	2.7	x		
541SJC501	6/8/22	37.67542	-121.26462	0.75	x		
544SJRNBC*	6/8/22	37.97419	-121.37608	5	x		
519DRYCRK	6/8/22	38.73423	-121.31441	NR	x		
511SOL011	6/8/22	38.34649	-121.89687	NR	x		
519POTW01	6/8/22	38.73403	-121.32181	NR	x		
511POTW02	6/8/22	38.34662	-121.90157	NR	x		
519SACUR3	6/8/22	38.60130	-121.49297	NR	x		
519PGC010	6/8/22	38.80474	-121.32733	NR	x		

\*Updated from 544LSAC13 based on CEC QAPP Amendment May 27, 2022.

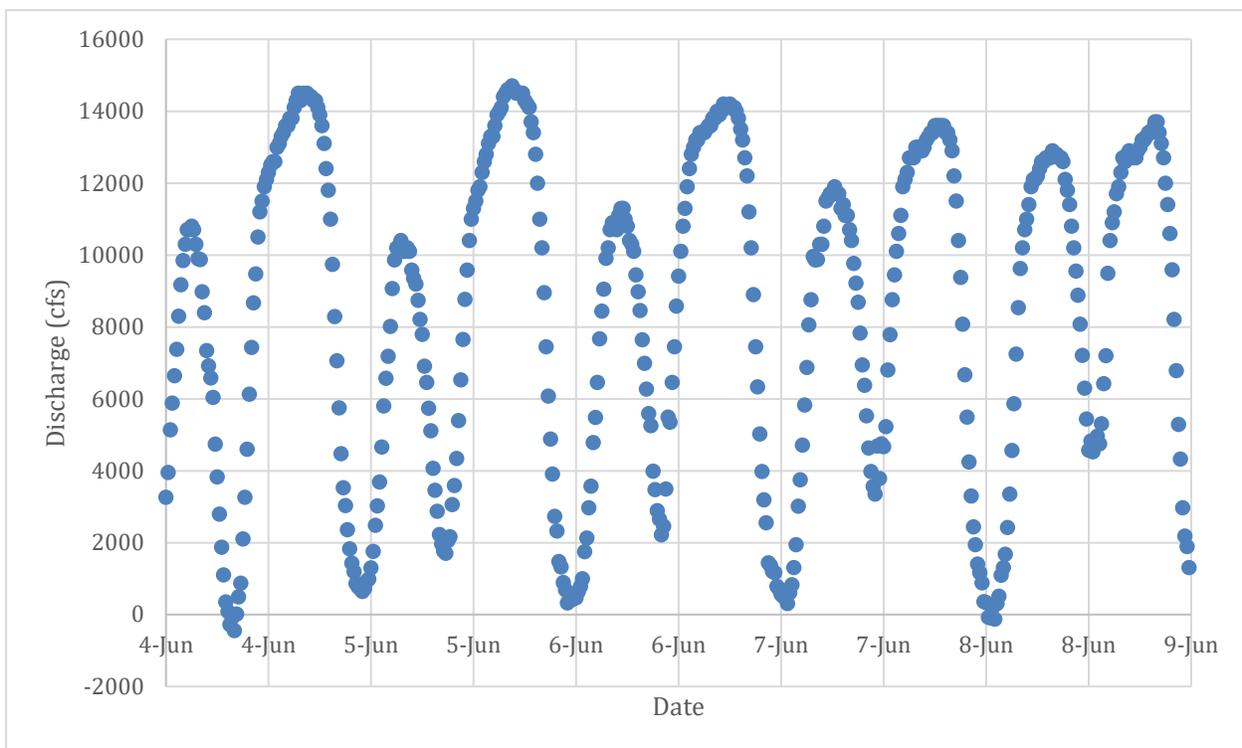
### 1.3. Sampling Event Selection

Sampling was targeted for a date with an antecedent dry condition of a minimum of 48 hours (ASC 2021). The previous rainfall occurred the morning of June 5, 2022, with total precipitation for the date reported as 0.1” at the Sacramento Airport.<sup>1</sup>

### 1.4. Sampling Procedures

All collections were completed in accordance with the project SAP (AMS 2021) and QAPP (ASC 2021). All sampling was conducted on June 8, 2022. Sites 519SUT108, 519AMNDVY, 510ST1301, 510SACC3A were sampled midchannel via an ICF operated vessel. All other sampling locations were accessed from land.

Flow measurements as reported at USGS sampling station 11447650<sup>2</sup> near Freeport, California, are shown in Figure 1-1. Hydrographs throughout the five-day period including and preceding the sampling event appear generally consistent and typical of the tidally-influenced flow regime here. All samples for this monitoring event were collected on the morning ebb to slack tide.



**Figure 1-1. Flow measurements recorded at USGS Station 11447650 near Freeport, California.**

<sup>1</sup> Weather Underground, <https://www.wunderground.com/history/daily/us/ca/sacramento/KSMF>, accessed 6/9/2022.

<sup>2</sup> USGS, [https://waterdata.usgs.gov/usa/nwis/uv?site\\_no=11447650](https://waterdata.usgs.gov/usa/nwis/uv?site_no=11447650), accessed 6/9/2022.

There were no deviations identified for this event. However, there is one change to site naming convention that was discussed but not incorporated in advance of monitoring. As was the case for the prior two wet season monitoring events conducted from shore, sampling personnel collected samples from a nearby location due to limited access at target coordinates for the Buckley Cove listed in CEDEN (site 544LSAC13). Prior to initiation of sampling for Event 4, the decision was made to transition to the nearby location and assign a new ID (544SJRNBC, San Joaquin River near Buckley Cove). However, the modification was not approved in time for monitoring and the prior site identification was used again in the field for this event. If the modification is approved in time, the new site name may be used for other data management and reporting functions associated with this event.

### **1.5. Sample Handling**

All samples were delivered to MLJ Environmental under standard Chain of Custody protocols. All water quality samples were stored on double-bagged wet ice from time of collection until delivery.

### **1.6. Quality Assurance**

QA samples collected for this event are described below, by media:

*Water Quality* – Field blank, field duplicate, and MS/MSD samples were collected at site 541SJC501.

## **2. References**

AMS 2021. *Sampling and Analysis Plan for the Delta RMP CECs Pilot Study*. Prepared for MLJ Environmental. August 10, 2021.

Aquatic Science Center, 2021. *Quality Assurance Project Plan for the Pilot Study of Constituents of Emerging Concern in the Sacramento – San Joaquin Delta, Version 2*. Prepared by the Aquatic Science Center, updated by MLJ Environmental. October 2021.

## **Appendix B. List of all CEC Analytes Reported for Year 2 Monitoring**

## Constituents of Emerging Concern Analytes Reported

**Table B.1. Year 2 Delta RMP constituents of emerging concern.**

Required analytes according to the Delta RMP CEC Pilot Study are indicated in bold.

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
PBDEs	<b>PBDE 047</b>	Required	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	<b>PBDE 099</b>	Required	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 028/33	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 100	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 153	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 154	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 183	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	PBDE 209	Additional	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	ng/g dw
PBDEs	Lipid	Ancillary	--	SGS-AXYS	AXYS MLA-033 Rev 06	Tissue	% ww
PBDEs	Moisture	Ancillary	--	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue	% ww
<b>PFAS</b>	<b>Perfluorooctanoic acid</b>	Required	<b>PFOA</b>	<b>Vista</b>	<b>EPA 537M</b>	<b>Water</b>	<b>ng/L</b>
<b>PFAS</b>	<b>Perfluorooctanesulfonic acid</b>	Required	<b>PFOS</b>	<b>Vista</b>	<b>EPA 537M</b>	<b>Water</b>	<b>ng/L</b>
<b>PFAS</b>	<b>Perfluorooctanesulfonate</b>	Required	<b>PFOS</b>	<b>SGS-AXYS</b>	<b>SGS AXYS MLA-110 Rev 02</b>	<b>Sediment, Tissue</b>	<b>ng/g dw</b>

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
PFAS	Perfluorooctanoate	Required	PFOA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	Additional	11Cl-PF3OUdS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	Additional	9Cl-PF3ONS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Dioxa-3H-Perfluorononanoate Acid, 4,8-	Additional	ADONA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	Additional	EtFOSAA, N-	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Ethyl-perfluorooctanesulfonamide, N-	Additional	EtFOSA, N-	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Ethyl-perfluorooctanesulfonamido ethanol, N-	Additional	EtFOSE, N-	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Fluorotelomer Carboxylic Acid, 3:3-	Additional	3:3 FTCA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Fluorotelomer Carboxylic Acid, 5:3-	Additional	5:3 FTCA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Fluorotelomer Carboxylic Acid, 7:3-	Additional	7:3 FTCA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Fluorotelomer Sulfonate, 4:2-	Additional	4:2 FTS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Fluorotelomer Sulfonate, 6:2-	Additional	6:2 FTS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
PFAS	Fluorotelomer Sulfonate, 8:2-	Additional	8:2 FTS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	Additional	MeFOSAA, N	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Methyl-perfluorooctanesulfonamide, N-	Additional	MeFOSA, N-	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Methyl-perfluorooctanesulfonamido ethanol, N-	Additional	MeFOSE, N-	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoro(2-ethoxyethane)sulfonic acid	Additional	PFEESA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoro-2-Propoxypropanoic Acid	Additional	HFPO-DA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoro-3,6-dioxaheptanoate	Additional	NFDHA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoro-3-methoxypropanoate	Additional	PFMPA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoro-4-methoxybutanoate	Additional	PFMBA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorobutanesulfonate	Additional	PFBS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorobutanoate	Additional	PFBA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorodecanesulfonate	Additional	PFDS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorodecanoate	Additional	PFDA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
PFAS	Perfluorododecanesulfonate	Additional	PFDoS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorododecanoate	Additional	PFDoA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoroheptanesulfonate	Additional	PFHpS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoroheptanoate	Additional	PFHpA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorohexanesulfonate	Additional	PFHxS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorohexanoate	Additional	PFHxA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorononanesulfonate	Additional	PFNS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorononanoate	Additional	PFNA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorooctanesulfonamide	Additional	PFOSA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoropentanesulfonate	Additional	PFPeS	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoropentanoate	Additional	PFPeA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorotetradecanoate	Additional	PFTrDA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluorotridecanoate	Additional	PFTrDA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw
PFAS	Perfluoroundecanoate	Additional	PFUnA	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	ng/g dw

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
PFAS	Lipid	Ancillary	--	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Tissue	% ww
PFAS	Moisture	Ancillary	--	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue	% ww
PPCPs-Hormones	Estradiol, 17beta-	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Hormones	Estrone	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Bisphenol A	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Diclofenac	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Ibuprofen	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Triclosan	Required	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Triclocarban	Required	--	Physis	EPA 625.1M_MRM	Water	ng/L
PPCPs-Pharma	Galaxolide	Required	--	Physis	EPA 625.1M	Water	ng/L
PPCPs-Hormones	Ethinylestradiol, 17alpha-	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Hormones	Progesterone	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Hormones	Testosterone	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Gemfibrozil	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Iopromide	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Naproxen	Additional	--	Weck	EPA 1694M	Water	ng/L
PPCPs-Pharma	Salicylic Acid	Additional	--	Weck	EPA 1694M	Water	ng/L
Physical and Conventional Parameters	Suspended Sediment Concentration	Ancillary	--	Weck	ASTM D3977	Water	mg/L

ANALYTE CATEGORY	ANALYTE	ANALYTE TYPE	ANALYTE ALIAS	AGENCY	METHOD	MATRIX	UNIT
Physical and Conventional Parameters	Total organic carbon	Ancillary	--	Weck	EPA 9060M	Sediment	mg/Kg dw

## Isotope Dilution Analogues and Associated Analytes

**Table B.2. Year 2 Delta RMP constituents of emerging concern Isotope Dilution Analogue quantitation relationships.**

Required analytes according to the Delta RMP CEC Pilot Study are indicated in bold.

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PBDEs	PBDE 047	--	<b>PBDE 047-13C12 (IsoDilAnalogue)</b>	Direct Isotope	Required	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 099	--	<b>PBDE 099-13C12 (IsoDilAnalogue)</b>	Direct Isotope	Required	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 028/33	--	PBDE 028-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 100	--	PBDE 100-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 153	--	PBDE 153-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 154	--	PBDE 154-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 183	--	PBDE 183-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PBDEs	PBDE 209	--	PBDE 209-13C12 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	AXYS MLA-033 Rev 06	Sediment, Tissue
PFAS	<b>Perfluorooctanesulfonic acid</b>	<b>PFOS</b>	<b>Perfluorooctanesulfonic acid-13C8 (IsoDilAnalogue)</b>	Direct Isotope	Required	Vista	EPA 537M	Water
PFAS	<b>Perfluorooctanoic acid</b>	<b>PFOA</b>	<b>Perfluorooctanoic acid-13C2 (IsoDilAnalogue)</b>	Direct Isotope	Required	Vista	EPA 537M	Water

