Naval Information Warfare Center PACIFIC

TECHNICAL REPORT 3320
SEPTEMBER 2023

Santa Margarita Estuary 2022 Sediment Monitoring Report (Project PEMEC2743)-FINAL (MAY 2023)

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This document was authored in January 2023 by NIWC Pacific Code 71750 and 71760 Staff for the Water Quality Section Head, Environmental Security, Marine Corps Base Camp Pendleton. This work is being conducted under project order M330002121666 (Encore No. PEMEC2743). For any project related inquiries contact Project manager Dr. Kara Sorensen.

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Data Quality Assurance:

- NIWC Pacific Bioassay Laboratory is a certified laboratory under the State of California Department of Health Services, Environmental Laboratory Accreditation Program (ELAP), Certificate No. 2601; State of Washington Department of Ecology, Lab ID. No. F893.
- All data have been reviewed and verified.
- Any test data discrepancies or protocol deviations have been noted in the summary report pages.

Editor: MRM

EXECUTIVE SUMMARY

This report describes results of sediment monitoring conducted in the Santa Margarita River Estuary (SMRE) located on Marine Corps Base Camp Pendleton (MCBCP) in 2022, performed on behalf of the MCBCP Environmental Security (ES) Staff, as part of their Municipal Watershed Monitoring Program. MCBCP voluntarily complies with certain additional monitoring requirements of the San Diego Regional Water Quality Control Board (SDRWQCB) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit, Number CAS0109266 / Order Number R9-2013-0001, as amended by Order Number R9-2015-0001 and Order Number R9-2015-0100 (collectively referred to as the Phase I MS4 permit). The work described here is intended to assist evaluation of the California Sediment Quality Objectives (CASQO) for the SMRE. This effort also leverages data collected under the SMRE monitoring program as mandated under the SDRWQCB Investigative Order (IO) No. R9-2019-0007 (referred to here as the Order). The monitoring work was conducted by the Energy and Environmental Science Branch at the Naval Information Warfare Center (NIWC) Pacific.

Sediment monitoring was conducted at three (3) locations on 12 July 2022, during the summer index period and following the analytical techniques and quality controls/assurances as required under the Sediment Quality Assessment Technical Support Manual and as specified under the SMRE IO Workplan and Quality Assurance Project Plan (QAPP; SCCWRP, 2014; Weston, 2019a,b). Samples were analyzed for standard sediment quality characteristics and benthic community composition, and were tested for toxicity with marine amphipods (Eohaustorius estuarius) and Mediterranean mussel (Mytilus galloprovincialis) embryos using standardized protocols (SCCWRP, 2014; Weston, 2019a,b).

The sediment evaluation showed that all three stations were categorized as “Likely Unimpacted” using standard CASQO guidance. In addition, as part of the SMRE IO Monitoring Program, benthic community data were also analyzed using the multivariate-AZTI's Marine Biotic Index (M-AMBI) approach, which categorized all three stations as “Unimpacted”.

Historical sediment monitoring of stations in the SMRE has been conducted since 2009. With the exception of station SMRE-1 in 2015, from 2009 through 2019 all stations were categorized as either “Likely Unimpacted” or “Unimpacted” using standard SQO guidance. Station SMRE-1 was found to be “Possibly Impacted” in 2015 primarily due to both the chemical and benthic indicator lines of evidence exhibiting “moderate” levels of disturbance.

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List of Acronyms

ASTM	American Society for Testing and Materials
BCA	Benthic Community Analysis
BRI	Benthic Response Index
CA LRM	California Logistic Regression Model
CASQO	California Sediment Quality Objectives
cfs	cubic feet per second
CETIS	Comprehensive Environmental Toxicity Information System
CSI	Chemical Score Index
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
EC_{50}	Median Effective Concentration
ERL	Effects Range Low
ERM	Effects Range Medium
ES	Environmental Security
Ft	Feet
HDPE	High density polyethylene
HMWPAH	High Molecular Weight Polycyclic Aromatic Hydrocarbons
IBI	Index of Biotic Integrity
IO	Investigative Order
I-5	Interstate 5
LC_{50}	Median Lethal Concentration
LOE	Line of Evidence
LMWPAH	Low Molecular Weight Polycyclic Aromatic Hydrocarbons
M-AMBI	multivariate-AZTI's Marine Biotic Index
MCBCP	Marine Corps Base Camp Pendleton
MDL	Method Detection Limit
MLOE	Multiple Lines of Evidence
MRL	Method Reporting Limit
MS4	Municipal Separate Storm Sewer System
ND	Not detected (non-detect)
NIWC	Naval Information Warfare Center
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PNA	Percent Normal Alive
PSU	Practical salinity units
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RBI	Relative Benthic Index
RIVPACS	River Invertebrate Prediction and Classification System
RL	Reporting Limit
SCCWRP	Southern California Coastal Water Research Project
SDRWQCB	San Diego Regional Water Quality Control Board

SM	Standard Method
SMRE	Santa Margarita River Estuary
SWI	Sediment-Water Interface
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

1. INTRODUCTION

This report describes results of sediment monitoring conducted in the Santa Margarita River Estuary (SMRE) located on Marine Corps Base Camp Pendleton (MCBCP) in 2022, performed on behalf of MCBCP Environmental Security (ES) Staff, in support of their Municipal Watershed Monitoring Program (MCBCP, 2020). MCBCP is included in the National Pollutant Discharge Elimination System (NPDES) requirements of the State Water Resources Control Board Small Municipal Separate Storm Sewer System (MS4) permit, NPDES Number CAS0000004 / Water Quality Order Number 2013-0001-DWQ, and subsequent amendments (collectively referred to as the Phase II MS4 permit). However, MCBCP voluntarily complies with certain additional monitoring requirements of the San Diego Regional Water Quality Control Board (SDRWQCB) MS4 permit, NPDES Number CAS0109266 / Order Number R9-2013-0001, as amended by Order Number R9-2015-0001 and Order Number R9-2015-0100 (collectively referred to as the Phase I MS4 permit). The work described herein is intended to evaluate the current California Sediment Quality Objectives (CASQO) for the SMRE. While a complete CASQO analysis of estuary sediments was not included in some of the previous municipal watershed monitoring reports, results from this effort were compared to prior year data (CH2M, 2016; CH2M, 2018; CH2M, 2019). This effort also leverages data collected under Investigative Order (IO) Number R9-2019-0007 issued by the SDRWQCB (Sorensen et al., 2023). The monitoring was conducted by the Energy and Environmental Science branch at the Naval Information Warfare Center (NIWC) Pacific.

Sediment monitoring was conducted at three (3) locations on 12 July 2022, during the summer index period, following the analytical techniques and quality controls/assurances as required under the Sediment Quality Assessment Technical Support Manual and as specified under the SMRE IO Workplan and Quality Assurance Project Plan (QAPP; SCCWRP, 2014; Weston, 2019a,b). Samples were analyzed for standard sediment quality characteristics and benthic community composition, and were tested for toxicity with marine amphipods (Eohaustorius estuarius) and Mediterranean mussel (Mytilus galloprovincialis) embryos using standardized protocols (SCCWRP, 2014; Weston, 2019a,b). This report describes the methods, results and data evaluation used to meet the monitoring goals following the CASQO line of evidence (LOE) framework to assess sediment quality using various metrics.

1.1. Study Area

MCBCP is the largest expeditionary training facility on the West Coast. The facility covers approximately 150,000 acres, with an average daytime population of approximately 70,000. It spans from southern Orange County to northeastern San Diego County and is home to multiple expeditionary forces, special operations battalions, tactical support activities, assault, medical and air units, and recruitment and field training forces.

The SMRE (herein referred to as the Estuary) is part of the Santa Margarita Watershed (Figure 1) and sits entirely within the boundaries of MCBCP (Figure 2). It is a fairly linear water body that extends approximately 2.4 miles along its longitudinal axis to the northeast from the ocean. The perennial wetted portion of the Estuary is roughly 98 acres. It is ~ 0.6 miles across at its widest point along its

western edge, but rapidly narrows to about 1/10th that distance at the Interstate Highway 5 (I-5) bridges. The Estuary continues to narrow to the northeast and can be as narrow as 20 feet (ft) across in the upper reaches. The Estuary is very shallow, with water depths commonly less than one meter, and ranging up to ~5 m under the bridges, presumably as a result of scouring. A large portion of the western Estuary is not wetted or has water depths of only a few inches at low tide.

The Estuary receives freshwater inflow from the Santa Margarita River, with a median daily discharge[1] of about 6.5 cubic ft per second (cfs) based on data from the United States Geological Survey (USGS) gage 11046000, located about five miles upstream of the Estuary mouth. Maximum inflows, as high as 44,000 cfs, occur during winter storms. Surface water inflows can diminish to zero during the summer dry period as confirmed by visual observations (Sorensen et al., 2021, 2022 and 2023). Surface water runoff is affected by upstream runoff, evapotranspiration demands by phreatophytes, upstream diversions, and pumping of the groundwater basin. Hydrodynamic modeling results have identified and confirmed that there is a groundwater flow into the Estuary from the watershed even during the dry season.

When open to the ocean, the Estuary is influenced by semi-diurnal tides that typically result in two high and two low water periods a day. During this time, the ocean can have a strong influence on Estuary hydrodynamics and basic water quality parameters. Previous monitoring of water quality in the Estuary (Katz and Rivera-Duarte, 2012) showed that this ocean influence results in a steep longitudinal gradient in water quality parameters in the vicinity of the I-5 bridges that can be thought of as a transition from a western ocean-dominated lower Estuary segment to an eastern river-dominated upper Estuary segment.

The Estuary does not always have a connection to the ocean, however, and can be isolated through buildup of a large beach berm. Historical gage data collected near the I-5 bridges between 1981 and 2010 (USGS gage 11046050) show that the mouth was essentially closed to the ocean (with < 0.1 ft change in water elevations each day, showing no tidal influence) 22% of the time. The size, depth, and location of the opening through the beach berm is in constant flux as a result of competing forces of freshwater flow through the Estuary, wave action and long-shore sediment drift along the beach. The beach berm tends to increase in height through the summer dry period, reducing the overall amount of tidal exchange with the Estuary, even if it remains open. This berm height effectively controls the lowest level of water in the Estuary, which is only augmented (or increased) when the tides are able to bring ocean water above the berm. Data collected from 2014 to 2016 shows that when the mouth is effectively closed from exchange, the highest spring tides can overtop the berm, adding ocean water

[1] Median daily discharge from USGS Gage 11046000 for the period from January 1981 through September 2020. Prior to January 1980, the gage was located at different locations downstream and statistics are not comparable.

to the Estuary and raising its level (Katz et al., 2018). The Estuary mouth can be opened or enlarged very quickly during large winter storms.

In January of 2017, a historic rain event occurred (total monthly precipitation of >6 inches) which resulted in an episodic river flow event of greater than 25,000 cfs. This resulted in significant flushing and scouring of the Estuary (herein referred to as a "reset event"). Incidentally, similar reset events occurred at the end of 2019 and early 2020.

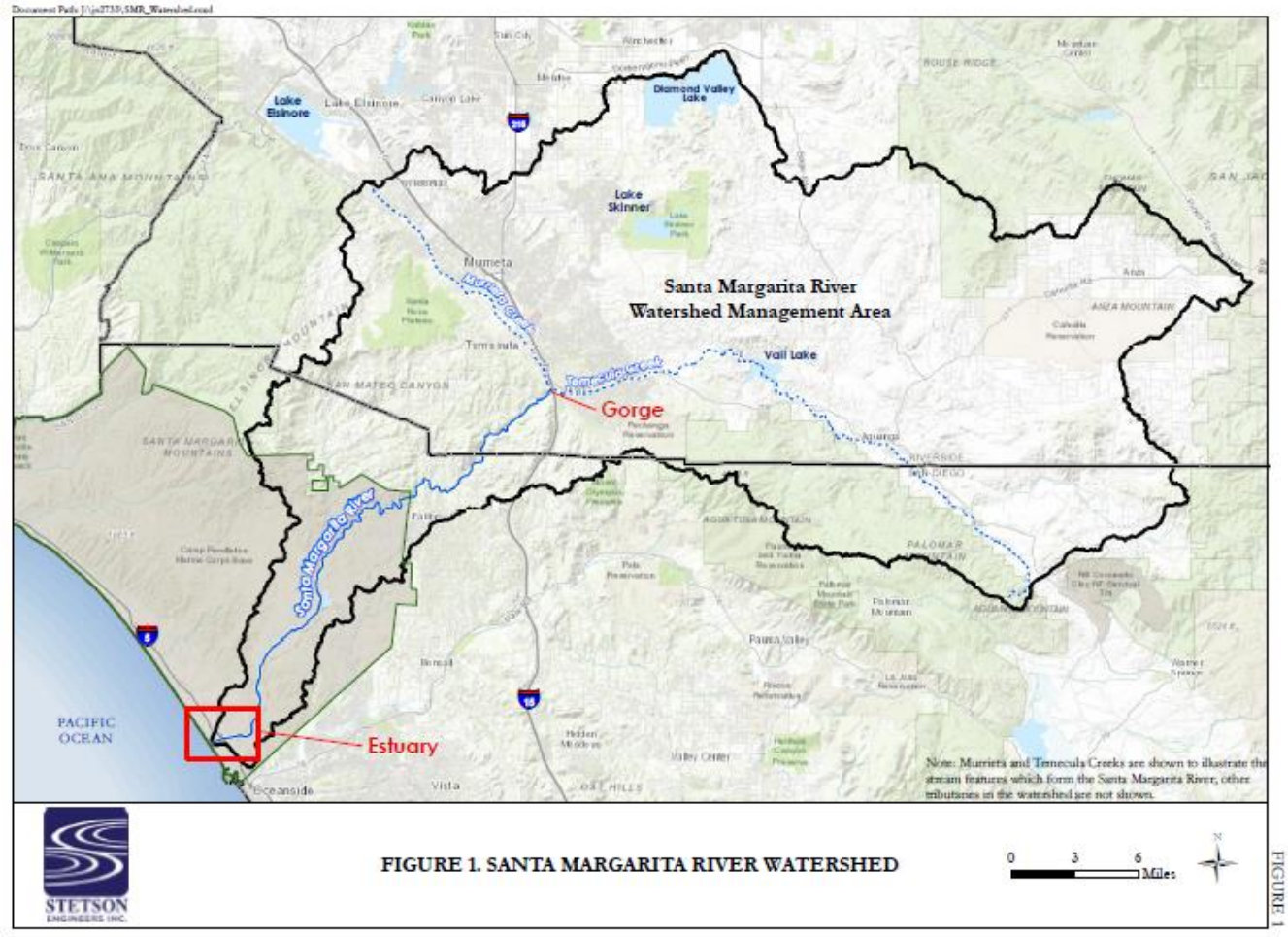


Figure 1 Santa Margarita River Estuary Watershed.