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PFAS	Perfluorooctanesulfonate	PFOS	Perfluorooctanesulfonate-13C8 (IsoDilAnalogue)	Direct Isotope	Required	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorooctanoate	PFOA	Perfluorooctanoate-13C8 (IsoDilAnalogue)	Direct Isotope	Required	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	11Cl-PF3OUdS	Perfluoro-2-Propoxypropanoic Acid-13C3 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	9Cl-PF3ONS	Perfluoro-2-Propoxypropanoic Acid-13C3 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Dioxa-3H-Perfluorononanoate Acid, 4,8-	ADONA	Perfluoro-2-Propoxypropanoic Acid-13C3 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	EtFOSAA, N-	Ethyl Perfluorooctane Sulfonamido Acetic Acid-d5, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Ethyl-perfluorooctanesulfonamide, N-	EtFOSA, N-	Ethyl-perfluorooctanesulfonamide-d5, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PFAS	Ethyl-perfluorooctanesulfonamidoethanol, N-	EtFOSE, N-	Ethyl-perfluorooctanesulfonamidoethanol-d9, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Carboxylic Acid, 3:3-	3:3 FTCA	Perfluoropentanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Carboxylic Acid, 5:3-	5:3 FTCA	Perfluorohexanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Carboxylic Acid, 7:3-	7:3 FTCA	Perfluorohexanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Sulfonate, 4:2-	4:2 FTS	Fluorotelomer Sulfonate-13C2, 4:2- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Sulfonate, 6:2-	6:2 FTS	Fluorotelomer Sulfonate-13C2, 6:2- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Fluorotelomer Sulfonate, 8:2-	8:2 FTS	Fluorotelomer Sulfonate-13C2, 8:2- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	MeFOSAA, N-	Methyl Perfluorooctane Sulfonamido Acetic Acid-d3, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PFAS	Methyl-perfluorooctanesulfonamide, N-	MeFOSA, N-	Methyl-perfluorooctanesulfonamide-d3, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Methyl-perfluorooctanesulfonamidoethanol, N-	MeFOSE, N-	Methyl-perfluorooctanesulfonamidoethanol-d7, N- (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	Perfluorohexanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoro-2-Propoxypropanoic Acid	HFPO-DA	Perfluoro-2-Propoxypropanoic Acid-13C3 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoro-3,6-dioxaheptanoate	NFDHA	Perfluorohexanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoro-3-methoxypropanoate	PFMPA	Perfluoropentanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoro-4-methoxybutanoate	PFMBA	Perfluoropentanoate-13C5 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorobutanesulfonate	PFBS	Perfluorobutanesulfonate-13C3 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PFAS	Perfluorobutanoate	PFBA	Perfluorobutanoate-13C4 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorodecanesulfonate	PFDS	Perfluorooctanesulfonate-13C8 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorodecanoate	PFDA	Perfluorodecanoate-13C6 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorododecanesulfonate	PFDoS	Perfluorooctanesulfonate-13C8 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorododecanoate	PFDoA	Perfluorododecanoate-13C2 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoroheptanesulfonate	PFHpS	Perfluorooctanesulfonate-13C8 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoroheptanoate	PFHpA	Perfluoroheptanoate-13C4 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorohexanesulfonate	PFHxS	Perfluorohexanesulfonate-13C3 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorohexanoate	PFHxA	Perfluorohexanoate-13C5 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PFAS	Perfluorononanesulfonate	PFNS	Perfluorooctanesulfonate-13C8 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorononanoate	PFNA	Perfluorononanoate-13C9 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorooctanesulfonamide	PFOSA	Perfluorooctanesulfonamide-13C8 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoropentanesulfonate	PFPeS	Perfluorohexanesulfonate-13C3 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoropentanoate	PFPeA	Perfluoropentanoate-13C5 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorotetradecanoate	PFTetrDA	Perfluorotetradecanoate-13C2 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluorotridecanoate	PFTTrDA	Perfluorotetradecanoate-13C2 (IsoDilAnalogue) & Perfluorododecanoate-13C2 (IsoDilAnalogue)	Indirect Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PFAS	Perfluoroundecanoate	PFUnA	Perfluoroundecanoate-13C7 (IsoDilAnalogue)	Direct Isotope	Additional	SGS-AXYS	SGS AXYS MLA-110 Rev 02	Sediment, Tissue
PPCPs-Hormones	Estradiol, 17beta-	--	Estradiol-d3, 17beta- (IsoDilAnalogue)	Direct Isotope	Required	Weck	EPA 1694M	Water

ANALYTE CATEGORY	TARGET ANALYTE	ANALYTE ALIAS	QUANTIFIED WITH	QUANT. TYPE	ANALYTE TYPE	AGENCY	METHOD	MATRIX
PPCPs-Hormones	Estrone	--	Ethynylestradiol-d4, 17alpha- (IsoDilAnalogue)	Indirect Isotope	Required	Weck	EPA 1694M	Water
PPCPs-Pharma	Bisphenol A	--	Bisphenol A-d16 (IsoDilAnalogue)	Direct Isotope	Required	Weck	EPA 1694M	Water
PPCPs-Pharma	Diclofenac	--	Ethynylestradiol-d4, 17alpha- (IsoDilAnalogue)	Indirect Isotope	Required	Weck	EPA 1694M	Water
PPCPs-Pharma	Ibuprofen	--	Ibuprofen-d3 (IsoDilAnalogue)	Direct Isotope	Required	Weck	EPA 1694M	Water
PPCPs-Pharma	Triclosan	--	Triclosan-d3 (IsoDilAnalogue)	Direct Isotope	Required	Weck	EPA 1694M	Water
PPCPs-Hormones	Ethynylestradiol, 17alpha-	--	Ethynylestradiol-d4, 17alpha- (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Hormones	Progesterone	--	Progesterone-d9 (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Hormones	Testosterone	--	Testosterone-d3 (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Pharma	Gemfibrozil	--	Gemfibrozil-d6 (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Pharma	Iopromide	--	Salicylic Acid-d4 (IsoDilAnalogue)	Indirect Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Pharma	Naproxen	--	Naproxen-d3 (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water
PPCPs-Pharma	Salicylic Acid	--	Salicylic Acid-d4 (IsoDilAnalogue)	Direct Isotope	Additional	Weck	EPA 1694M	Water

## Appendix C. Summary of Completeness and Quality Control Sample Acceptability for Year 2 CEC Monitoring

The following sections outline the completeness and overall acceptability of each analysis completed for the Delta Regional Monitoring Program (RMP) Constituents of Emerging Concern (CEC) monitoring that occurred during Year 2.

All results for Year 2 CEC Monitoring were reviewed according to the CEC QAPP v2 and the Delta RMP Data Management Standard Operating Procedures (SOP) and were flagged with California Environmental Data Exchange Network (CEDEN) comparable QA Codes. All codes applied to the Year 2 CEC Monitoring are defined in **Table C.1**.

**Table C.1. QA Codes Used in Year 2 CEC Dataset (water, sediment, and tissue).**

QA CODE	QA NAME
AWM	Detection limit increased due to dilution prior to final sample volume (not a secondary dilution)
BB	Sample > 4x spike concentration
CJ	Analyte concentration is in excess of the instrument calibration; considered estimated
DB	QA results outside of acceptance limits due to matrix effects
DF	Reporting limits elevated due to matrix interferences
DO	Coelution
EUM	LCS is outside of control limits
FDP	Field duplicate RPD above QC limit
FI	Analyte in field sample and associated blank
GB	Matrix spike recovery not within control limits
GIDA	Isotope Dilution Analogue recovery not within control limits
GR	Internal standard recovery is outside method recovery limit
H	A holding time violation has occurred.
IDA	Isotope Dilution Analogue corrected
IL	RPD exceeds laboratory control limit
IP	Analyte detected in field or lab generated blank
LRJ	Data rejected - Estimated value - EPA Flag, flagged by laboratory
M	A matrix effect is present
None	None - No QA Qualifier
PJM	Result from re-extract/re-anal to confirm original result
QAX	When the native sample for the MS/MSD or DUP is not included in the batch reported
UKM	Lock mass interference present
VIL	RPD exceeds control limit, flagged by QAO

QA CODE	QA NAME
VIP	Analyte detected in field or lab generated blank, flagged by QAO

### ***Summary of Completeness***

Year 2 CEC monitoring samples were collected from a variety of matrices from 12 ambient and source monitoring sites over four sampling events, per the Central Valley CEC Pilot Study Workplan (see **Sampling Overview**). An evaluation of field, transport and analytical completeness, along with field quality control sample completeness are provided in tables.

## Sample Completeness

**Table C.2. Field and transport and analytical completeness for Year 2 CEC Monitoring.**

Samples are counted as individual results, i.e., separate organism composites for tissue samples and separate sample fractions analyzed for chemistry results.

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
ASTM D3977	Water	Ancillary	Suspended Sediment Concentration	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Bisphenol A	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Diclofenac	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Estradiol, 17beta-	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Estrone	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Ibuprofen	48	48	100.0	48	100.0
EPA 1694M	Water	Required	Triclosan	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Ethynylestradiol, 17alpha-	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Gemfibrozil	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Iopromide	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Naproxen	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Progesterone	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Salicylic Acid	48	48	100.0	48	100.0
EPA 1694M	Water	Additional	Testosterone	48	48	100.0	48	100.0
EPA 537M	Water	Required	Perfluorooctanesulfonic acid (PFOS)	48	48	100.0	48	100.0
EPA 537M	Water	Required	Perfluorooctanoic acid (PFOA)	48	48	100.0	48	100.0
EPA 625.1M	Water	Required	Galaxolide	48	48	100.0	48	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
EPA 625.1M_MRM	Water	Required	Triclocarban	48	48	100.0	48	100.0
AXYS MLA-033 Rev 06	Sediment	Required	PBDE 047	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Required	PBDE 099	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 028/33	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 100	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 153	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 154	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 183	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Additional	PBDE 209	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Sediment	Ancillary	Moisture	3	3	100.0	3	100.0
EPA 9060M	Sediment	Ancillary	Total Organic Carbon	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Required	Perfluorooctanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Required	Perfluorooctanoate	3	3	100.0	3	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Dioxa-3H-Perfluorononanoate Acid, 4,8-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Ethyl-perfluorooctanesulfonamide, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Ethyl-perfluorooctanesulfonamidoethanol, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Carboxylic Acid, 3:3-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Carboxylic Acid, 5:3-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Carboxylic Acid, 7:3-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Sulfonate, 4:2-	3	3	100.0	3	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Sulfonate, 6:2-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Fluorotelomer Sulfonate, 8:2-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Methyl-perfluorooctanesulfonamide, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Methyl-perfluorooctanesulfonamidoethanol, N-	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoro(2-ethoxyethane)sulfonic acid	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoro-2-Propoxypropanoic Acid	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoro-3,6-dioxaheptanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoro-3-methoxypropanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoro-4-methoxybutanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorobutanesulfonate	3	3	100.0	3	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorobutanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorodecanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorodecanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorododecanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorododecanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoroheptanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoroheptanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorohexanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorohexanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorononanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorononanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorooctanesulfonamide	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoropentanesulfonate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoropentanoate	3	3	100.0	3	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorotetradecanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluorotridecanoate	3	3	100.0	3	100.0
SGS AXYS MLA-110 Rev 02	Sediment	Additional	Perfluoroundecanoate	3	3	100.0	3	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Required	PBDE 047	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Required	PBDE 099	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 028/33	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 100	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 153	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 154	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 183	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Additional	PBDE 209	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Bivalves Tissue	Ancillary	Lipids	6	6	100.0	2 <sup>1</sup>	33.3
AXYS MLA-033 Rev 06	Bivalves Tissue	Ancillary	Moisture	6	6	100.0	6	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Required	PBDE 047	4	4	100.0	4	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
AXYS MLA-033 Rev 06	Fish Tissue	Required	PBDE 099	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 028/33	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 100	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 153	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 154	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 183	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Additional	PBDE 209	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Ancillary	Lipid	4	4	100.0	4	100.0
AXYS MLA-033 Rev 06	Fish Tissue	Ancillary	Moisture	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Required	Perfluorooctanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Required	Perfluorooctanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	4	4	100.0	4	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Dioxa-3H-Perfluorononanoate Acid, 4,8-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Ethyl-perfluorooctanesulfonamide, N-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Ethyl-perfluorooctanesulfonamidoethanol, N-	4	4	100.0	3	75.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Carboxylic Acid, 3:3-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Carboxylic Acid, 5:3-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Carboxylic Acid, 7:3-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Sulfonate, 4:2-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Sulfonate, 6:2-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Fluorotelomer Sulfonate, 8:2-	4	4	100.0	4	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Methyl-perfluorooctanesulfonamide, N-	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Methyl-perfluorooctanesulfonamidoethanol, N-	4	4	100.0	0	0.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoro(2-ethoxyethane)sulfonic acid	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoro-2-Propoxypropanoic Acid	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoro-3,6-dioxaheptanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoro-3-methoxypropanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoro-4-methoxybutanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorobutanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorobutanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorodecanesulfonate	4	4	100.0	4	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorodecanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorododecanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorododecanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoroheptanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoroheptanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorohexanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorohexanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorononanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorononanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorooctanesulfonamide	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoropentanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoropentanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorotetradecanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluorotridecanoate	4	4	100.0	4	100.0

METHOD	MATRIX	ANALYTE TYPE	ANALYTE	ENV. SAMPLES SCHEDULED	ENV. SAMPLES COLLECTED	FIELD AND TRANSPORT COMPLETENESS (%)	TOTAL SAMPLES ANALYZED	ANALYTICAL COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoroundecanoate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Additional	Perfluoropentanesulfonate	4	4	100.0	4	100.0
SGS AXYS MLA-110 Rev 02	Fish Tissue	Ancillary	Moisture	4	4	100.0	4	75.0
<b>Total</b>				<b>1282</b>	<b>1282</b>	<b>100.0</b>	<b>1273</b>	<b>99.3</b>

<sup>1</sup>Lipid analysis for bivalve tissue samples was originally not performed due to laboratory oversight. SGS-AXYS agreed to use the available remaining tissue for the two composites with enough mass available to run this analysis; results have not been provided at the time of writing this report. See **Deviations and Corrective Actions**.

## Field Measurement Completeness

**Table C.3. Field measurement completeness counts for Year 2.**

Fish tissue collections by MPSL-DFW do not require the collection of field measurements. Field measurements associated with the July sediment samples collected by SPoT crews are being reported directly to SWAMP and are not stored in the CV RDC.

ANALYTE	SAMPLES SCHEDULED	INSTRUMENT FAILURE	MEASUREMENTS TAKEN	COMPLETENESS (%)
Dissolved Oxygen, mg/L	48	0	48	100.0
Oxygen Saturation (%)	48	0	46	95.8
pH	48	0	48	100.0
Specific Conductivity, $\mu$ S/cm	48	0	48	100.0
Temperature, water, °C	48	0	48	100.0
Temperature, air, °C	48	0	34	70.8
Turbidity, NTU	48	0	48	100.0
<b>Total</b>	<b>336</b>	<b>0</b>	<b>320</b>	<b>95.2</b>

## Field Quality Control Frequency

**Table C.4. Field quality control sample completeness for Year 2 CEC Monitoring.**

Samples are counted as individual results, i.e., separate sample fractions analyzed for chemistry results.