Note: Figure by Stetson Engineering from Sorensen et al., 2021
Red Box indicates location of Estuary and location of this study, relative to rest of watershed
Grey area indicates MCBCP base boundaries

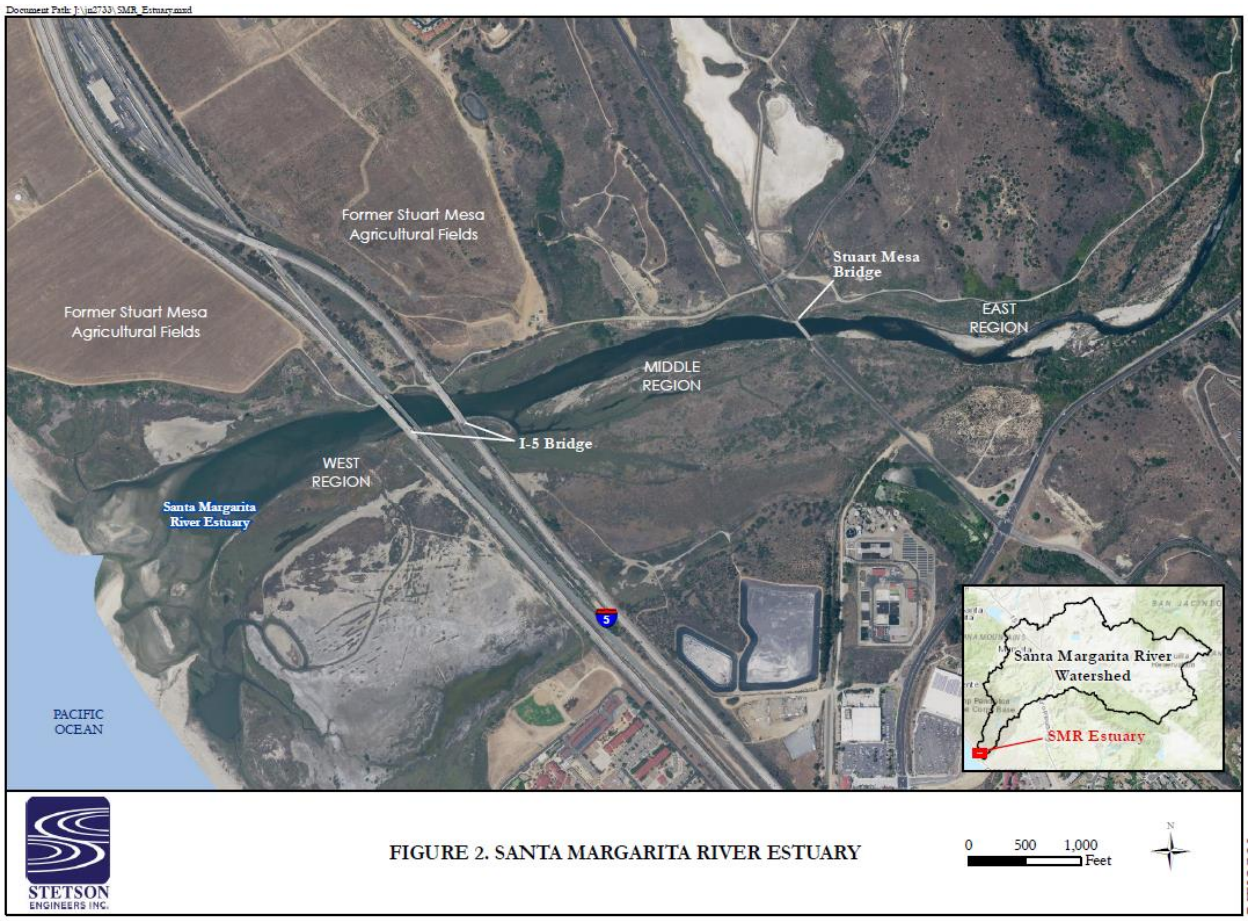


Figure 2 Santa Margarita River Estuary.

Note: Figure by Stetson Engineering from Sorensen et al., 2021

1.2. Site Background

MCBCP voluntarily complies with several watershed monitoring components for the SDRWQCB MS4 NPDES permits, and has elected to perform watershed monitoring in accordance to protocols specified in permit A of the Phase I MS4 Permit, outlined in their Municipal Watershed Monitoring Guide (dated June 2, 2016). This Municipal Watershed Monitoring Guide summarizes annual monitoring requirements which include, among other requirements, ambient bay (Estuary) monitoring. The ambient bay monitoring portion of the requirement is designed to provide an overview of the Estuary's health, and consists of water and sediment chemistry, sediment toxicity, and benthic infauna analyses. Previous Estuary monitoring seasons completed under MCBCP's Municipal Watershed Monitoring Program occurred in 2002-2004, 2005-2006, and 2008-2019 (CDM, 2009; CH2M, 2016; CH2M, 2018; CH2M, 2019). This report will only focus on sediment quality, sediment toxicity, and benthic community analysis (BCA), and will then calculate an integrated score for each monitoring site using these LOEs. The results from the 2022 monitoring event will then be compared to historic results for the same analyses.

1.3. Monitoring History

Between 2009 to 2019, the ambient bay (Estuary) monitoring component of the MCBCP Municipal Watershed Monitoring Program focused on collecting and analyzing sediment from three locations within the Estuary. While the exact location of sampling slightly changed from year to year, sampling sites were generally labeled as outlet (SME-3; located close to the Estuary mouth), middle (SME-2; located close to the southbound I-5 bridge), and inlet (SME-1; located on the east side of the Stuart Mesa bridge) monitoring points (Figure 2). For these efforts, sediments were characterized using several parameters including chemistry (and texture), toxicity, and BCA, all used to inform CASQO analysis (CDM, 2009; CH2M, 2016; CH2M, 2018; CH2M, 2019).

Sediment chemistry and texture analyses typically included: total organic carbon (TOC), grain size and some combination of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) (Aroclors), synthetic pyrethroid insecticides, organophosphate pesticides, organochlorine pesticides, and heavy metals. Inclusion of analyses for all these chemistry classes and parameters varied from year to year.

Sediment toxicity analysis typically included an acute and chronic measurement and followed United States Environmental Protection Agency (USEPA) approved methods and CASQO guidelines. Species analyzed varied, but generally consisted of an amphipod (e.g. *Eohaustorius estuarius)* and mussel (e.g. *Mytilus galloprovincialis).* The BCA methods followed CASQO protocols for identification of benthic macroinvertebrates (SCCWRP, 2014).

Finally, an overall station score was generally calculated in each monitoring year following the California multiple LOE (MLOE; Chemistry, toxicity, benthic community) methods and procedures (SCCWRP, 2014).

Collection of samples generally involved use of some form of a grab sampler from each site and consisted of either a composited sample from multiple small grabs or one larger grab sample that was separated into sub samples for each of the various analyses performed for each site. Sampling generally occurred in the recommend sampling period of early summer (June or July) to align with the summer index growth period. For a complete description of methods used and parameters measured per each of the monitoring years, refer to the annual municipal monitoring reports (CDM, 2009; CH2M, 2016; CH2M, 2018; CH2M, 2019).

2. METHODS

To assess sediment quality under the CASQO framework in 2022, three main analyses were completed: BCA, sediment chemistry and sediment toxicity. Field collection of sediment samples and BCA were leveraged with other monitoring efforts under a current five-year monitoring program for the SMRE in response to IO R9-2019-0007.

2.1. Sediment Collection and Processing

As with historical sampling described above, the 2022 effort collected sediment samples from three stations in the SMRE (Table 1, Figure 3), placed in the same general vicinity as historic municipal

watershed monitoring locations but aligned with current monitoring stations under the SMRE IO (R9-2019-0007). These three sampling locations are located in approximately the “inlet”, “midpoint” and “outlet” points of the Estuary. Historic monitoring locations are also provided in Table 1 (and shown in Figure 3) for comparative purposes.

Table 1 Sample station locations.

Station ID	General Location	Latitude (Degree N)	Longitude (Degree W)
2022 Sites			
MA1 / W1	**Outlet**	**33.23402**	**-117.4133**
MA2 / W8	**Midpoint**	**33.23547**	**-117.40857**
E3	**Inlet**	**33.23783**	**-117.39352**
Historic Sites (approximate locations)			
SME-3	**Outlet**	**33.23385**	**-117.41335**
SME-2	**Midpoint**	**33.23437**	**-117.41130**
SME-1	**Inlet**	**33.23513**	**-117.40929**

Figure 3 Sediment stations, MA1, MA2 and E3 at Santa Margarita Estuary (SME). Historic monitoring stations noted with pink markers.

Sediment samples were collected by NIWC staff using a Multi-Substrate Subtidal Sampler (SUBS-Sampler; Patent No. 11,054,345 B2; Figure 4) with a 4-inch diameter (0.008 m^2) core barrel, as per Bight Regional Monitoring suggestions for brackish estuarine sampling (McLaughlin et al., 2019). This sampler design was chosen due to the shallow water depths of the Estuary stations (averaging approximately 1.5 ft), requiring manual operation which prevented the use of a large grab sampling device.

Figure 4 Subsampler/ BCA sample collection. The SUBS sampler in water just prior to collecting sample (left). Suction tube method of draining water, in this case into tray for benthic sample collection (right).

For BCA, all sediment samples were collected in subtidal conditions and the entire contents of the grab sample (including water) were placed in plastic containers and transported back to the shoreline for further processing. Samples were sieved through a 0.5-mm mesh screen to remove sediment fines. All residual sediment, debris, shells, and benthic organisms remaining on the screen were carefully collected into labelled wide-mouth bottles. Samples were "fixed" on-site in formalin buffered with borax and diluted by seawater to create a 5% formalin preservative. The benthic samples were stored at ambient temperature throughout transit and shipped to the EcoAnalysts benthic laboratory in Moscow, Idaho for further processing and identification. A copy of the chain of custody form is provided in Appendix A.

For the chemistry and toxicity sediment samples, additional grab samples were collected and placed in high density polyethylene (HDPE) bag liners by NIWC Pacific personnel. Between sites, all equipment was thoroughly washed and rinsed with ambient water and then deionized water to avoid cross-contamination. Chemistry and toxicity samples were then transferred to the NIWC Pacific Bioassay Laboratory in insulated ice chests containing blue ice. Upon receipt at the NIWC Pacific Bioassay Laboratory, arrival temperature of the samples was documented, and samples were stored at 4°C until processing.

At the NIWC Pacific Bioassay Laboratory, sediment samples were thoroughly homogenized and subsamples from each station were collected into the following containers for chemistry analysis: 1 × 8 oz. amber glass jar (for total organic carbon and trace metals) and 3 × 4 oz. amber glass jars (for

organic contaminants). These samples were shipped priority overnight in insulated ice chests containing blue ice to Weck Laboratories, Inc. in Industry City, CA on 13 July 2022. Copies of the chain of custody forms for chemistry are provided in Appendix B.

The remaining homogenized sediment material was press-sieved through a 1-mm sieve to remove native organisms and potential predators before being placed into toxicity exposure chambers at NIWC Pacific. Copies of the chain of custody forms for toxicity are provided in Appendix C.

2.2. Analytical Methods

Samples were analyzed for BCA metrics by EcoAnalysts Inc., for bulk chemistry by Weck Laboratories, and for toxicity by NIWC Pacific's Bioassay Lab. Complete reports for the BCA and bulk chemistry analyses are provided in Appendix A and B, respectively; toxicity test data and statistical summaries are provided in Appendix C. The following sections summarize the analytical methods for each set of parameters.

2.2.1. Benthic Community Analysis

All BCA samples were processed by EcoAnalysts Inc. using CASQO protocols for identification of benthic macroinvertebrates (SCCWRP, 2014) and in accordance to SMRE IO approved Workplan and QAPP (Weston, 2019a,b). Briefly, at the laboratory, samples were transferred to 70% ethanol for long-term preservation and storage. Organisms were then separated into vials according to major taxon categories (e.g., mollusks, crustaceans, annelids, etc.) under a dissecting microscope until 100% of the sample was sorted. A quality assurance (QA) check consisting of a 10% re-sort of each sample was performed by staff who did not initially sort the sample to assure ≥ 95% accuracy in the removal of all macrofauna from each sample.

All sorted organisms were identified by qualified taxonomists down to the lowest practical taxonomic level (generally considered to be genus/species) and enumerated. A quality control (QC) check was performed by conducting a full taxonomic re-analysis of two samples by taxonomists who did not originally identify the organisms.

Following guidance outlined by the CASQO framework and in accordance with the IO workplan (Weston, 2019a), determination of benthic community condition was investigated using four indices (Index of Biotic Integrity [IBI], Relative Benthic Index [RBI], Benthic Response Index [BRI], and River Invertebrate Prediction and Classification System [RIVPACS]). These indices characterize the sample into one of four categories of disturbance (Reference, Low, Moderate, and High), and are based on the level of abundance, the variety of taxa, and signs of stress. The results of these four indices were then summarized into one integrated benthic indicator value for each sample, which forms the benthic community LOE that goes into the CASQO MLOE calculation for that site.

As part of the SMRE IO monitoring program and in an effort to determine whether community effects as deemed by the CASQO methods are due potentially to anthropogenic disturbance or are environmentally driven, the M-AMBI was also computed. The M-AMBI is more suitable for dynamic estuaries such as the SMRE as it is more inclusive of benthic assemblages unique to lower saline environments and those in which a natural salinity gradient is present (Gillett et al., 2019). For a

complete description of M-AMBI analysis methods and raw data associated with this analysis, refer to Sorensen et al. (2023).

2.2.2. Sediment Chemistry

Weck Laboratories analyzed bulk sediment samples for grain size, percent solids, total organic carbon (TOC), cadmium, copper, lead, mercury, zinc, a suite of low and high molecular weight PAHs, a suite of chlorinated pesticides, and a suite of 51 PCB congeners. This included all 18 PCB congeners used in the calculation of the CASQO chemistry LOE. The analyses and published protocols that were followed are shown in Table 2. A full list of analytes measured is presented in Table 3. A full suite of QC samples was prepared for every analysis batch including a procedural blank, matrix spike, matrix spike duplicate, duplicates, a laboratory control sample and standard reference material.

Table 2 Sediment chemistry analyses and respective analytical methods.

Parameter	Method
Grain size	American Society for Testing and Materials (ASTM) D4464
Total Solids	Standard Method (SM) 2540 B
Total Organic Carbon	USEPA 9060A
Metals	USEPA 6020A
Mercury	USEPA 7471A
PAHs, Pesticides, and PCB Congeners	USEPA 8270C SIM

Table 3 Bulk sediment chemical analytes measured following CASQO requirements.