METHOD	MATRIX	ANALYTE	ENV. SAMPLES	FIELD DUPLICATES	FIELD BLANKS	TOTAL SAMPLES	FIELD DUPLICATE COMPLETENESS (%)	FIELD BLANK COMPLETENESS (%)
ASTM D3977	Water	Suspended Sediment Concentration	48	4	4	56	8.3	8.3
EPA 1694M	Water	Bisphenol A	48	4	4	56	8.3	8.3
EPA 1694M	Water	Diclofenac	48	4	4	56	8.3	8.3
EPA 1694M	Water	Estradiol, 17beta-	48	4	4	56	8.3	8.3
EPA 1694M	Water	Estrone	48	4	4	56	8.3	8.3
EPA 1694M	Water	Ethynylestradiol, 17alpha-	48	4	4	56	8.3	8.3
EPA 1694M	Water	Gemfibrozil	48	4	4	56	8.3	8.3
EPA 1694M	Water	Ibuprofen	48	4	4	56	8.3	8.3
EPA 1694M	Water	Iopromide	48	4	4	56	8.3	8.3
EPA 1694M	Water	Naproxen	48	4	4	56	8.3	8.3
EPA 1694M	Water	Progesterone	48	4	4	56	8.3	8.3
EPA 1694M	Water	Salicylic Acid	48	4	4	56	8.3	8.3
EPA 1694M	Water	Testosterone	48	4	4	56	8.3	8.3
EPA 1694M	Water	Triclosan	48	4	4	56	8.3	8.3
EPA 537M	Water	Perfluorooctanesulfonic acid (PFOS)	48	4	4	56	8.3	8.3
EPA 537M	Water	Perfluorooctanoic acid (PFOA)	48	4	4	56	8.3	8.3
EPA 625.1M	Water	Galaxolide	48	4	4	56	8.3	8.3
EPA 625.1M_MRM	Water	Triclocarban	48	4	4	56	8.3	8.3
AXYS MLA-033 Rev 06	Sediment	Moisture	3	1	NA	4	33.3	NA

METHOD	MATRIX	ANALYTE	ENV. SAMPLES	FIELD DUPLICATES	FIELD BLANKS	TOTAL SAMPLES	FIELD DUPLICATE COMPLETE NESS (%)	FIELD BLANK COMPLET ENESS (%)
AXYS MLA-033 Rev 06	Sediment	PBDE 028/33	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 047	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 099	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 100	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 153	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 154	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 183	3	1	NA	4	33.3	NA
AXYS MLA-033 Rev 06	Sediment	PBDE 209	3	1	NA	4	33.3	NA
EPA 9060M	Sediment	Total Organic Carbon	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Dioxa-3H-Perfluorononanoate Acid, 4,8-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Ethyl-perfluorooctanesulfonamide, N-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Ethyl-perfluorooctanesulfonamidoethanol, N-	3	1	NA	4	33.3	NA

METHOD	MATRIX	ANALYTE	ENV. SAMPLES	FIELD DUPLICATES	FIELD BLANKS	TOTAL SAMPLES	FIELD DUPLICATE COMPLETENESS (%)	FIELD BLANK COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Carboxylic Acid, 3:3-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Carboxylic Acid, 5:3-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Carboxylic Acid, 7:3-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Sulfonate, 4:2-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Sulfonate, 6:2-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Fluorotelomer Sulfonate, 8:2-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Methyl-perfluorooctanesulfonamide, N-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Methyl-perfluorooctanesulfonamideethanol, N-	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Moisture	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoro(2-ethoxyethane)sulfonic acid	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoro-2-Propoxypropanoic Acid	3	1	NA	4	33.3	NA

METHOD	MATRIX	ANALYTE	ENV. SAMPLES	FIELD DUPLICATES	FIELD BLANKS	TOTAL SAMPLES	FIELD DUPLICATE COMPLETENESS (%)	FIELD BLANK COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoro-3,6-dioxaheptanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoro-3-methoxypropanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoro-4-methoxybutanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorobutanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorobutanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorodecanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorodecanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorododecanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorododecanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoroheptanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoroheptanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorohexanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorohexanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorononanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorononanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorooctanesulfonamide	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorooctanesulfonate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorooctanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoropentanesulfonate	3	1	NA	4	33.3	NA

METHOD	MATRIX	ANALYTE	ENV. SAMPLES	FIELD DUPLICATES	FIELD BLANKS	TOTAL SAMPLES	FIELD DUPLICATE COMPLETENESS (%)	FIELD BLANK COMPLETENESS (%)
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoropentanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorotetradecanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluorotridecanoate	3	1	NA	4	33.3	NA
SGS AXYS MLA-110 Rev 02	Sediment	Perfluoroundecanoate	3	1	NA	4	33.3	NA
<b>Total</b>			<b>1017</b>	<b>123</b>	<b>72</b>	<b>1212</b>	<b>12.1</b>	<b>7.1</b>

## Quality Control Sample Acceptability

### Field Blanks Samples

Table C.5. Field blank (FB) acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL FB SAMPLES	FB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
ASTM D3977	Weck	Water	Particulate	Suspended Sediment Concentration	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Bisphenol A	< MDL	4	1	25.0
EPA 1694M	Weck	Water	Total	Diclofenac	< MDL	4	3	75.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Estrone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Ethynylestradiol, 17alpha-	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Iopromide	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Naproxen	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Progesterone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	< MDL	4	3	75.0
EPA 1694M	Weck	Water	Total	Testosterone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Triclosan	< MDL	4	4	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid (PFOS)	< MDL	4	4	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid (PFOA)	< MDL	4	4	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	< MDL	4	0	0.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	< MDL	4	4	100.0
<b>Total</b>						<b>72</b>	<b>63</b>	<b>87.5</b>

## Field Duplicate Samples

Table C.6. Field duplicate acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL FIELD DUP SAMPLES	FIELD DUP SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
ASTM D3977	Weck	Water	Suspended Sediment Concentration	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Bisphenol A	RPD $\leq$ 35	4	1	25.0
EPA 1694M	Weck	Water	Diclofenac	RPD $\leq$ 35	4	3	75.0
EPA 1694M	Weck	Water	Estradiol, 17beta-	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Estrone	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Ethynylestradiol, 17alpha-	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Gemfibrozil	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Ibuprofen	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Iopromide	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Naproxen	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Progesterone	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Salicylic Acid	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Testosterone	RPD $\leq$ 35	4	4	100.0
EPA 1694M	Weck	Water	Triclosan	RPD $\leq$ 35	4	4	100.0
EPA 537M	Vista	Water	Perfluorooctanesulfonic acid (PFOS)	RPD $\leq$ 35	4	4	100.0
EPA 537M	Vista	Water	Perfluorooctanoic acid (PFOA)	RPD $\leq$ 35	4	4	100.0
EPA 625.1M	Physis	Water	Galaxolide	RPD $\leq$ 35	4	2	50.0
EPA 625.1M_MRM	Physis	Water	Triclocarban	RPD $\leq$ 35	4	4	100.0
EPA 9060M	Weck	Sediment	Total Organic Carbon	RPD $\leq$ 35	1	1	100

METHOD	LAB	MATRIX	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL FIELD DUP SAMPLES	FIELD DUP SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Dioxa-3H-Perfluorononanoate Acid, 4,8-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Ethyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Ethyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Carboxylic Acid, 3:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Carboxylic Acid, 5:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Carboxylic Acid, 7:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Sulfonate, 4:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Sulfonate, 6:2-	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL FIELD DUP SAMPLES	FIELD DUP SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Fluorotelomer Sulfonate, 8:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Methyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Methyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Moisture	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoro(2-ethoxyethane)sulfonic acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoro-2-Propoxypropanoic Acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoro-3,6-dioxaheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoro-3-methoxypropanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoro-4-methoxybutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorobutanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorobutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorodecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorodecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorododecanesulfonate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL FIELD DUP SAMPLES	FIELD DUP SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorododecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoroheptanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoroheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorohexanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorohexanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorononanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorononanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorooctanesulfonamide	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorooctanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorooctanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoropentanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoropentanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorotetradecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluorotridecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Perfluoroundecanoate	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Moisture	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 028/33	RPD ≤ 35	1	0	0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 047	RPD ≤ 35	1	0	0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 099	RPD ≤ 35	1	0	0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 100	RPD ≤ 35	1	0	0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 153	RPD ≤ 35	1	0	0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 154	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 183	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	PBDE 209	RPD ≤ 35	1	0	0
<b>Total</b>					<b>123</b>	<b>111</b>	<b>90.2</b>

<sup>1</sup>RPD criteria not applicable if the concentration of either sample is below the MDL.

## Laboratory Blank Samples

Table C.7. Laboratory blank (LB) acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
ASTM D3977	Weck	Water	Particulate	Suspended Sediment Concentration	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Bisphenol A	< MDL	5	3	60.0
EPA 1694M	Weck	Water	Total	Diclofenac	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Estrone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Ethinylestradiol, 17alpha-	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Iopromide	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Naproxen	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Progesterone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Testosterone	< MDL	4	4	100.0
EPA 1694M	Weck	Water	Total	Triclosan	< MDL	4	4	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid (PFOS)	< MDL	4	4	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid (PFOA)	< MDL	4	4	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	< MDL	4	0	0.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	< MDL	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028/33	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209	< MDL	1	1	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	< MDL	2	2	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamidoethanol, N-	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 3:3-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 5:3-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 7:3-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 4:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 6:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 8:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamidoethanol, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro(2-ethoxyethane)sulfonic acid	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3,6-dioxaheptanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3-methoxypropanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-4-methoxybutanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanesulfonate	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotridecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 028/33	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 047	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 099	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 100	< MDL	1	0	0.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 153	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 154	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 183	< MDL	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 209	< MDL	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Dioxa-3H-Perfluorononanoate Acid, 4,8-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamide, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamidoethanol, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 3:3-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 5:3-	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 7:3-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 4:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 6:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 8:2-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl-perfluorooctanesulfonamide, N-	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro(2-ethoxyethane)sulfonic acid	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-2-Propoxypropanoic Acid	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3,6-dioxaheptanoate	< MDL	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3-methoxypropanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-4-methoxybutanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanesulfonate	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonamide	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanoate	< MDL	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LB SAMPLES	LB SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanesulfonate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotetradecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotridecanoate	< MDL	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroundecanoate	< MDL	1	1	100.0
<b>Total</b>						<b>170</b>	<b>156</b>	<b>91.8</b>

**Laboratory Duplicate Samples (Unspiked)**

**Table C.8. Laboratory duplicate (LD) acceptability for Year 2 CEC Monitoring.**

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 1694M	Weck	Water	Total	Bisphenol A	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Diclofenac	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	NA <sup>2</sup>	1	1	100.0
EPA 1694M	Weck	Water	Total	Estrone	NA <sup>2</sup>	1	1	100.0
EPA 1694M	Weck	Water	Total	Ethynylestradiol, 17alpha-	NA <sup>2</sup>	1	1	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Iopromide	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Naproxen	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Progesterone	NA <sup>2</sup>	1	1	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	NA <sup>2</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Testosterone	NA <sup>2</sup>	1	1	100.0
EPA 1694M	Weck	Water	Total	Triclosan	NA <sup>2</sup>	2	2	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	Moisture	RPD ≤ 34	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028/33	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209	RPD ≤ 35	1	0	0.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 3:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 5:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 7:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 4:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 6:2-	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 8:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Moisture	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro(2-ethoxyethane)sulfonic acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3,6-dioxaheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3-methoxypropanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-4-methoxybutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanesulfonate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotridecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	Lipid	RPD ≤ 35	2	1	50.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	Moisture	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 028/33	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 047	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 099	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 100	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 153	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 154	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 183	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 209	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Dioxa-3H-Perfluorononanoate Acid, 4,8-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 5:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 7:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 4:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 6:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 8:2-	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro(2-ethoxyethane)sulfonic acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-2-Propoxypropanoic Acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3,6-dioxaheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanesulfonate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LD SAMPLES	LD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonamide	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotetradecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotridecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroundecanoate	RPD ≤ 35	1	1	100.0
<b>Total</b>						<b>116</b>	<b>110</b>	<b>94.8</b>

<sup>1</sup>RPD criteria not applicable if the concentration of either sample is < MDL.

<sup>2</sup>There are no Delta RMP laboratory duplicate MQOs for PPCPs analyzed by EPA method 1694M; unspiked duplicate results provided by Weck were evaluated against the laboratory criteria of RPD ≤ 35.

## Laboratory Control Spike Samples

Table C.9. Laboratory control spike (LCS) recovery acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
ASTM D3977	Weck	Water	Particulate	Suspended Sediment Concentration	PR 50-150	4	4	100.0
EPA 1694M	Weck	Water	Total	Bisphenol A	PR 50-150	7	3	42.9
EPA 1694M	Weck	Water	Total	Diclofenac	PR 50-150	6	5	83.3
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Estrone	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Ethinylestradiol, 17alpha-	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	PR 50-150	6	3	50.0
EPA 1694M	Weck	Water	Total	Iopromide	PR 50-150	6	4	66.7
EPA 1694M	Weck	Water	Total	Naproxen	PR 50-150	6	2	33.3
EPA 1694M	Weck	Water	Total	Progesterone	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Testosterone	PR 50-150	6	6	100.0
EPA 1694M	Weck	Water	Total	Triclosan	PR 50-150	6	6	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid (PFOS)	PR 50-150	8	8	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid (PFOA)	PR 50-150	8	8	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	PR 50-150	10	10	100.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	PR 50-150	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028/33	PR 50-150	2	2	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209	PR 50-150	2	2	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	PR 50-150	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamidoe thanol, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 3:3-	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 5:3-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 7:3-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 4:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 6:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 8:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamideol, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro(2-ethoxyethane)sulfonic acid	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3,6-dioxaheptanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3-methoxypropanoate	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-4-methoxybutanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotridecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate	PR 50-150	3	3	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 028/33	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 047	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 099	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 100	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 153	PR 50-150	2	2	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 154	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 183	PR 50-150	2	2	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 209	PR 50-150	2	2	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Dioxa-3H-Perfluorononanoate Acid, 4,8-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamide, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamidoe thanol, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 3:3-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 5:3-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 7:3-	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 4:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 6:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 8:2-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl-perfluorooctanesulfonamide, N-	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro(2-ethoxyethane)sulfonic acid	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-2-Propoxypropanoic Acid	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3,6-dioxaheptanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3-methoxypropanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-4-methoxybutanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanesulfonate	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonamide	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanesulfonate	PR 50-150	3	3	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL LCS SAMPLES	LCS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotetradecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotridecanoate	PR 50-150	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroundecanoate	PR 50-150	3	3	100.0
<b>Total</b>						<b>392</b>	<b>378</b>	<b>96.4</b>

**Table C.10. Laboratory control spike duplicate (LCSD) recovery acceptability for Year 2 CEC Monitoring.**

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 1694M	Weck	Water	Total	Bisphenol A	RPD ≤ 25	2	0	0.0
EPA 1694M	Weck	Water	Total	Diclofenac	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Estrone	RPD ≤ 25	2	1	50.0
EPA 1694M	Weck	Water	Total	Ethynylestradiol, 17alpha-	RPD ≤ 25	2	1	50.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	RPD ≤ 25	2	1	50.0
EPA 1694M	Weck	Water	Total	Iopromide	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Naproxen	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Progesterone	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Testosterone	RPD ≤ 25	2	2	100.0
EPA 1694M	Weck	Water	Total	Triclosan	RPD ≤ 25	2	2	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid (PFOS)	RPD ≤ 30	4	4	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid (PFOA)	RPD ≤ 30	4	4	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	NA	4	4	100.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	NA	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028/33	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209	RPD ≤ 35	1	1	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 3:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 5:3-	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 7:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 4:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 6:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 8:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro(2-ethoxyethane)sulfonic acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3,6-dioxaheptanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3-methoxypropanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-4-methoxybutanoate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotridecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 028/33	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 047	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 099	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 100	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 153	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 154	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 183	RPD ≤ 35	1	1	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 209	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid, 11-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Dioxa-3H-Perfluorononanoate Acid, 4,8-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl-perfluorooctanesulfonamido ethanol, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 3:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 5:3-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Carboxylic Acid, 7:3-	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 4:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 6:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Fluorotelomer Sulfonate, 8:2-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Methyl-perfluorooctanesulfonamide, N-	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro(2-ethoxyethane)sulfonic acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-2-Propoxypropanoic Acid	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3,6-dioxaheptanoate	RPD ≤ 35	1	0	0.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-3-methoxypropanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoro-4-methoxybutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorobutanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanesulfonate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorodecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorododecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroheptanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorohexanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorononanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonamide	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanesulfonate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorooctanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanesulfonate	RPD ≤ 35	1	1	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA <sup>1</sup>	TOTAL LCSD SAMPLES	LCSD SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoropentanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotetradecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluorotridecanoate	RPD ≤ 35	1	1	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Perfluoroundecanoate	RPD ≤ 35	1	1	100.0
<b>Total</b>						<b>138</b>	<b>131</b>	<b>94.9</b>

<sup>1</sup>RPD criteria not applicable if concentration of either sample < MDL

## Matrix Spike Samples

Table C.11. Matrix spike (MS) recovery acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL MS SAMPLES	MS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 1694M	Weck	Water	Total	Bisphenol A	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Diclofenac	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Estrone	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Ethynylestradiol, 17alpha-	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Iopromide	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Naproxen	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Progesterone	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Testosterone	NA <sup>1</sup>	4	4	100.0
EPA 1694M	Weck	Water	Total	Triclosan	NA <sup>1</sup>	4	4	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	PR 50-150	8	6 <sup>2</sup>	75.0 <sup>2</sup>
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	PR 50-150	8	6	75.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	PR 50-150	4	2	50.0
<b>Total</b>						<b>72</b>	<b>66</b>	<b>91.7</b>

<sup>1</sup>There are no Delta RMP MS recovery MQOs for PPCPs analyzed by EPA method 1694M; MS results provided by Weck were evaluated against the laboratory criteria of 50-150%.

<sup>2</sup>Two MS samples exceeded the upper control limit of 150% but were not flagged because the native concentration was >4x the spike concentration.

**Table C.12. Matrix spike duplicate (MSD) acceptability for Year 2 CEC Monitoring.**

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL MS SAMPLES	MS SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 1694M	Weck	Water	Total	Bisphenol A	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Diclofenac	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Estrone	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Ethynylestradiol, 17alpha-	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Iopromide	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Naproxen	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Progesterone	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Salicylic Acid	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Testosterone	NA <sup>1</sup>	2	2	100.0
EPA 1694M	Weck	Water	Total	Triclosan	NA <sup>1</sup>	2	2	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	RPD ≤ 25 <sup>2</sup>	4	4	100.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	RPD ≤ 25 <sup>2</sup>	4	4	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	RPD ≤ 35 <sup>2</sup>	2	2	100.0
<b>Total</b>						<b>36</b>	<b>36</b>	<b>100</b>

<sup>1</sup>There are no Delta RMP MSD MQOs for PPCPs analyzed by EPA method 1694M; MS results provided by Weck were evaluated against the laboratory criteria of RPD ≤ 30.

<sup>2</sup>RPD criteria not applicable if the concentration of either sample is < MDL.

**Surrogate Samples**

**Table C.13. Surrogate recovery acceptability for Year 2 CEC Monitoring.**

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SURROGATE SAMPLES	SURROGATE SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 625.1M	Physis	Water	Total	Galaxolide-d6(Surrogate)	PR 30-130	78	78	100.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban-13C6(Surrogate)	PR 50-150	19	19	100.0
<b>Total</b>						<b>97</b>	<b>97</b>	<b>100.0</b>

## Isotope Dilution Standards

Table C.14. Isotope dilution analogue recovery acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
EPA 1694M	Weck	Water	Total	Bisphenol A-d16(IsoDilAnalogue)	PR 50-200	74	69	93.2
EPA 1694M	Weck	Water	Total	Estradiol-d3, 17beta-(IsoDilAnalogue)	PR 50-200	108	101	93.5
EPA 1694M	Weck	Water	Total	Ethynylestradiol-d4, 17alpha-(IsoDilAnalogue)	PR 50-200	72	66	91.7
EPA 1694M	Weck	Water	Total	Gemfibrozil-d6(IsoDilAnalogue)	PR 50-200	72	58	80.6
EPA 1694M	Weck	Water	Total	Ibuprofen-d3(IsoDilAnalogue)	PR 50-200	72	68	94.4
EPA 1694M	Weck	Water	Total	Naproxen-d3(IsoDilAnalogue)	PR 50-200	72	68	94.4
EPA 1694M	Weck	Water	Total	Progesterone-d9(IsoDilAnalogue)	PR 50-200	72	67	93.1
EPA 1694M	Weck	Water	Total	Salicylic Acid-d4(IsoDilAnalogue)	PR 50-200	72	59	81.9
EPA 1694M	Weck	Water	Total	Testosterone-d3(IsoDilAnalogue)	PR 50-200	72	66	91.7
EPA 1694M	Weck	Water	Total	Triclosan-d3(IsoDilAnalogue)	PR 50-200	72	65	90.3
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid-13C8(IsoDilAnalogue)	PR 25-150	68	68	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid-13C2(IsoDilAnalogue)	PR 25-150	68	68	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183-13C12(IsoDilAnalogue)	PR 25-200	8	8	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209-13C12(IsoDilAnalogue)	PR 10-200	8	7	87.5
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid-d5, N-(IsoDilAnalogue)	PR 50-200	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide-d5, N-(IsoDilAnalogue)	PR 24-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamidoethano l-d9, N-(IsoDilAnalogue)	PR 30-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate-13C2, 4:2-(IsoDilAnalogue)	PR 47-186	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate-13C2, 6:2-(IsoDilAnalogue)	PR 50-154	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate-13C2, 8:2-(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid-d3, N-(IsoDilAnalogue)	PR 47-200	9	9	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide-d3, N-(IsoDilAnalogue)	PR 25-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamidoethano l-d7, N-(IsoDilAnalogue)	PR 34-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid-13C3(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate-13C3(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate-13C4(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate-13C6(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate-13C2(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate-13C4(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate-13C3(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate-13C5(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate-13C9(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide-13C8(IsoDilAnalogue)	PR 50-150	9	9	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate-13C8(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate-13C8(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate-13C5(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate-13C2(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate-13C7(IsoDilAnalogue)	PR 50-150	9	9	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 028-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 047-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 099-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 100-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 153-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 154-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 183-13C12(IsoDilAnalogue)	PR 25-200	14	14	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	PBDE 209-13C12(IsoDilAnalogue)	PR 10-200	14	14	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish	Ethyl Perfluorooctane Sulfonamido Acetic Acid-d5, N-(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Ethyl-perfluorooctanesulfonamide-d5, N-(IsoDilAnalogue)	PR 15-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Ethyl-perfluorooctanesulfonamidoethanol-d9, N-(IsoDilAnalogue)	PR 9-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Fluorotelomer Sulfonate-13C2, 4:2-(IsoDilAnalogue)	PR 50-157	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Fluorotelomer Sulfonate-13C2, 6:2-(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Fluorotelomer Sulfonate-13C2, 8:2-(IsoDilAnalogue)	PR 50-156	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid-d3, N-(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Methyl-perfluorooctanesulfonamide-d3, N-(IsoDilAnalogue)	PR 15-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Methyl-perfluorooctanesulfonamidoethanol-d7, N-(IsoDilAnalogue)	NA <sup>1</sup>	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluoro-2-Propoxypropanoic Acid-13C3(IsoDilAnalogue)	PR 43-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorobutanesulfonate-13C3(IsoDilAnalogue)	PR 50-150	9	9	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL IDA SAMPLES	IDA SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorobutanoate-13C4(IsoDilAnalogue)	PR 50-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorodecanoate-13C6(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorododecanoate-13C2(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluoroheptanoate-13C4(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorohexanesulfonate-13C3(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorohexanoate-13C5(IsoDilAnalogue)	PR 50-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorononanoate-13C9(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorooctanesulfonamide-13C8(IsoDilAnalogue)	PR 50-155	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorooctanesulfonate-13C8(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorooctanoate-13C8(IsoDilAnalogue)	PR 50-150	9	9	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluoropentanoate-13C5(IsoDilAnalogue)	PR 50-150	9	8	88.9
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluorotetradecanoate-13C2(IsoDilAnalogue)	PR 34-150	9	7	77.8
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Total	Perfluoroundecanoate-13C7(IsoDilAnalogue)	PR 50-150	9	9	100.0
<b>Total</b>						<b>1502</b>	<b>1421</b>	<b>94.6</b>

<sup>1</sup>There are no recovery criteria for D7-N-MeFOSE. Per the laboratory, recoveries of D7-N-MeFOSE and D9-N-EtFOSE in tissue samples may be low, with increased uncertainty in the analyte concentration when the surrogate recovery is below 8%. Under these conditions, N-Et-FOSE and N-Me-FOSE results are for information only.

## Summary of Sample Handling Acceptability

### Hold Time Evaluations

Table C.15. Sample hold time acceptability for Year 2 CEC Monitoring.

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
ASTM D3977	Weck	Water	Particulate	Suspended Sediment Concentration	14 Days	56	56	100.0
EPA 1694M	Weck	Water	Total	Bisphenol A	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Diclofenac	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Estradiol, 17beta-	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Estrone	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Ethinylestradiol, 17alpha-	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Gemfibrozil	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Ibuprofen	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Iopromide	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Naproxen	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Progesterone	Extract within 28 days, analyze within 30 Days	58	58	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
EPA 1694M	Weck	Water	Total	Salicylic Acid	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Testosterone	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 1694M	Weck	Water	Total	Triclosan	Extract within 28 days, analyze within 30 Days	58	58	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanesulfonic acid (PFOS)	Extract within 28 days, analyze within 30 Days	56	56	100.0
EPA 537M	Vista	Water	Total	Perfluorooctanoic acid (PFOA)	Extract within 28 days, analyze within 30 Days	56	56	100.0
EPA 625.1M	Physis	Water	Total	Galaxolide	Extract within 7 days, analyze within 40 Days	60	54	90.0
EPA 625.1M_MRM	Physis	Water	Total	Triclocarban	Extract within 7 days, analyze within 40 Days	60	45	75.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	Moisture	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 028/33	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 047	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 099	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 100	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 153	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 154	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 183	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Sediment	Total	PBDE 209	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
EPA 9060M	Weck	Sediment	Total	Total Organic Carbon	28 Days	6	6	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamide, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Ethyl-perfluorooctanesulfonamidoethanol, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 3:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 5:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Carboxylic Acid, 7:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 4:2-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 6:2-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Fluorotelomer Sulfonate, 8:2-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamide, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Methyl-perfluorooctanesulfonamidoethanol, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Moisture	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro(2-ethoxyethane)sulfonic acid	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-2-Propoxypropanoic Acid	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3,6-dioxaheptanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-3-methoxypropanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoro-4-methoxybutanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorobutanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorodecanoate	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorododecanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroheptanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorohexanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorononanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonamide	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorooctanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoropentanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotetradecanoate	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluorotridecanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Sediment	Total	Perfluoroundecanoate	365 days	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish	Lipid	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	4	4	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Total	Moisture	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 028/33	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 047	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 099	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 100	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 153	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 154	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 183	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
AXYS MLA-033 Rev 06	AXYS	Tissue	Bivalves, Fish, Not Applicable, Total	PBDE 209	Extract within 365 days, analyze within 40 days not to exceed 365 days from sample collection	10	10	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid, 11-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid, 9-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Dioxa-3H-Perfluorononanoate Acid, 4,8-	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Ethyl Perfluorooctane Sulfonamido Acetic Acid, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Ethyl-perfluorooctanesulfonamide, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Ethyl-perfluorooctanesulfonamidoethanol, N-	365 days	3	3	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Carboxylic Acid, 3:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Carboxylic Acid, 5:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Carboxylic Acid, 7:3-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Sulfonate, 4:2-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Sulfonate, 6:2-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Fluorotelomer Sulfonate, 8:2-	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPT ABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Methyl Perfluorooctane Sulfonamido Acetic Acid, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Methyl-perfluorooctanesulfonamide, N-	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Total	Moisture	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoro(2-ethoxyethane)sulfonic acid	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoro-2-Propoxypropanoic Acid	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoro-3,6-dioxaheptanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoro-3-methoxypropanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoro-4-methoxybutanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorobutanesulfonate	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorobutanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorodecanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorodecanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorododecanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorododecanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoroheptanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoroheptanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorohexanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorohexanoate	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorononanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorononanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorooctanesulfonamide	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorooctanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorooctanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoropentanesulfonate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoropentanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorotetradecanoate	365 days	4	4	100.0
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluorotridecanoate	365 days	4	4	100.0

METHOD	LAB	MATRIX	FRACTIONS	ANALYTE	ACCEPTABILITY CRITERIA	TOTAL SAMPLES	SAMPLES WITHIN LIMITS	ACCEPTABILITY MET (%)
SGS AXYS MLA-110 Rev 02	AXYS	Tissue	Fish, Not Applicable, Total	Perfluoroundecanoate	365 days	4	4	100.0
<b>Total</b>						<b>1501</b>	<b>1480</b>	<b>98.6</b>

## **Appendix D. Deviation Forms**

***2021-01. Year 2 Clam Tissue Collection***



## Deviation Report / Corrective Action Form

Title:	CEC Year 2 Clam Tissue Collection
Deviation Number:	2021-01_CECv2_Dev_Vernalis_Clams
Prepared By:	Cassandra Lamerdin

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021
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Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

	Date	Notes/Description (optional)
Date Deviation Occurred:	10/21/2021	Sampling occurred for Event 1 Clam collections
Field Report Submitted for Review by AMS:	11/9/2021	
Date CVRWQCB QA Staff Notified:	11/15/2021	TAC Meeting
Deviation Form Drafted:	11/17/2021	Internal Review
Deviation Form sent for Review:	11/23/2021	Sent to Selina Cole (RB QA) and Will Hagan (DRMP QAO)
New information received from laboratory:	6/14/2022	Composite weights received from SGS-AXYS via email to determine if the expected tissue amount was received.
Updates provided via email:	6/15/2022	Selina Cole/ Will Hagan notified of tissue amounts available for each composite
Deviation Form Revised:	6/29/2022	Revised to include clam sample homogenization tissue amounts reported from SGS-AXYS.
Individual clam sizes added to dataset:	9/9/2022	MLJ added lengths, widths and tissue weight of individual clams that were used in Year 2 analysis from laboratory report. MLJ added

## Deviation Report / Corrective Action Form, page 2 of 5

	Date	Notes/Description (optional)
		RLs and MLDs from EDD reported on same day.
Deviation Form Revised:	9/12/2022	Deviation form was revised to reflect the actual number and tissue composite weights that were used in the analyses.
Deviation Form Sent for Signatures:	10/31/2022	

**Description of Deviation/ Change:**

The QAPP requires a composite of a minimum of 20 *Corbicula fluminea* clams to be collected using roughly the same proportion of clams that is representative of the size classes observed at the sample location. The minimum mass required to support all analyses is 12 g of wet tissue mass per composite (18 g for replicate sites). If less than this amount of tissue is provided, reporting limits for the analysis increase.