Chemical Name	Chemical Group	Chemical Name	Chemical Group
Total Organic Carbon	General	2,3,3',4'-Tetrachlorobiphenyl	PCB 56
Grain Size	General	2,3,4,4'-Tetrachlorobiphenyl	PCB 60
Cadmium	Metal	2,3,4',6-Tetrachlorobiphenyl	PCB 64
Copper	Metal	2,3',4,4'-Tetrachlorobiphenyl	PCB 66
Lead	Metal	2,3',4',5-Tetrachlorobiphenyl	PCB 70
Mercury	Metal	2,4,4',5-Tetrachlorobiphenyl	PCB 74
Zinc	Metal	3,3',4,4'-Tetrachlorobiphenyl	PCB 77
Acenaphthene	PAH	2,2',3,4,5'-Pentachlorobiphenyl	PCB 87
Anthracene	PAH	2,2',3,5',6-Pentachlorobiphenyl	PCB 95
Biphenyl	PAH	2,2',3,4',5'-Pentachlorobiphenyl	PCB 97
Naphthalene	PAH	2,2',4,4',5-Pentachlorobiphenyl	PCB 99
2,6-Dimethylnaphthalene	PAH	2,2',4,5,5'-Pentachlorobiphenyl	PCB 101
Fluorene	PAH	2,3,3',4,4'-PentachlorobiphenyL	PCB 105
1-Methylnaphthalene	PAH	2,3,3',4',6-Pentachlorobiphenyl	PCB 110
2-Methylnaphthalene	PAH	2,3,4,4',5-Pentachlorobiphenyl	PCB 114
1-Methylphenanthrene	PAH	2,3',4,4',5-Pentachlorobiphenyl	PCB 118
Phenanthrene	PAH	3,3',4,4',5-Pentachlorobiphenyl	PCB 126
Benzo(a)anthracene	PAH	2,2',3,3',4,4'- Hexachlorobiphenyl	PCB 128
Benzo(a)pyrene	PAH	2,2',3,4,4',5-Hexachlorobiphenyl	PCB 137
Benzo€pyrene	PAH	2,2',3,4,4',5'- Hexachlorobiphenyl	PCB 138
Chrysene	PAH	2,2',3,4,5,5'-Hexachlorobiphenyl	PCB 141
Dibenz(a,h)anthracene	PAH	2,2',3,4',5,5'-Hexachlorobiphenyl	PCB 146
Fluoranthene	PAH	2,2',3,4',5',6-Hexachlorobiphenyl	PCB 149
Perylene	PAH	2,2',3,5,5',6-Hexachlorobiphenyl	PCB 151
Pyrene	PAH	2,2',4,4',5,5'- Hexachlorobiphenyl	PCB 153
Alpha Chlordane	Pesticide	2,3,3',4,4',5-Hexachlorobiphenyl	PCB 156
Gamma Chlordane	Pesticide	2,3,3',4,4',5'-Hexachlorobiphenyl	PCB 157
Trans Nonachlor	Pesticide	2,3,3',4,4',6-Hexachlorobiphenyl	PCB 158
Dieldrin	Pesticide	3,3',4,4',5,5'-Hexachlorobiphenyl	PCB 169
2,4'-DDE	Pesticide	2,2',3,3',4,4',5-Heptachlorobiphenyl	PCB 170
2,4'-DDD	Pesticide	2,2',3,3',4,5,6'-Heptachlorobiphenyl	PCB 174
2,4'-DDT	Pesticide	2,2',3,3',4,5',6'-Heptachlorobiphenyl	PCB 177
4,4'-DDD	Pesticide	2,2',3,4,4',5,5'-Heptachlorobiphenyl	PCB 180
4,4'-DDE	Pesticide	2,2',3,4,4',5',6-Heptachlorobiphenyl	PCB 183
4,4'-DDT	Pesticide	2,2',3,4',5,5',6-Heptachlorobiphenyl	PCB 187
2,4'-Dichlorobiphenyl	PCB 8	2,3,3',4,4',5,5'-Heptachlorobiphenyl	PCB 189
2,2',5-Trichlorobiphenyl	PCB 18	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	PCB 194
2,3',6-Trichlorobiphenyl	PCB 27	2,2',3,3',4,4',5,6-Octachlorobiphenyl	PCB 195
2,4,4'-Trichlorobiphenyl	PCB 28	2,2',3,3',4,5,5',6-Octachlorobiphenyl	PCB 198
2,4,5-Trichlorobiphenyl	PCB 29	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	PCB 199
2,4',5-Trichlorobiphenyl	PCB 31	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	PCB 200
2,3',4'-Trichlorobiphenyl	PCB 33	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	PCB 201

Chemical Name	Chemical Group	Chemical Name	Chemical Group
2,2',3,5'-Tetrachlorobiphenyl	PCB 44	2,2',3,4,4',5,5',6-Octachlorobiphenyl	PCB 203
2,2',4,5'-Tetrachlorobiphenyl	PCB 49	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	PCB 206
2,2',5,5'-Tetrachlorobiphenyl	PCB 52	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	PCB 209

*Shaded cells are used for PCB CASQO calculations.

2.2.3. Sediment Toxicity

NIWC Pacific's Bioassay Laboratory conducted two toxicity tests on all samples in accordance with CASQO guidelines using standard methods (US EPA, 1994; ASTM E1367-03; SCCWRP, 2014).

Bulk sediment acute toxicity was evaluated using a 10-day amphipod (*Eohaustorius estuarius*) survival toxicity test (Figure 5). Sediment water interface (SWI) chronic toxicity was evaluated using a 2-day Mediterranean mussel (*Mytilus galloprovincialis*) embryo-larval development test (Figure 5). Negative controls consisting of sediment from the amphipod collection site were included in the 10-day whole sediment test. For the 2-day SWI test, a chamber control (screen tube) and a seawater negative control were also tested concurrently. In addition, a 4-day reference toxicant test and a 2-day reference toxicant test using cadmium and copper were conducted concurrently for the amphipods and Mediterranean mussels, respectively. Summaries of the test conditions are provided in Table 4 and Table 5.

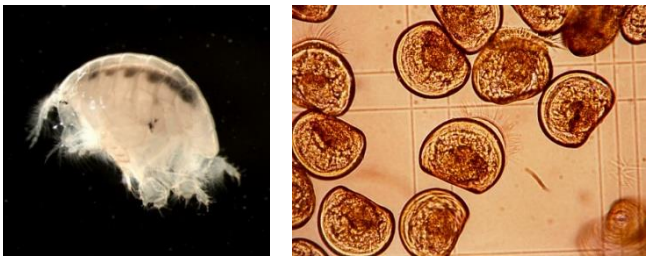


Figure 5 Toxicity test organisms used for the sediment toxicity line of evidence: *Eohaustorius estuarius* (left) and *Mytilus galloprovincialis* (right).

All test chambers were set up with sediment, water and aeration on the day prior to test initiation. Screen tubes for the SWI test were gently introduced to each test chamber on the day of test initiation. Water quality parameters including pH, dissolved oxygen (DO), salinity, temperature and ammonia were measured in the overlying water prior to organism addition. Mussel embryos were introduced to the screen tubes and amphipods were introduced directly into each chamber. Daily observations of water quality, aeration and sediment condition (e.g., anoxia, microbial growth, etc.) were made.

At the end of the exposure period for the SWI toxicity test, screen tubes were carefully removed from the sediment and the embryos were washed into glass scintillation vials and preserved in 10% buffered formalin for later microscopic examination. At the end of the 10-day survival test with marine amphipods, surviving organisms were recovered by sieving sediment through a 500-µm mesh sieve

and were immediately enumerated. Ammonia in the overlying water was measured on the day of termination for both tests. The results from the two tests for each station were integrated into a single toxicity LOE metric following the CASQO framework.

Table 4 Specifications for 10-day whole sediment acute exposure test using the marine amphipod *Eohaustorius estuarius*.

Test period	7/15/2022 – 7/25/2022
Test organism	Marine amphipod – *Eohaustorius estuarius*
Test organism source	Northwestern Aquatic Sciences (Newport, OR)
Test duration; endpoint	10-day; survival
Test solution renewal	None
Feeding	None
Test Chamber size/type	1L glass mason jar
Test sediment depth	2 cm
Test sediment manipulation	Homogenized and sieved to <1.0 mm
Overlying water volume	800 ml
Control sediment source	Sediment from amphipod collection site, Yaquina Bay, OR
Test temperature	15 ± 1 °C
Test salinity	32 ± 2 PSU
Light quality	10-20 µE/m^2/s (Ambient laboratory levels)
Photoperiod	Continuous light (24 hr), ambient laboratory lighting
Aeration	Laboratory filtered air, continuous (1-2 bubbles per second delivered through capillary tubing)
No. of organisms per chamber	20
No. of replicates	5
Overlying water source	Filtered (0.45 µm) natural seawater collected from near the mouth of San Diego Bay at NIWC Pacific Laboratory
Test acceptability criteria	≥ 90% mean survival in control sediment
Reference toxicant	Cadmium chloride (CdCl); 96-h water only exposure; six concentrations (4 replicates each)
Test protocol	US EPA, 1994; ASTM E1367-03; SCCWRP, 2014

Table 5 Specifications for 2-day sublethal exposure test using the Mediterranean mussel *Mytilus galloprovincialis* embryo-larvae at the sediment-water interface.