Clam collections occurred for the late Summer/ early Fall sampling Event 1 on October 20 and 21, 2021 by Applied Marine Science (AMS). AMS submitted the field report on November 9, 2021 notifying that AMS collected at least 20 clams at each site. However, it was noted that there was potential for insufficient tissue from the 25 clams collected at San Joaquin River at Airport Way near Vernalis (541SJC501) on October 21, 2021 since the size of the clams collected may not yield a sufficient tissue amount. The sample collected was limited by the availability of the clams at the location and to try to remediate this issue the samplers collected more than 20 clams. Table 1 indicates the number of clams measured in the field at each site per size class in millimeters.

Table 1 Clam total length size reported from representative clams collected in the field.

Station Code	Station Name	Shell size in mm						
		Total Measured in the Field	<10	10-15	16-20	21-25	26-30	>30
541SJC501	San Joaquin River at Airport Way near Vernalis	25*	1	21	3			
544SJRNBC	San Joaquin River near Buckley Cove	20*		5	6	6	3	
519AMNDVY	American River at Discovery Park	20		6	6	8		
519SUT108	Sacramento River at Elkhorn Boat Launch Facility	20		4	4	3	8	1
510ST1301	Sacramento River at Freeport, CA-510ST1301	20		3	5	6	4	2
510SACC3A	Sacramento River at Hood Monitoring Station Platform	20		4	5	10	1	

\* SGS-AXYS laboratory used more than the number of clams measured in the field for the analytical composites at these sites.

## Deviation Report / Corrective Action Form, page 3 of 5

The field report from AMS was shared with the CEC Technical Advisory Committee on November 15, 2021 and the concern regarding the potential for insufficient clam tissue was discussed. However, it was unknown if there was the expected wet tissue mass of 12 g for all of the sites until SGS-AXYS was able to process the samples. This deviation form was originally drafted on November 17 and sent to the Delta RMP Quality Assurance Officer (QAO), Will Hagan, and the Regional Board QA Representative, Selina Cole, for review and comments on November 23; however, the deviation was not finalized with signatures at that time. It was agreed that the Delta RMP would follow up with SGS-AXYS to ensure that the Delta RMP was informed within 5 business days of compositing and weighing the samples to communicate the amount of tissue available for analysis.

The clams were homogenized by SGS-AXYS on June 8, 2022 and the composited tissue amounts were reported to the CV RDC on June 14, 2022 prior to sample analysis. SGS-AXYS informed the Delta RMP that there were three composites that were below the desired 12 grams of wet weight tissue. The composites for American River at Discovery Park (519AMNDVY) contained 6.58 grams, San Joaquin River at Airport Way near Vernalis (541SJC501) contained 3.77 grams, and Sacramento River at Hood Monitoring Station Platform (510SACC3A) contained 9.05 grams. The laboratory was informed to proceed with analysis from all 6 sites on June 15, 2022. This information was forwarded to the Delta RMP QAO and the Regional Board QA Representative on June 15, 2022. SGS-AXYS provided the clam size and count results in the laboratory report on August 18, 2022 which allowed for a more accurate accounting of the number of clams and tissue amounts used in each composite (Table 2).

Table 2 Clam Numbers and Composite Weights Reported from SGS-AXYS Lab Report.

Station Code	Station Name	Total Clams used in Composite	Composite Tissue Weight (g)
541SJC501	San Joaquin River at Airport Way near Vernalis	35	3.77
544SJRNBC	San Joaquin River near Buckley Cove	85	32.41
519AMNDVY	American River at Discovery Park	19	6.58
519SUT108	Sacramento River at Elkhorn Boat Launch Facility	18	15.72
510ST1301	Sacramento River at Freeport, CA-510ST1301	18	12.18
510SACC3A	Sacramento River at Hood Monitoring Station Platform	20	9.05

**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

Deviations occurred at site San Joaquin River at Airport Way near Vernalis (541SJC501), where field staff were unable to collect the desired number of clams of sufficient size. At this location, clam collections were conducted manually using rakes and shovels in lieu of the dredge dragged behind a vessel due to shallow water depth and a lack of nearby vessel launch facilities. Three field staff attempted collections for approximately 3 hours and found a low abundance of clams, of mostly smaller size classes (10-15 mm), resulting in an estimated 5 g of tissue sample mass.

Deviations also occurred at sites American River at Discovery Park (519AMNDVY) and Sacramento River at Hood Monitoring Station Platform (510SACC3A) which lacked the desired amount of tissue upon homogenization at the laboratory.

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

These clams were scheduled for analysis of PBDEs, moisture and lipids. Ideally the lab (SGS-AXYS) would like to have ~ 10 grams for analysis of PBDEs and 2 grams for lipids and moisture; the ideal weight is 12 grams total (18 g for a replicate site) to ensure there is enough tissue for all analysis. Table 3 lists the three samples that are below the ideal mass but were still analyzed for all the constituents at raised minimum detection and reporting limits.

*Table 3 Reporting Limits for the 3 stations with limited tissue availability.*

Per DRMP Deviation 2021-09, the QAPP RL is based on the wet weight (ww) concentration. The Expected RL represents the QAPP value as converted to the dry weight (dw) concentration based on the tissue weights of each sample. Reported RLs and MDLs are the dw values provided by the laboratory in the EDD.

	Value	Units	American R at Discovery Park	Sacramento R at Hood Platform	San Joaquin R near Vernalis
<b>Analyte</b>	Wet Weight	g ww	5.303	7.381	2.721
	Dry Weight	g dw	0.3805	0.8506	0.3247
PBDE 028/33	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.185	0.0705	0.158
	Reported MDL	ng/g dw	0.00876	0.00737	0.00982
PBDE 047	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.131
	Reported MDL	ng/g dw	0.00635	0.00179	0.00603
PBDE 099	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.131
	Reported MDL	ng/g dw	0.00891	0.0306	0.00588
PBDE 100	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.131
	Reported MDL	ng/g dw	0.00507	0.0194	0.00346
PBDE 153	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.131
	Reported MDL	ng/g dw	0.0102	0.00448	0.00855
PBDE 154	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.131
	Reported MDL	ng/g dw	0.00496	0.00223	0.00426
PBDE 183	QAPP RL	ng/g ww	0.005	0.005	0.005
	Expected RL	ng/g dw	0.0697	0.0434	0.0419
	Reported RL	ng/g dw	0.154	0.0588	0.0151
	Reported MDL	ng/g dw	0.00883	0.0034	0.00477

## Deviation Report / Corrective Action Form, page 5 of 5

	Value	Units	American R at Discovery Park	Sacramento R at Hood Platform	San Joaquin R near Vernalis
PBDE 209	QAPP RL	ng/g ww	0.05	0.05	0.05
	Expected RL	ng/g dw	0.697	0.434	0.419
	Reported RL	ng/g dw	1.54	0.588	1.31
	Reported MDL	ng/g dw	0.122	0.0354	0.0909

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	By date	By whom
1) Inform the Delta RMP Program Manager if there are any concerns with the amount of tissue received by SGS-AXYS and the impact on analysis.	Within 5 business days of receiving the information from SGS-Axys	Sean Campbell, SGS-AXYS Project Manager
2) The Regional Board QA Representative will be notified within 7 days as per the Board Resolution R5-2021-0054 when it is determined that there is a potential deviation (e.g. insufficient clam mass collected). An email template has been developed to allow for quicker notification prior to submitting a formal deviation form and will be used for expedited communication.	Future Sampling Efforts	Melissa Turner, Delta RMP Program Manager

**ACKNOWLEDGED BY:**

Regional Board Representative:	DocuSigned by: <i>Selina Cole</i> F3102A0E248748B...	Date:	11/10/2022
	Selina Cole		

Program Manager:	DocuSigned by: <i>Melissa Turner</i> 9796DD915C44446...	Date:	11/12/2022
	Melissa Turner		

DRMP QA Officer:	DocuSigned by: <i>Will Hagan</i> A1D771E8E56040F...	Date:	11/10/2022
	Will Hagan		

**2021-02. Buckley Cove Location Offset**



## Deviation Report / Corrective Action Form

Title:	CEC Buckley Cove Location Offset
Deviation Number:	2021-02_CECv2_Dev_Buckley_LocationOffset
Prepared By:	Cassandra Lamerdin

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021

Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

	Date	Notes/Description (optional)
Date Deviation Occurred:	10/25/2021	Sampling Occurred for Event 2; DRMP PM notified
Field Report Submitted for Review by AMS	11/9/2021	
Date CVRWQCB QA Staff Notified:	11/15/2022	TAC Meeting
Deviation Form Drafted:	11/17/2022	Internal Review
Deviation Form sent for Review:	11/23/2021	Sent to Selina Cole (Regional Board QA Representative) and Will Hagan (DRMP QA Officer)
Deviation Form Sent for Signatures:	10/24/2022	

### Description of Deviation/Change:

On 10/25/2021 (Event 2), samplers collected water samples for CEC analysis from San Joaquin R at Buckley Cove (544LSAC13) approximately 350 meters downstream of target coordinates. The CEC QAPP indicates that samples must be collected within 100 meters of the target coordinate for any samples collected from the bank/shore.

**Reason for Deviation/Change**

Samplers arrived at the San Joaquin R at Buckley Cove location and found that the gate to the marina was closed which prevented them from accessing the end of the dock which is where the target coordinates are. The gate was closed due to a Monday holiday. Sampling personnel notified the sampling coordinator for the project of the situation and identified a nearby publicly accessible sampling location, approximately 350 meters from the target coordinates. The sampling coordinator communicated to the Delta RMP Program Manager, Melissa Turner, that the samplers were going to collect samples as close to the target coordinates as possible and confirmed that there were no additional inputs between the two locations (the actual lat/longs and the target lat/longs) and that the sample locations were very similar. It was unknown at the time if the actual sample location would be more than the 100 meters prescribed in the QAPP. During discussions with field crews, it was not anticipated that this would be a reoccurring issue and that additional steps would be taken to contact the marina and make sure the gate is open.

It was also noted that in Year 1, Department of Water Resources (DWR) also sampled closer to this location than the target latitude and longitudes (see map below).

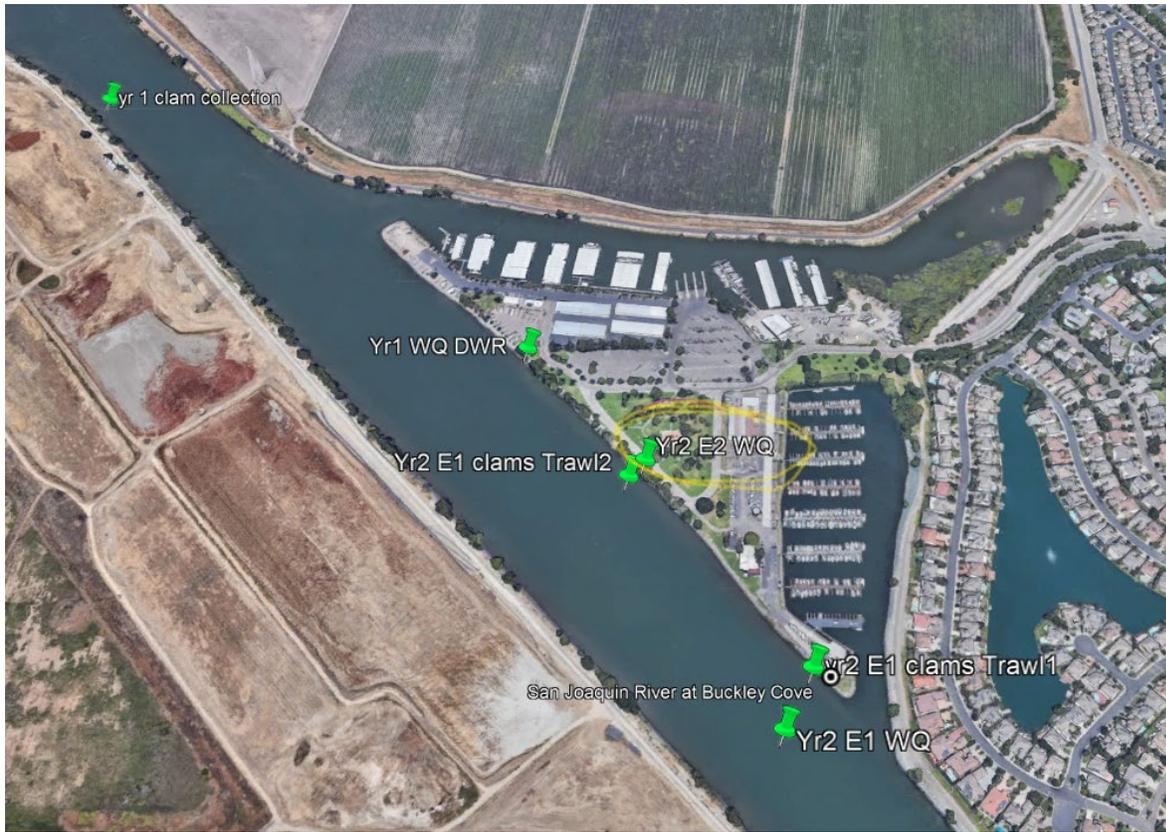
*Table 1. Target and actual latitude and longitudes for San Joaquin R at Buckley Cove (544LSAC13) sampled on October 25, 2021.*

Station Code	Sample Date	Actual Latitude	Actual Longitude	Target Latitude	Target Longitude
544LSAC13	10/25/21	37.97417	-121.37601	37.97183	-121.373619

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

It is expected that the impact of sampling 350 meters downstream of the target location will be minimal. The Year 2 Event 2 collection location for 544LSAC13 is similar to the Year 1 water collection location accessed by DWR. Figure 1 shows the locations where water was collected in Year 1 and Year 2 relative to where water samples were collected for Event 2.

Figure 1. Image of where water samples were collected for San Joaquin R at Buckley Cove (544LSAC13) in Year 1 with DWR (Yr1 WQ DWR) and Year 2 for Event 1 (Yr2 E1 WQ – water collection from the boat, Yr E1 clams trawl2 – clam collection from the boat) and Event 2 (Yr2 E2 WQ).



**Corrective Action**

Corrective Action	by date	by whom
1) Add the following comment to the sample comment field in database: Water collected ~ 350 m downstream of target location due to marina closure.	12/13/21	Cassandra Lamerdin Delta RMP Data Manager
2) Field crews will contact the marina prior to sampling to ensure gate is open.	Future Sampling Efforts	CEC Field Crews
3) In accordance with the QAPP page 64, if the target location is not accessible by more than 100 meters, the field crew will contact the DRMP Project Manager who will in turn obtain approval from the CVRWQCB QA Representative or the SWB QA Officer prior to sample collection.	Future Sampling Efforts	Melissa Turner Delta RMP Program Manager
4) The RB will be notified within 7 days as per the Board Resolution R5-2021-0054 when it has been identified that a site was collected in a location greater than 100 m from the target coordinates. An	Future Sampling Efforts	Melissa Turner Delta RMP Program Manager

Deviation Report / Corrective Action Form, page 4 of 4

Corrective Action	by date	by whom
email notification template has been created to allow for expedited to allow for more prompt notifications.		

**ACKNOWLEDGED BY:**

Task/Lab Manager:	DocuSigned by:  <small>5770F12ED7504A9...</small>	Date:	10/26/2022
Lead Field Scientist	Paul Salop		

Regional Board Representative:	DocuSigned by:  <small>F3102A0E248746B...</small>	Date:	10/26/2022
	Selina Cole		

Program Manager:	DocuSigned by:  <small>9796DD915C44446...</small>	Date:	10/26/2022
	Melissa Turner		

DRMP QA Officer:	DocuSigned by:  <small>A1D771E8E56040F...</small>	Date:	10/26/2022
	Will Hagan		

***2021-03. TOC Missing Lab Duplicate Event 1 July***



## Deviation Report / Corrective Action Form

Prepared By:	Cassandra Lamerdin
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Date:	3/1/2022	Deviation Number:	2021-03_CECv2_Dev_TOCsed_NoLabDup
Title:	TOC Sediment Missing Lab Duplicate Event 1 July		

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021
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### Description of Deviation/Change:

On 09/08/2021, Weck Laboratories informed the Central Valley Regional Data Center (CV RDC) who is managing the CEC Year 2 data, that the analyst ran a laboratory control spike duplicate (LCSD) instead of an unspiked laboratory duplicate as requested and required by the CEC QAPP v2. Sediment samples in this batch were collected by University California -Granite Canyon on July 22, 2021 as part of the SPoT program and as a collaborator on this project.
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**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

This deviation occurred at the laboratory even though there had been previous email communication between CV RDC and Weck to ensure there was enough sample available for an unspiked duplicate. The Chain of Custody (COC) form did request a laboratory duplicate. It was determined to be an oversight by the analyst at the laboratory and flagged appropriately according to the Data Management SOP.
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The Regional Board Resolution requiring deviations to be reported within 7 days of the DRMP being notified of the deviation was adopted in October after this occurred. It was also unclear if this constituted a deviation since the data were flagged according to the Data Management SOP. This situation was discussed with the Regional Board QA Representative, Selina Cole, on February 18, 2022 and it was recommended to submit a deviation form. This form was created to fulfill that request.
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**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

The analytical batch will not have representation of precision from an environmental sample for this batch; however, the analyst did perform prepare and analyze a laboratory control spike duplicate (LCSD) instead.

The following is the definition of laboratory duplicate in the CEC QAPP : replicate sub-samples of field samples, taken through the full analytical procedure including all laboratory processes combined, to measure analytical precision. Although standard reference materials, laboratory reference materials, matrix spike samples, or laboratory control samples can also be analyzed in replicate, references to those are prefaced by their sample type name, e.g., "matrix spike duplicates".

The expected impact is minimal because although the duplicate was not performed on an unspiked sample, precision can be assessed with the LCSD. The batch has been flagged following the Data Management Standard Operating Procedures to indicate that QC is missing.

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	by date	by whom
1) Weck informed the CV RDC when submitting the lab report that the batch was missing an unspiked duplicate, but an LCSD was performed instead.	09/08/2021	Chris Samatmanakit (Weck Laboratories)
2) The analytical batch missing the lab duplicate will be flagged with a Lab Submission Code of QI and a Lab Batch Comment.	09/24/2021	Cassandra Lamerdin (MLJ Environmental)
3) Conversation occurred between Weck laboratory and MLJ that sediment samples collected in October for Event 1 will include an unspiked laboratory duplicate for TOC analysis.	10/27/2021	Chris Samatmanakit (Weck Laboratories)
4) Confirmed analysis of unspiked TOC laboratory duplicate with sediment samples collected in October as part of Event 1.	01/07/2022	Cassandra Lamerdin (MLJ Environmental)

Deviation Report / Corrective Action Form, page 1 of 3

**ACKNOWLEDGED BY:**

DRMP Data Manager	DocuSigned by: <i>Cassandra Lamerdin</i>	Date:	10/21/2022
	<small>F2801D2DF64FB454...</small> Cassandra Lamerdin		

Regional Board Representative:	DocuSigned by: <i>Selina Cole</i>	Date:	10/21/2022
	<small>F3102A0E248746B...</small> Selina Cole		

Program Manager:	DocuSigned by: <i>Melissa Turner</i>	Date:	10/21/2022
	<small>9796DD915C44446...</small> Melissa Turner		

DRMP QA Officer:	DocuSigned by: <i>Will Hagan</i>	Date:	10/21/2022
	<small>A1D771E8E56040F...</small> Will Hagan		

***2021-04. Missing Laboratory Duplicate for SSC Analysis***



### Deviation Report / Corrective Action Form

<b>Title:</b>	<b>Missing Laboratory Duplicate for CEC SSC Analysis.</b>
<b>Deviation Number:</b>	2021-04_CECv2_Dev_SSC_NoLabDup
<b>Prepared By:</b>	Cassandra Lamerdin

#### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021
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Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

<b>Event</b>	<b>Date</b>	<b>Notes/Description (optional)</b>
DRMP Staff Notified:	12/22/2021	Weck Laboratories (Weck) notified Delta RMP DMT that a lab duplicate for SCC was not possible for Events 1 and 2.
CVRWQCB QA Staff Notified:	01/07/2022	Call with Regional Board QA Representative to discuss issue; agreed to submit a deviation form to document missed quality control sample and an amendment form to remove duplicate requirement.
Amendment Form Submitted:	01/20/2022	Amendment form submitted for signature.
Deviation Form Drafted:	01/20/2022	
Deviation Form Submitted for Signatures:	10/21/2022	

**Description of Deviation/Change:**

The CEC QAPP v2 requires a laboratory duplicate to measure laboratory precision at a frequency of 1 per analytical batch for the Suspended Sediment Concentration (SSC) analysis run with method ASTM D3977-97 by Weck. Weck informed the Delta RMP Data Management Team (DMT) on 12/22/2021 that given the constraints of the ASTM method and the procedure for preparing laboratory control spike (LCS) samples, they were unable to generate a duplicate sample (e.g. a laboratory control spike duplicate (LCSD)) that could be used to assess laboratory precision for water samples collected during Event 1 (October 20-21) and Event 2 (October 25-26) SSC analysis.

**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

The lack of laboratory precision in the batch analysis of SSC occurred for the following reasons. Method ASTM D3977-97 requires the use of the entire collected sample volume which does not allow for the lab taking aliquots from a larger volume of water. SSC standard capsules are available from a vendor and utilized in the batch analysis; however, these capsules vary in concentration from sample to sample thus making an LCSD unsuitable to evaluate laboratory precision.

Weck informed the DMT that the method does not require a laboratory duplicate sample and most projects do not require this additional quality control. The Program QA Officer, Will Hagan, noted that a laboratory duplicate is not required by SWAMP providing additional justification for removing this requirement from the QAPP for this method/analyte. This situation was discussed with Selina Cole, the Regional Board (RB) QA Representative, and it was agreed that an amendment to the QAPP should be submitted to revise the quality control requirements.

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

The QAPP will still require a positive and negative control which is more than is required by SWAMP. A field duplicate is required and is a control to inform the precision of both field and laboratory activities; therefore, information about laboratory precision is still required by the QAPP.

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	By Date	By Whom
1) Weck informed the Delta RMP Program Manager and associated data management staff of the issues with being able to perform a laboratory duplicate. This information was emailed to the DRMP Program QA Officer, Will Hagan, and Regional Board QA Representative, Selina Cole.	12/22/2021	Lisa McCrink (MLJ Environmental)
2) Independent research regarding method QC requirements and SWAMP criteria; discussions with laboratory to further understand situation and impact on data.	01/06/2022	Will Hagan (MLML), Lisa McCrink (MLJ Environmental)
3) Discussion with Selina Cole produced consensus to recommend an amendment to the CEC QAPP v2 as well as create a deviation for Event 1 and 2.	01/07/2022	Melissa Turner (DRMP Program Manager), Lisa McCrink (MLJ Environmental)

**ACKNOWLEDGED BY:**

Regional Board QA Representative:	DocuSigned by: <i>Selina Cole</i> F3102A0E248746B...	Date:	10/21/2022
	Selina Cole		

DRMP Program Manager:	DocuSigned by: <i>Melissa Turner</i> 9796DD915C4446...	Date:	10/21/2022
	Melissa Turner		

DRMP Program QA Officer:	DocuSigned by: <i>Will Hagan</i> A1D771E8E56040F...	Date:	10/21/2022
	Will Hagan		

***2021-05. Weck MDLs and RL elevated for some Analytes***



## Deviation Report / Corrective Action Form

Prepared By: Cassandra Lamerdin

Date:	03/04/2022	Deviation Number:	2021-04 CECv2_Dev_Weck_MDLS_RL_Elevated
Title:	Weck Elevated MDLs and RL		

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021

Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

Event	Date	Notes/Description (optional)
Date Deviation Occurred:	02/14 /2022	Data review process of Weck EDD from Event 1 and 2 identified potential deviations in MDLs reported vs the MDLs in the QAPP.
Lab Confirmed Deviation:	02/28/2022	
Date CVRWQCB QA Staff Notified:	03/02/2022	Email sent to Selina Cole (Regional Board QA Representative) indicating that the MDLs are different and that the QAPP needs to be amended.
Deviation Form Drafted:	03/04/2022	
Amendment Form Finalized:	06/02/2022	
Deviation Form Submitted for Signatures:		

### Description of Deviation/Change and Timelines related with the Deviation:

Weck Laboratories provided results for the October Events 1 and 2 (October 20-21 and 25-26, 2022) on January 7 and 10, 2022, respectively. While performing internal review of the data in February, data management staff noted that the reported Minimum Detection Limits (MDLs) and one Reporting Limit (RL) did not match the QAPP. On February 14, 2022, data management staff emailed Weck to verify that the MDLs and single RL were reported correctly. In response, the Weck Project Manager originally informed data management staff that the discrepancies in the MDLs were a mistake and would be corrected in an updated Electronic Data Deliverable (EDD);

however, on February 28, 2022, the Weck Project Manager informed MLJ staff that the MDLs reported were not a mistake and that they could not be changed. The laboratory indicated that due to a recent MDL study, the detection limits that were included in the QAPP were no longer valid. In addition to the updated MDLs, the Reporting Limit (RL) for triclosan was also elevated, which the laboratory indicated was an oversight that was not noticed during their review of the CEC QAPP v2.

On March 2, 2022, data management staff (Lisa McCrink) emailed Selina Cole and Will Hagan to inform them of this deviation within the Resolution timeline for notification of 7 days.

The table below summarizes the MDLs and RLs that were reported in the QAPP and those that were reported for the October events. The analytes for which the reported values are higher than what Weck originally provided are in red and bolded. While some MDLs are marginally increased, it should be noted that the MDLs for gemfibrozil and salicylic acid have increased significantly (50X and 116X, respectively).

Analyte	Analyte Type	MDL in QAPP	MDL Reported for October Events	RL in QAPP	RL Reported for October Events	Units
Bisphenol A	Required	<b>2</b>	<b>4</b>	10	10	ng/L
Diclofenac	Required	<b>0.26</b>	<b>4</b>	10	10	ng/L
Estradiol, 17beta-	Required	10	4	10	10	ng/L
Estrone	Required	10	4	10	10	ng/L
Ethinylestradiol, 17alpha-	Additional	10	4	10	10	ng/L
Gemfibrozil	Additional	<b>0.08</b>	<b>4</b>	10	10	ng/L
Ibuprofen	Required	5	4	10	10	ng/L
Iopromide	Additional	<b>1.8</b>	<b>4</b>	50	50	ng/L
Naproxen	Additional	<b>2</b>	<b>4</b>	10	10	ng/L
Progesterone	Additional	10	4	10	10	ng/L
Salicylic Acid	Additional	<b>0.86</b>	<b>100</b>	500	500	ng/L
Testosterone	Additional	10	4	10	10	ng/L
Triclosan	Required	10	8	<b>10</b>	<b>20</b>	ng/L
Total Organic Carbon	Ancillary	36	<b>41</b>	200	200	mg/Kg dw

**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

Upon inquiry to the lab, Chris Samatmanakit provided the following description for the deviation. "Weck is now required to perform a new MDL study every calendar year using the new format of performing the MDL study for 3 consecutive days of data to establish the MDL for the method in accordance to the operation and instrument capabilities. This would mean that the MDL (and possibly the MRL) may evolve every year when we are required to do the MDL study or if there are any significant changes to either the method operations or the instrument. We have not made any changes to the method procedure or the instrument prior to the commencement of this project.

The RL for Triclosan may have been an oversight during the review of the QAPP. We were reporting a RL of 20 for the first year of this project and fixed the RL's based on those parameters. This RL should be 20."

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

Based on the QAPP Table 7-3, the elevated Triclosan RL is still below the the Monitoring Trigger Limit. None of the other RLs changed and all RLs remained less than the Monitoring Trigger Limits identified in Table 7-3 (for those with trigger limits identified). No impact is expected in the interpretation of the results.