Test Period	7/15/2022 – 7/17/2022
Test organism	Mediterranean mussel – *Mytilus galloprovincialis*
Test organism source	Field collected in Mission Bay, San Diego, CA
Test duration; endpoints	48 hr; embryo-larval percent normal alive
Test solution renewal	None
Feeding	None
Test Chamber size/type	1L glass mason jar w/ polycarbonate screen tubes with 25 µm mesh
Test sediment depth	5 cm
Test sediment manipulation	Homogenized and sieved to <1.0 mm
Overlying water volume	300 ml
Test temperature	15 ± 1 °C
Test salinity	32 ± 2 PSU
Light quality	10-20 µE/m^2/s (Ambient laboratory levels)
Photoperiod	16 hr light/ 8 hr dark
Aeration	Laboratory filtered air, continuous (1-2 bubbles per second delivered through capillary tubing)
No. of organisms per chamber	~250 eggs, appropriate sperm density to provide > 90% fertilization success (determined in a pre-test trial)
No. of replicates	5
Overlying water source	Filtered (0.45 µm) natural seawater collected from near the mouth of San Diego Bay at SSC Pacific Laboratory
Test acceptability criteria	≥ 80% survival in control
Reference toxicant	Ammonia chloride (NH_4Cl); 48-h water only exposure; seven concentrations (5 replicates each)
Test protocol	Anderson, 1996 (modified); USEPA, 1995

For purposes of interpretation, data from the 10-day survival test were categorized by following the flow chart in Figure 6 (SCCWRP, 2014):

1) First, if mean percent survival was greater than 90%, the sample was deemed Non-toxic. If mean percent survival for each treatment was less than 90%, the data were adjusted to the control response (i.e. [mean survival of test sample/mean survival of control]*100]).

2) Second, after control normalization, if the mean percent survival was greater than 82%, the non-normalized data were statistically compared to the control response using a student's t-test assuming unequal variance. If the sample was found to be not significantly different from the control, the sample was deemed Non-toxic. If the sample was found to be significantly different from the control, the sample was deemed to be of Low Toxicity. This procedure would continue following the flow chart for samples with lower survival rates.

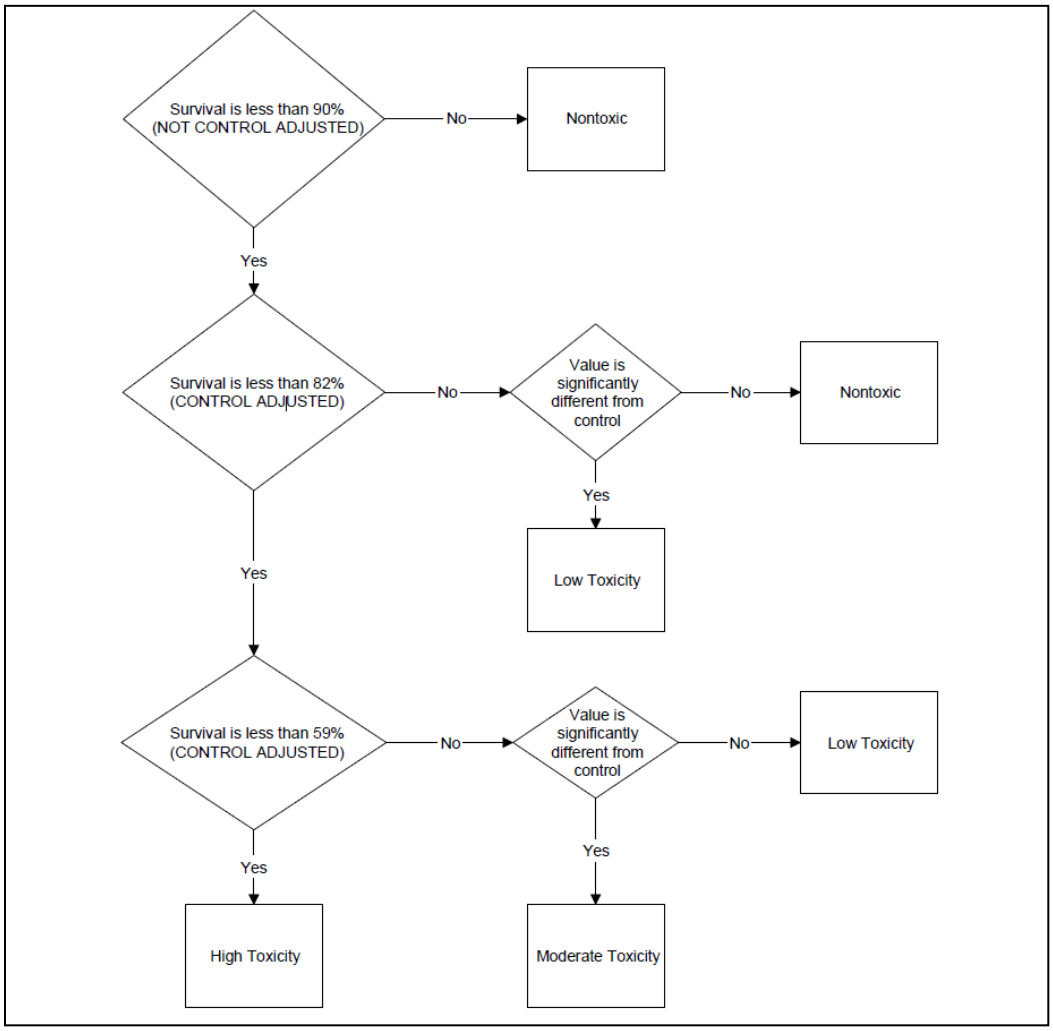


Figure 6 Flow chart for determining the *E. estuarius* toxicity response category (SCCWRP, 2014).

For purposes of interpretation, data for the 2-day sublethal exposure test were categorized by following the flow chart in SCCWRP (2014):

1) First, if mean percent normal alive (PNA) was greater than 80%, the sample was deemed Non-toxic. If mean PNA for each treatment was less than 80%, the data were adjusted to the control response (i.e. [mean PNA of test sample/mean PNA of control]*100]).

2) Second, after control normalization, if the mean control-adjusted PNA was greater than 77%, the non-normalized data were statistically compared to the control response using a student's t-test assuming unequal variance. If the sample was found to be not significantly different from

the control, the sample was deemed Non-toxic. If the sample was found to be significantly different from the control, the sample was deemed to be of Low Toxicity. This procedure would continue following the flow chart for samples with lower control-adjusted PNA values.