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	by date	by whom
1) MLJ staff found that seven MDLs and one RL were higher than what was reported in the QAPP and confirmed with Weck that the MDLs (and one RL) need to be updated in the QAPP.	02/28/2022	Cassandra Lamerdin (MLJ Environmental)
2) Ensure next CEC QAPP (Year 3 Study Plan) will have MDLs and RLs that are in sync with the capabilities of the laboratory MDL study.	February-April 2023	Melissa Turner (DRMP Program Manager)
3) Submit a QAPP Amendment to reflect update MDLs and RL.	06/22/2022	Lisa McCrink (MLJ Environmental)

**ACKNOWLEDGED BY:**

Regional Board Representative:		Date:	
	Selina Cole		

DRMP Program Manager:		Date:	
	Melissa Turner		

DRMP QA Officer:		Date:	
	Will Hagan		

***2021-06. Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported***



## Deviation Report / Corrective Action Form

<b>Title:</b>	<b>CEC Event 3 Field Sampling Deviations for 1 Site Offset and 2 O2 Saturation Not Reported</b>
<b>Deviation Number:</b>	2021-06_CEC_Dev_WY21_Event3FieldSampling
<b>Prepared By:</b>	Cassandra Lamerdin

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021
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### Deviation Timeline

Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

	<b>Date</b>	<b>Notes/Description (optional)</b>
Date Deviation Occurred:	03/28/2022	Date of field sampling when two issues occurred: 1) samplers were unable to collect water samples within 100 meters of the Buckley Cove target latitude/longitudes, and 2) one sampling team had to use a rented field meter which did not have the ability to collect percent oxygen saturation.
Date DRMP Staff Notified:	03/28/2022; 04/01/2022	Field sampling lead contacted the DRMP Program Manager regarding the deviation from the Buckley Cover target latitude / longitude. The field sampling lead noticed on the field sheets that percent oxygen

	Date	Notes/Description (optional)
		saturation was not recorded on the field sheet due to the meter not having that capacity.
Date CVRWQCB QA Staff Notified:	03/28/2022; 04/05/2022	Email sent from the DRMP Program Manager to the Regional Board QA Representative regarding Buckley Cove potential deviation. Follow up email from Data Manager, Cass Lamerdin, to the DRMP QA Officer, Will Hagan, and the Regional Board QA Representative, Selina Cole, regarding the percent oxygen saturation and the need to create a deviation form for the Event 3 deviations.
Deviation Form Drafted:	04/07/2022	
Date of meeting to discuss station location:	05/18/2022	DRMP Program Manager to the Regional Board QA Representative regarding Buckley Cove
Amendment Submitted for Signatures:	05/27/2022	
Deviation Form Submitted for Signatures:		

**DESCRIPTION / BACKGROUND OF DEVIATION:**

On 03/28/2022, the Delta RMP conducted sampling activities at twelve sites for Event 3 (Wet Season 2). There were four teams total that sampled the event and the two deviations identified occurred with the ICF sample team that was sampled locations from the bank in the Sacramento area.

The first deviation that occurred during Event 3 was a sampling offset from the target location at San Joaquin R at Buckley Cove (Station Code 544LSAC13; see Figure 1; Table 1). This deviation occurred without discussing with the Delta RMP Program Manager (Melissa Turner) until after samples were collected. Once this deviation was communicated to the Delta RMP Program Manager (evening of the same sample date, 3/28/2022), an email notification was sent to the Regional Board QA Representative, Selina Cole. This is not the first time that the target location for the Buckley Cove has not been accessible. During Event 2 (Deviation Form # 21-02), samplers were unable to access the target location and sampled this same alternative spot. At the time of the Event 2 deviation, it was discussed that the issue with access (locked gate) should not be an ongoing issue and that if it is an issue the DRMP Program Manager should be identified right away.

The second deviation that occurred during Event 3 consisted of sampling personnel not recording dissolved oxygen percent saturation at two locations, San Joaquin R at Buckley Cove (544LSAC13) and San Joaquin River at Airport Way near Vernalis (541SJC501); dissolved oxygen was collected and recorded. This deviation was identified when the data sheets were being reviewed by the field sampling lead for completion, Matthew Bundock, and communicated to the Delta RMP Program Manager on 4/5/2022. Notification of the missed field parameter was communicated to the Regional Board QA Representative and the DRMP QA Officer, Will Hagan, on 4/5/2022 by Cassandra Lamerdin (Data Manager).

Figure 1. Map of Target and Actual Locations for Events 1 (CEC\_Yr2\_E1), Event 2 (CEC\_Yr2\_E2) and Event 3 (CECYr2\_E3).



Table 1. Location information for Buckley Cove water quality collections.

Station Code	Sample Date	Event	Actual Latitude	Actual Longitude	Target Latitude	Target Longitude
544LSAC13	10/21/2021	Event 1	37.97124	-121.374256	37.971833	-121.373619
	10/25/2021	Event 2	37.97417	-121.37601	37.971833	-121.373619
	03/28/2022	Event 3	37.974196	-121.37600	37.971833	-121.373619

**REASON FOR DEVIATION:**

The sample collection offset at Buckley Cove occurred due to a misunderstanding with the samplers. The samplers saw No Trespassing signs and thought that they should sample where they sampled the previous event which was a deviation (Deviation Form # 21-02). Samples were again collected at a publicly accessible location nearby and downstream of the target coordinates (Table 1). When the samplers met with the sampling lead at the end of the day to discuss how their day went, it was communicated that they did not go through the gate to the end of the marina to collect samples. The sampling lead let them know that this was a deviation which the samplers did not originally understand.

The field crew from ICF was using a rental YSI meter and output was not set up to record percent oxygen saturation. All other schedule field measurements were collected (including percent oxygen saturation) from all field crews at all sites.

### IMPACT ON PRESENT AND COMPLETED WORK

It is expected that the impact of sampling downstream of the target location will be minimal. The Year 2 Event 2 & 3 collection locations for 544LSAC13 are similar to the Year 1 water collection location accessed by Department of Water Resources (DWR), where all collections were from the bank.

A meeting occurred with Selina Cole and Melissa Turner on May 18, 2022 to discuss whether a new station code to reflect the location where water quality samples were collected for Event 2 and 3 and determine where the fourth collection would be collected. Consensus was that a new station code will be created, and the existing data will be updated to the new station code. An amendment to the QAPP would further document this process.

The new CEC station code was updated from 544LSAC13, San Joaquin R at Buckley Cove to 544SJRNBC, San Joaquin River near Buckley Cove. The target coordinate for 544SJRNBC San Joaquin River near Buckley Cove will be 37.97417, -121.37601 (WGS84).

Table 2 list the oxygen results for both sites. Percent saturated oxygen can be approximated with the dissolved oxygen and temperature results which were recorded from all sites. There is no expected impact of missing the dissolved saturated oxygen measurements from these two sites due to the other field parameters being collected.

*Table 2. Year 1 and 2 oxygen results for the two sites missing oxygen saturation during Event 3 (03/28/2022).*

Project Year	Station Code	Sample Date	Oxygen, Dissolved (mg/L)	Oxygen, Saturation (% Saturation)
20DRMP5CEC	544LSAC13	09/20/2020	8.38	99.2
20DRMP5CEC	544LSAC13	10/16/2020	7.12	80.8
20DRMP5CEC	544LSAC13	4/14/2021	8.93	93.9
20DRMP5CEC	544LSAC13	6/16/2021	8.02	93.8
21DRMP5CEC	544LSAC13	10/21/2021	8.25	86.4
21DRMP5CEC	544LSAC13	10/25/2021	9.34	97.3
21DRMP5CEC	544LSAC13	3/28/2022	10.45	Not Recorded
20DRMP5CEC	541SJC501	09/30/2020	8.15	93.4
20DRMP5CEC	541SJC501	04/14/2021	9.32	96.6
20DRMP5CEC	541SJC501	06/16/2021	9.48	100.6
21DRMP5CEC	541SJC501	10/20/2021	9.34	91.1
21DRMP5CEC	541SJC501	10/25/2021	7.51	75.2
21DRMP5CEC	541SJC501	03/28/2022	9.05	Not Recorded

### CORRECTIVE ACTIONS

Identify steps taken to ensure similar problems do not re-occur:

Corrective Action	Completion Date	Responsible Party
1) Information about the sample offset was identified and sent to the DRMP Program Manager and Regional Board Representative on the same day of occurrence.	03/28/22	Melissa Turner Delta RMP Program Manager
2) Discussion with Selina Cole and Melissa Turner to determine where the final event should be collected for this site.	Prior to Future Event 4	Melissa Turner Delta RMP Program Manager
3) MLJ will ensure, prior to next sampling event, that all field measures listed in the QAPP are able to be reported from all field crews and instruments.	Prior to Future Event 4	Matthew Bundock Sample Coordinator

**ACKNOWLEDGED BY:**

Regional Board Representative:		Date:	
	Selina Cole		

DRMP Program Manager:		Date:	
	Melissa Turner		

DRMP QA Officer:		Date:	
	Will Hagan		

***2021-08. Weck Event 3 Missed Resolution Reporting Timeline***



## Deviation Report / Corrective Action Form

Title:	Weck Laboratories Late Reporting of PPCPs Preliminary Data for Event 3
Deviation Number:	2021-08_CEC_Dev_Weck_MissedResolutionTimeline
Prepared By:	Cassandra Lamerdin

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021

Resolution R5-2021-0054 Approval of Delta Regional Monitoring Program Governance Structure and Implementing Entity

Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

Event	Date	Notes/Description (optional)
Date DRMP Staff Notified	7/21/2022	Weck Laboratories (Weck) sent preliminary lab report for review which contained analysis date of 4/8/2022
Date CVRWQCB QA Staff Notified:	7/21/2022	Email was sent to Selina Cole noting the potential deviation of the Resolution R5-2021-0054 reporting timeline requirements.

Event	Date	Notes/Description (optional)
60- day deadline:	6/6/2022	60-day deadline for reporting preliminary results. Analysis Date: 4/08/22; Preliminary Data Received: 7/27/2022
Amendment sent for signatures:	5/28/2022	
Deviation Form Drafted:	8/01/2022	
Deviation Form Submitted for Signatures:		

**DESCRIPTION / BACKGROUND OF DEVIATION:**

On 3/28/2022, the Delta RMP conducted sampling activities at twelve sites for Event 3. Samples were sent to Weck on 3/30/2022 for Pharmaceutical and Personal Care Product (PPCP) analysis.

Based on the Regional Board Resolution R5-2021-0054, preliminary results are required to be reported within 60 calendar days of the sample analysis date. Weck should have reported the preliminary results to the Delta RMP by 6/6/2022. Weck reported Event 3 results on 7/21/2022 which was 51 days past the Resolution deadline.

**REASON FOR DEVIATION:**

The delay in reporting of preliminary results is due to extra time that Weck spent to refine their laboratory report and Electronic Data Deliverable (EDD) to include percent recoveries of isotope dilution analogues (IDAs) in the extraction standards. Weck agreed to update their reporting system to allow for the reporting of percent recoveries based on a conference call with the Delta RMP Program Manager, the Regional Board QA Representative (Selina Cole), the State Board QA Officer (Andrew Hamilton), and data management staff (Lisa McCrink) on 3/22/22.

Weck analyzed a total of 13 PPCP constituents in water samples collected on 3/28/2022 using EPA 1694. Weck performs the analysis with a modified version of EPA 1694, which uses an isotope dilution method to quantify the analytical results. Though the isotopically labeled standards used for this quantification are added at the beginning of the extraction process, the previous methodology by which Weck processed and analyzed the samples for Events 1 and 2 did not allow for the calculation of the percent recovery results of the isotope dilution analogues (IDAs) in the extraction standards.

Given recent CEDEN guidance regarding the reporting of isotope dilution methods, the recoveries of each IDA associated with a sample result should be reported with the result concentration; this requirement was discussed with Weck on 3/23/2022. Moving forward, Weck agreed to provide these percent recoveries with each analysis performed with EPA 1694M even though this requirement was not listed in the QAPP. This deviation

occurred because Weck was refining their laboratory report and EDD reporting capabilities and the time to make the adjustments took longer than anticipated. Data management staff began following up with Weck on 5/9/2022 via email to determine when staff could expect to receive the results and ensure that they could amend their reporting process. Data management staff continued to inquire with the laboratory via email 5/16, 5/22, 6/2, 6/21, and 7/6 with minimal response. It was not until the results were received on 7/21/2022 that data management staff could confirm that the results were reported outside of the Resolution timeframe which is based on the sample analysis date.

This deviation only affects the timing for when preliminary results were received; there were no hold time violations associated with these results. Event 4 data were reported within the 60-day timeframe and included the percent recoveries as requested.

### IMPACT ON PRESENT AND COMPLETED WORK

There will be no specific impact on the present or complete work, Delta RMP has prioritized getting these data internally reviewed, loaded, and ready for data verification to meet all other Resolution reporting timelines.

### CORRECTIVE ACTIONS

Identify steps taken to ensure similar problems do not re-occur:

Corrective Action	Completion Date	Responsible Party
1. Amend the CEC QAPP (v2.0) include language requiring the percent recovery reporting for methods with IDAs.	6/2/22 (signed amendment form)	Melissa Turner (DRMP Program Manager)

### ACKNOWLEDGED BY:

Regional Board Representative:		Date:	
	Selina Cole		

DRMP Program Manager:		Date:	
	Melissa Turner		

DRMP QA Officer:		Date:	
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	Will Hagan		
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**2021-09. CEC Year 2 Tissue RLs and Missing Lipids and Moisture Results**



## Deviation Report / Corrective Action Form

Title:	CEC Year 2 Tissue RLs and Missing Lipids and Moisture Results
Deviation Number:	2021-09_CECv2_Dev_AXYS_Tissue_RLs_MissingResults
Prepared By:	Cassandra Lamerdin

### Applicable Reference(s):

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021
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Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.

	Date	Notes/Description (optional)
EDD Submitted by SGS-AXYS:	08/19/2022	
Date Deviation Occurred:	09/02/2022	On 9/2/22, the CV RDC reviewed the EDD for clams and fish sampled in October 2021 (received from SGS-AXYS on 8/19/22) and identified the potential deviation; confirmation occurred with SGS-AXYS that they did not do the QC.
Date CVRWQCB QA Staff Notified:	09/07/2022	Email identifying deviation sent to Selina Cole (RB QA Representative) and Will Hagan (DRMP QAO).
SGS-AXYS notified by DRMP Program Manager to run lipids on 2 samples as a corrective measure	09/09/2022	There are two clam samples (544SJRNBC & 519SUT108) that have enough tissue to run lipids and one (544SJRNBC) of the two samples has enough to report a duplicate. SGS-AXYS will analyze and report on the results as soon as possible
Deviation Form Drafted:	09/10/2022	Internal development of Deviation Form and follow up with AXYS-SGS to determine corrective actions and additional analysis that could be performed.
Deviation Form sent for Review:	10/12/2022	Sent to Will Hagan (DRMP QAO).

	Date	Notes/Description (optional)
Deviation Form Sent for signatures:	10/21/2022	Sent to Selina Cole (RB QA Representative) and other for signatures.

### Description of Deviation/ Change:

This deviation form reflects multiple deviations noted in the tissue PBDE and PFAS batches submitted by SGS-AXYS including 1) deviation from the QAPP reporting limits (RL), and 2) missing required batch Quality Control samples, and 3) missing analysis of lipids in clam tissue. The Central Valley Regional Water Quality Control Board Quality Assurance Representative (QA Representative) and the Program QA Officer were notified via email on September 7 regarding these deviations including actions that the Central Valley Regional Data Center (CV RDC) would be doing to follow up with SGS-AXYS to confirm results.

#### 1. Deviation from the QAPP RL

The SGS-AXYS tissue results for PDBE and PFAS were reported on August 19, 2022 for the October 2021 sample event (clams were sampled on October 20 -21, 2021 and fish were sampled October 18-20, 2021). During the data review by the Central Valley Regional Data Center (CV RDC), it was determined that the reporting limits (RL) in the Electronic Data Deliverable (EDD) are higher than what is listed in the QAPP. These deviations are summarized in Table 1.

Table 1. Summary of tissue reporting limits (RL) and minimum detection limits (MDL) reported in the EDD versus the QAPP.

Required Analyte	Matrix	EDD MDL (ng/g dw)	EDD RL (ng/g dw)	QAPP MDL	QAPP RL (ng/g dw)
PBDE 047	blankmatrix	0.00245	0.0179	Not	0.005
	Tissue <sup>1</sup>	0.000804	0.0248	Applicable	
PBDE 099	blankmatrix	0.00183	0.0575	Not	0.005
	Tissue <sup>1</sup>	0.00187	0.0284	Applicable	
Perfluorooctanesulfonate	blankmatrix	0.150	0.600	Not	0.4
	Tissue <sup>1</sup>	0.410	1.64	Applicable	
Perfluorooctanoate	blankmatrix	0.150	0.600	Not	0.4
	Tissue <sup>1</sup>	0.410	1.64	Applicable	

<sup>1</sup>the lowest tissue MDL and RL reported in the EDD are captured in this table; the MDL and RL vary based on the amount of tissue analyzed.

#### 2. Missing required batch QC samples

The QAPP requires a laboratory duplicate for both moisture and lipids at a frequency of 1 per batch and an RPD  $\leq$  35% (not applicable if the concentration of either sample is less than the minimum detection limit or MDL). During the data review by the CV RDC, it was determined that in the PFAS batch analyzed on fish, there was no lipids reported and there were no moisture or lipid duplicates reported. For the PBDE batch that was analyzed on fish and clams, there was no duplicate reported for lipids.

#### 3. Missing lipid analysis for clam tissue

The project schedule required a lipid to be analyzed on each of the tissue samples. In the PBDE batch, lipids were reported for all four fish composites (519ST1309, 510ST1317, 544LSAC13, 541SJC501) and one clam composite (from the laboratory replicate for 544SJRNBC). Five clam composites did not have lipids reported (519AMNDVY, 519SUT108, 510ST1301, 510SACC3A, 541SJC501).

**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

With respect to the difference in method RLs, SGS-AXYS cited that these differences are due to a conversion issue specifically between dry weight (dw) units which are reported in QAPP and the wet weight (ww) units reported in the EDD. The actual RLs are generated from a wet weight sample and are recalculated to account for moisture. In sediment analyses, the wet weight of the subsample taken for analysis is adjusted so that the dry weight equals 10 grams (or whatever the standard sample size is). That is not possible in tissues because lipid is the limiting factor. If the subsample is greater than what the method is designed for extract, cleanup will not remove enough lipid and the instrument will be overwhelmed. When SGS-AXYS reports tissue data on a dry weight basis, the sample size taken for analysis is still the maximum wet weight allowed by the method (10 g for PBDE and 2 g for PFAS). The sample mass used for quantification is then adjusted based on the moisture content and the RLs are prorated to sample size.

For example, for PBDE 047 above where the result of sample L36462-2 is 10.07 g ww and 2.34 g dw, which is 1/5 the wet weight or original sample size. The detection is increased proportionally to the reduced sample size (e.g.,  $0.005 * 5 = 0.025$  where 0.005 is the QAPP RL as ww and the 0.025 EDD RL is the converted dw for the specific sample). SGS-AXYS checked the other examples, and the following formula was applied consistently:

$$\text{wet weight/dry weight} * \text{QAPP RL} = \text{EDD RL}$$

With respect to the moisture and lipid reporting, SGS-AXYS reported that for the method SGS AXYS MLA-110 Rev 02 (PFAS) batch, the extraction technique does not allow for a lipid analysis, and it was incorrectly identified in the QAPP as an analyte to be analyzed by this method. However, lipids were analyzed with method AXYS MLA-033 Rev 06 (PBDE) batch but in fish only not clams. For this same batch, a lab duplicate was not performed on the fish that did have lipids reported.

It was laboratory oversight that a moisture split was not analyzed on one of the four composites in the PFAS batch. It was also laboratory oversight that the clams did not have lipid analysis or a laboratory duplicate in the PBDE batch.

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

Lipids were not analyzed on five (519SUT108 (15.72 g), 510ST1301 (12.18 g), 541SJC501 (3.77 g), 519AMNDVY (6.58 g) and 510SACC3A (9.05 g)) of the six clam samples due to a laboratory oversight. When the laboratory was contacted regarding this oversight, SGS-AXYS determined that they could not perform analysis on four of the six composite samples due to a lack of available tissue. SGS-AXYS agreed to run a lipid analysis on the two samples (544SJRNBC (32.41 g; plus a lab duplicate which was absent in the initial batch) and 519SUT108 (15.72 g)) that had enough tissue remaining for analysis.

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	By date	By whom
Future QAPPs will include language to clarify the reporting limits for wet weight vs dry weight.	Future CEC QAPPs	Melissa Turner, DRMP Program Manager
There were two clam samples (544SJRNBC & 519SUT108) that have enough tissue to run lipids and one (544SJRNBC) of the two samples has enough to report a duplicate. SGS-AXYS will analyze	Reported on 10/14/2022	Sean Campbell, SGS-AXYS Project Manager

Deviation Report / Corrective Action Form, page 4 of 4

Corrective Action	By date	By whom
<p>and report on the clam tissues results as soon as possible.</p> <p>MLJ reviewed the relevant QAPP requirements for clam tissue analyses with the project manager to prevent missing results due to lab oversight going forward.</p>	<p>09/09/2022</p>	<p>Cassandra Lamerdin, DRMP Data Manager</p>

**ACKNOWLEDGED BY:**

<p>Regional Board Representative:</p>	<p>DocuSigned by: <i>Selina Cole</i></p>	<p>Date:</p>	<p>10/21/2022</p>
	<p>F3102A0E248746B... Selina Cole</p>		

<p>DRMP Program Manager:</p>	<p>DocuSigned by: <i>Melissa Turner</i></p>	<p>Date:</p>	<p>10/21/2022</p>
	<p>9796DD915C44446... Melissa Turner</p>		

<p>DRMP QA Officer:</p>	<p>DocuSigned by: <i>Will Hagan</i></p>	<p>Date:</p>	<p>10/21/2022</p>
	<p>A1D771E8E56040F... Will Hagan</p>		

**2021-10. CEC Year 2 Clam Laboratory Measurements**



## Deviation Report / Corrective Action Form

<b>Title:</b>	<b>CEC Year 2 Clam Laboratory Measurements</b>
<b>Deviation Number:</b>	2021-10_CECv2_Dev_AXYS_ClamMeasurements
<b>Prepared By:</b>	Cassandra Lamerdin

**Applicable Reference(s):**

Delta Regional Monitoring Program Pilot Study of Constituents of Emerging Concern in the Sacramento-San Joaquin Delta Quality Assurance Project Plan Version 2.0, October 11, 2021

**Complete the following table regarding the major milestones for the relevant deviation. Add additional rows as needed.**

	Date	Notes/Description (optional)
Lab Report Submitted by SGS-AXYS:	08/19/2022	
Date Deviation Occurred:	09/07/2022	On 9/07/22, the CV RDC used the lab report to populate the bivalve composite EDD for clams dissected in the lab at SGS-AXYS. The clam widths were identified as a potential deviation.
MLJ Staff checked in with SGS-AXYS	09/12/2022	Sean Campbell will ask analysts and get back to CV RDC.
MLJ Staff checked in with SGS-AXYS	09/20/2022	MLJ staff sent email asking Sean Campbell for updates with no response from S. Campbell.
MLJ Staff left message with S. Campbell	10/10/2022	No call back from SGS-AXYS.
MLJ Staff called S. Campbell	10/13/2022	Sean (SGS-AXYS) said he will check with analyst.
Date CVRWQCB QA Staff Notified:	10/13/2022	Email identifying potential deviation sent to Selina Cole (RB QA Representative)
Deviation Form Drafted:	10/14/2022	Internal development of Deviation Form and follow up with AXYS-SGS.

	Date	Notes/Description (optional)
Lab verified measurements	10/14/2022	Email back from Sean Campbell confirming how measurements were recorded.
Deviation Form sent for Review:	11/18/2022	Will Hagan (DRMP QAO)
Deviation Form Sent for signatures:	11/18/2022	

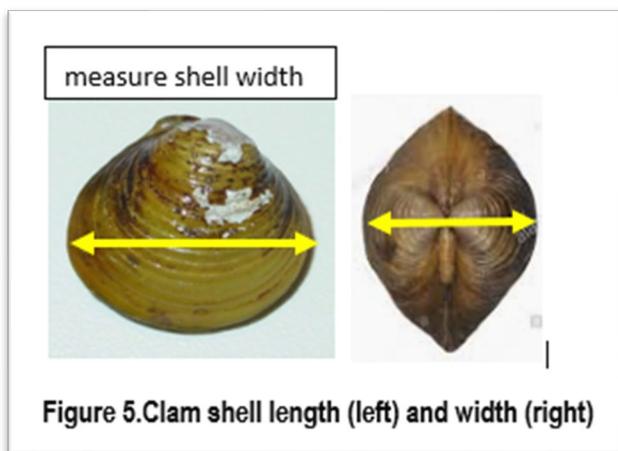
**Description of Deviation/ Change:**

This deviation form was created to document the clarification of bivalve length and width measures recorded in the lab in order to determine if QAPP measuring guidelines were followed.

Upon review of the SGS-AXYS lab report (received on 8/19/2022), it was noted by Central Valley Regional Data Center (CV RDC) data management staff that clam widths were consistently larger than the lengths (Figure 3). This is opposite from the measurements recorded in the database for Year 1 where in Year 1 the lengths were consistently larger than the widths.

The CEC v2 QAPP (Figure 1) shows how the clam measurements should be recorded. On a phone call between Cassandra Lamerdin (DRMP Data Manager) and Sean Campbell (SGS-AXYS Project Manager) on 9/22/2022, Sean said he would double check with the lab analyst who recorded the measurements.

*Figure 1 Figure from CEC QAPP v2 to describe the clam length and width measurements.*



The CV RDC received email confirmation on 10/14/2022 from Sean Campbell that the clams were incorrectly measured in the fashion described in Figure 2. Based on the verification of how the clams were measured, the database was corrected to reflect the correct shell length which were recorded in the data report (Figure 4) as width. The records associated with the width measurement include a comment where the height measurement was recorded in the comments field of the CV RDC table ProcessedOrganismExpandedBivalves. The following standard comment was applied to these records: "Shell width not recorded; shell height equals XX millimeters" where xx refers to the recorded width.

Shell width was left blank in the database because those measurements were not actually recorded.

Figure 2 SGS-AXYS lab confirmed that the red line was recorded as length and yellow line was recorded as width in the lab report.

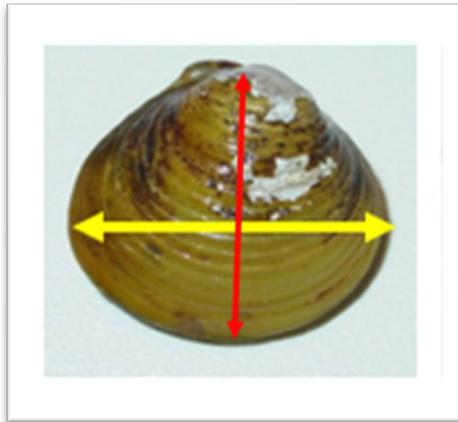


Figure 3 Datasheet from lab report by SGS-AXYS and MLJ annotation to clam measurements (in red) based on lab technician confirmation.

Weight (g)	Updated to shell height length (cm)	Updated to shell length width (cm)
muscle with shell - shell = muscle		
$1.13 - 0.78 = 0.35$	1.2	1.6
$3.87 - 3.39 = 0.48$	2.3	2.5
$0.94 - 0.72 = 0.22$	1.3	1.5
$2.15 - 1.70 = 0.45$	2.0	2.2

**Reason for Deviation/Change** (what happened, when and why -- could include inadvertent deviations from the QAPP, contradictory language in the QAPP, unanticipated problems, schedule and/or time constraints):

The reason for the deviation was due to the laboratory technician not understanding how to measure the clam dimensions.

There are no future tissue analyses from SGS-AXYS planned for this project.

**Impact on Present and Completed Work** (discuss potential magnitude of impact and bias of deviation/change, if this can be anticipated, if no impact is expected please indicate this)

The clam lengths recorded in the CV RDC database have been corrected. The width is unknown because it was not measured, and this might affect a full understanding of the size of the clam shell. However, both width and height were measured in Year 1 and that information could be used to understand a relationship of width and height that could be inferred to the Year 2 data.

**Corrective Action** (how the issue was addressed, any steps taken to ensure similar problems do not re-occur):

Corrective Action	By date	By whom
CV RDC Database was updated to have the correct shell length; shell height was added to the comments field in the table ProcessedOrganismExpandedBivalve.	10/17/2022	Cassandra Lamerdin CV RDC Data Manager.

**ACKNOWLEDGED BY:**

Regional Board Representative:		Date:	
	Selina Cole		

DRMP Program Manager:		Date:	
	Melissa Turner		

DRMP QA Officer:		Date:	
	Will Hagan		