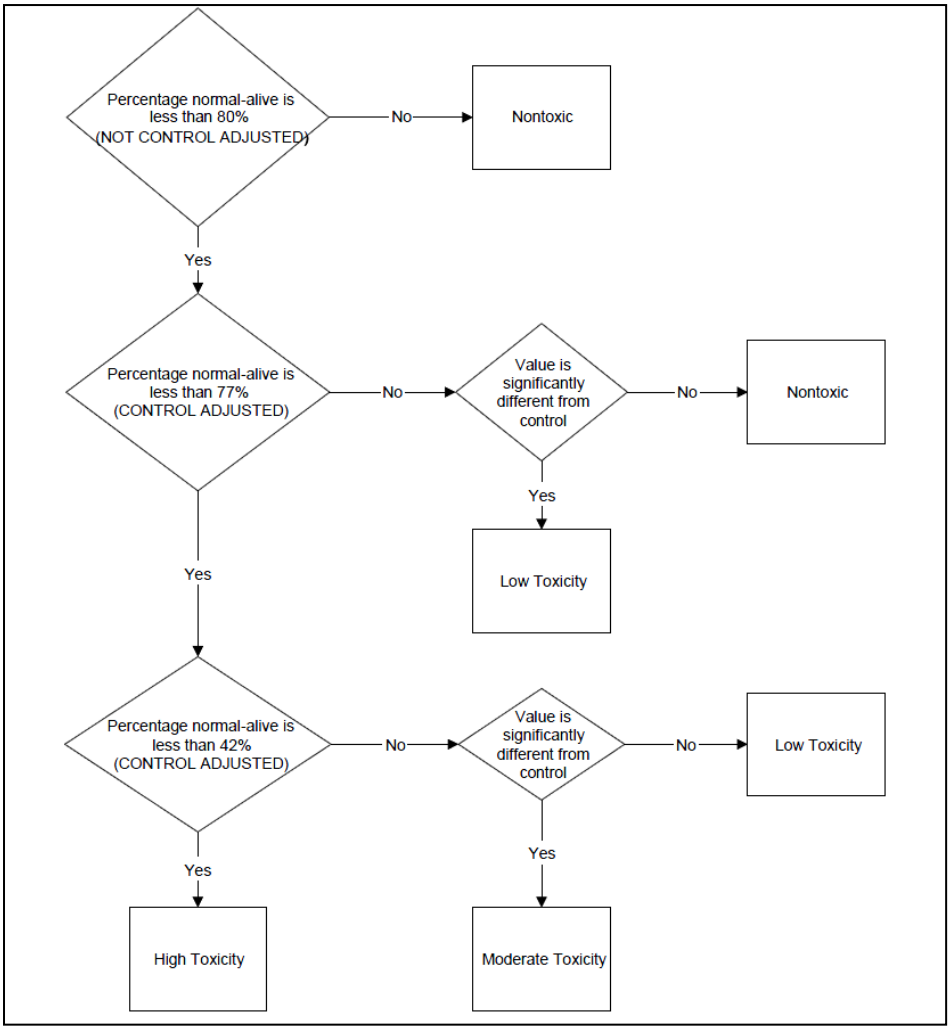


Figure 7 Flow chart for determining the *M. galloprovincialis* toxicity response category (SCCWRP, 2014).

3. 2022 MONITORING RESULTS AND ASSESSMENT

Sampling details and a general description of sediments at time of collection are provided in Table 6 (where PSU indicates practical salinity units).

Table 6 Sampling station conditions.

Station ID	Sample Date	Collection Time	Marine (>27 PSU) OR Brackish (<27 PSU)	Sampling Depth (ft)	General Characteristics
MA1 / W1	12 Jul 2022	09:25	Marine	1.6	brown, sandy
MA2 / W8	12 Jul 2022	10:35	Marine	1.9	brown, silty clay, sulfide odor
E3	12 Jul 2022	14:14	Brackish	1.0	brown, sandy

3.1 Benthic Community Analysis

Benthic community analysis results for each station are summarized in Table 7. The complete results can be found in Appendix A. The table contains the measured abundance and taxa values along with several standard indices used to assess community metrics such as richness, diversity, dominance and evenness.

The taxonomy QC samples passed, achieving an average 95.8-97.7% similarity between the original and QC identifications. The individual and integrated index scores for each station are shown in Table 8 . When averaged together into one score, known as the Integrated Benthic Indicator, stations MA1 and E3 were categorized as High Disturbance and station MA2 was categorized as Moderate Disturbance. Using the M-AMBI method to assess benthic community condition, all three stations were categorized as Low Disturbance.

Table 7 Summary of benthic community abundance, richness, diversity, evenness, and dominance data.

Benthic Community Index	Station ID		
	MA1	MA2	E3
Total Abundance (Individuals/0.1 m^2)	33	1240	678
Richness (Taxa/0.1 m^2)	12	20	15
Shannon-Wiener Diversity	1.75	1.54	1.77
Pielou's Evenness	0.70	0.51	0.65
Schwartz Dominance	4	3	4

Table 8 Summary of individual benthic community indices scores and categories and integrated benthic community indicator. Categories are Reference, Low Disturbance (Low), Moderate Disturbance (Moderate), and High Disturbance (High).

Benthic Community Index		Station ID		
		MA1	MA2	E3
IBI	Score	2	1	3
	Category	Moderate	Low	High
RBI	Score	0.05	0.58	0.25
	Category	High	Reference	Low
BRI	Score	47.44	66.52	77.80
	Category	Low	Moderate	High
RIVPACS	Score	0.19	0.52	0.38
	Category	High	Moderate	Moderate
Integrated Benthic Indicator		**High**	**Moderate**	**High**

Table 9 Summary of M-AMBI benthic community indices scores and condition. Conditions are Reference, Low Disturbance, Moderate Disturbance, and High Disturbance.

Station ID	M-AMBI Score	M-AMBI Condition
MA1	0.53	Low Disturbance
MA2	0.53	Low Disturbance
E3	0.52	Low Disturbance

3.2 Bulk Sediment Chemistry

Bulk sediment chemistry results are summarized in Table 10 through Table 14. The dataset includes five metal concentrations, 18 PAHs, 10 chlorinated pesticides and 18 PCBs that are required to perform the CASQO calculations as well as total organic carbon, percent fines, and the additional PCB congeners specifically requested by the SDRWQCB. Data are presented as reported by the analytical Lab. All QC parameters were within the established control limits. The complete results including QA are in Appendix B.

3.2.1 Physical chemistry

A summary of the physical sediment metric results is presented in Table 10. Sediment percent fines (<0.63µm) were 0.56, 0.54 and 4.97% in site samples MA1, MA2 and E3, respectively. TOC measurements were 0.116, 0.679 and 0.138% for sites MA1, MA2 and E3, respectively. Total solids measured 72.5, 68.7 and 64.6% for MA1, MA2 and E3, respectively. Site sediments were composed primarily of medium sized (MA1 and MA2) and fine (E3) sand.

Table 10 Bulk sediment total organic carbon and sediment grain size concentrations in units of percent for sediment monitoring stations.

Measurement (%)		Station ID		
		MA1	MA2	E3
Total Organic Carbon (TOC)		0.116	0.679	0.138
Total Solids		72.5	68.7	64.6
Gravel (>2mm)		0.00	0.00	0.00
Sand	Coarse (0.5-2mm)	10.18	14.88	3.68
	Medium (0.25-0.5mm)	61.91	56.42	28.76
	Fine (0.0625-0.25mm)	27.35	28.15	62.58
Silt (0.00391 - 0.0625mm)		0.22	0.33	4.35
Clay (<0.00391mm)		0.34	0.21	0.62
Percent Fines (Silt + Clay)		0.56	0.54	4.97

3.2.2 Metals

The bulk sediment metals data are presented in Table 11. Cadmium and Mercury were not detected (ND) in all three samples. Copper measured 3.1, 3.5 and 15 mg/kg in MA1, MA2 and E3, respectively. Lead measured 1.2, 0.87 and 4.0 mg/kg for sites MA1, MA2 and E3, respectively, and Zinc measured 9.7, 12 and 49 mg/kg MA1, MA2 and E3, respectively. CASQO maximum reporting limits (RL) and laboratory achieved RL are also reported for metals in Table 11.

The National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (Buchman, 2008) Effects Range Low (ERL) and Effects Range Medium (ERM) concentrations for inorganic contaminants in marine sediments are also included in Table 11. The ERL represents a value at the low end of the range at which toxicity may begin to be observed in sensitive species and the ERM is the median concentration at which toxicity may be observed. ERL and ERM concentrations are used as benchmarks that, if exceeded, could result in occasional toxicity to marine organisms.

Table 11 Bulk sediment metals concentrations (mg/kg) for sediment monitoring stations, as well as general guidelines.

Analyte	CASQO Max RL	Achieved RL Range	Method DL	Station ID			ERL[1]	ERM[1]
				MA1	MA2	E3		
Cadmium	0.09	0.28 - 0.31	0.083	ND	ND	ND	1,200	9,600
Copper	52.8	0.69 - 0.77	0.40	3.1	3.5	15	34,000	270,000
Lead	25.0	0.69 - 0.77	0.29	1.2	0.87	4	46,700	218,000
Mercury	0.09	0.014 - 0.015	0.0079	ND	ND	ND	150	710
Zinc	60.0	6.9 - 7.7	3.3	9.7	12	49	150,000	410,000

[1]Screening values are from Buchman (2008). ND indicates measured value was below method detection limit.

3.2.3 PAHs, Pesticides and PCBs

Bulk sediment PAH, Pesticide and PCB data as well as CASQO maximum RL and laboratory achieved RL are presented in Table 12, Table 13, and Table 14, respectively. All measurements for these analytes were ND. For all of these analyses, the sample and/or sample extract was diluted prior to preparation due to matrix interferences. The method detection limit (MDL) and method reporting limit (MRL) were raised due to this required dilution. A few of the PCBs listed in Table 3 were not include in the PCB analytes provided by the analytic laboratory. However, none of the missing PCBs were part of the required PCBs needed for calculating the CASQO and it is unlikely that the analytes would have resulted in any detectable concentrations.

Table 12 Bulk sediment PAH concentrations in µg/kg for sediment monitoring stations.

Analyte	CASQO Max RL (µg/kg)	Achieved RL Range (µg/kg)*	Method DL (ug/kg)	Station ID		
				MA1	MA2	E3
Low Molecular Weight PAHs (LMWPAH) in units of µg/kg						
Naphthalene	20	97 - 120	7.3	ND	ND	ND
1-Methylnaphthalene	20	97 - 120	6.1	ND	ND	ND
2-Methylnaphthalene	20	97 - 120	6.1	ND	ND	ND
2,6-Dimethylnaphthalene	20	97 - 120	9.3	ND	ND	ND
Acenaphthene	20	97 - 120	5.3	ND	ND	ND
Biphenyl	20	97 - 120	7.8	ND	ND	ND
Fluorene	20	97 - 120	6.1	ND	ND	ND
Phenanthrene	20	97 - 120	6.5	ND	ND	ND
1-Methylphenanthrene	20	97 - 120	12	ND	ND	ND
Anthracene	20	97 - 120	9.0	ND	ND	ND
High Molecular Weight PAHs (HMWPAH) in units of µg/kg						
Pyrene	80	97 - 120	39	ND	ND	ND
Fluoranthene	80	97 - 120	39	ND	ND	ND
Benzo(a)anthracene	80	97 - 120	35	ND	ND	ND
Dibenz(a,h)anthracene	80	97 - 120	45	ND	ND	ND
Chrysene	80	97 - 120	6.2	ND	ND	ND
Benzo(a)pyrene	80	97 - 120	49	ND	ND	ND
Benzo(e)pyrene	80	97 - 120	14	ND	ND	ND
Perylene	80	97 - 120	12	ND	ND	ND
Sum LMWPAH				ND	ND	ND
Sum HMWPAH				ND	ND	ND

* Due to the nature of matrix interferences, sample and/or sample extract was diluted prior to preparation. The MDL and MRL were raised due to the dilution. ND indicates concentration was below method detection limits.

Table 13 Bulk sediment chlorinated pesticide concentrations in µg/kg for sediment monitoring stations.

Analyte	CASQO Max RL (µg/kg)	Achieved RL Range (µg/kg)*	Method DL (µg/kg)	Station ID		
				MA1	MA2	E3
Dieldrin	2.5	61 - 80	13	ND	ND	ND
Chlordane (tech)	0.50	1200 - 1600	270	ND	ND	ND
Alpha-Chlordane	0.54	61 - 80	15	ND	ND	ND
Gamma-Chlordane	4.6	61 - 80	14	ND	ND	ND
Trans-Nonachlor	0.5	61 - 80	7.3	ND	ND	ND
2,4'-DDD	0.5	61 - 80	11	ND	ND	ND
4,4'-DDD	0.5	61 - 80	13	ND	ND	ND
2,4'-DDE	0.5	61 - 80	10	ND	ND	ND
4,4'-DDE	0.5	61 - 80	14	ND	ND	ND
2,4'-DDT	0.5	61 - 80	13	ND	ND	ND
4,4'-DDT	2.5	61 - 80	13	ND	ND	ND

* Due to the nature of matrix interferences, sample and/or sample extract was diluted prior to preparation. The MDL and MRL were raised due to the dilution. ND indicates measured value was below method detection limit.

Table 14. Bulk sediment PCB congener 8-209 concentrations in µg/kg for sediment monitoring stations.

Analyte	CASQO Max RL (mg/kg)	Achieved RL Range (mg/kg)	Method DL (mg/kg)	Station ID		
				MA1	MA2	E3
PCB 005/008	3.0	32 - 81	32	ND	ND	ND
PCB 18	3.0	32 - 81	32	ND	ND	ND
PCB 27	3.0	32 - 81	32	*	*	*
PCB 28	3.0	32 - 81	32	ND	ND	ND
PCB 29	3.0	32 - 81	32	*	*	*
PCB 31	3.0	32 - 81	32	ND	ND	ND
PCB 33	3.0	32 - 81	32	ND	ND	ND
PCB 44	3.0	32 - 81	32	ND	ND	ND
PCB 49	3.0	32 - 81	32	ND	ND	ND
PCB 52	3.0	32 - 81	32	ND	ND	ND
PCB 56	3.0	32 - 81	32	ND	ND	ND

Analyte	CASQO Max RL (mg/kg)	Achieved RL Range (mg/kg)	Method DL (mg/kg)	Station ID		
				MA1	MA2	E3
PCB 60	3.0	32 - 81	32	ND	ND	ND
PCB 64	3.0	32 - 81	81	*	*	*
PCB 66	3.0	32 - 81	81	ND	ND	ND
PCB 70	3.0	32 - 81	32	ND	ND	ND
PCB 74	3.0	32 - 81	32	ND	ND	ND
PCB 77	3.0	32 - 81	32	ND	ND	ND
PCB 87	3.0	32 - 81	32	ND	ND	ND
PCB 95	3.0	32 - 81	32	ND	ND	ND
PCB 97	3.0	32 - 81	32	ND	ND	ND
PCB 99	3.0	32 - 81	81	ND	ND	ND
PCB 101	3.0	32 - 81	32	ND	ND	ND
PCB 105	3.0	32 - 81	81	ND	ND	ND
PCB 110	3.0	32 - 81	81	ND	ND	ND
PCB 114	3.0	32 - 81	32	ND	ND	ND
PCB 118	3.0	32 - 81	81	ND	ND	ND
PCB 126	3.0	32 - 81	32	ND	ND	ND
PCB 128	3.0	32 - 81	32	ND	ND	ND
PCB 132/153	3.0	32 - 81	81	ND	ND	ND
PCB 137	3.0	32 - 81	81	*	*	*
PCB 138/158	3.0	32 - 81	81	ND	ND	ND
PCB 141	3.0	32 - 81	81	ND	ND	ND
PCB 146	3.0	32 - 81	32	*	*	*
PCB 149	3.0	32 - 81	81	ND	ND	ND
PCB 151	3.0	32 - 81	32	ND	ND	ND
PCB 156	3.0	32 - 81	32	ND	ND	ND
PCB 157	3.0	32 - 81	32	ND	ND	ND
PCB 169	3.0	32 - 81	81	ND	ND	ND
PCB 170	3.0	32 - 81	81	ND	ND	ND
PCB 174	3.0	32 - 81	32	ND	ND	ND
PCB 177	3.0	32 - 81	32	ND	ND	ND
PCB 180	3.0	32 - 81	32	ND	ND	ND
PCB 183	3.0	32 - 81	81	ND	ND	ND
PCB 187	3.0	32 - 81	81	ND	ND	ND
PCB 189	3.0	32 - 81	81	ND	ND	ND
PCB 194	3.0	32 - 81	81	ND	ND	ND
PCB 195	3.0	32 - 81	32	ND	ND	ND
PCB 198	3.0	32 - 81	81	*	*	*
PCB 199	3.0	32 - 81	32	ND	ND	ND
PCB 200	3.0	32 - 81	81	*	*	*
PCB 201	3.0	32 - 81	32	ND	ND	ND
PCB 203	3.0	32 - 81	32	ND	ND	ND
PCB 206	3.0	32 - 81	32	ND	ND	ND

Analyte	CASQO Max RL (mg/kg)	Achieved RL Range (mg/kg)	Method DL (mg/kg)	Station ID		
				MA1	MA2	E3
PCB 209	3.0	32 - 81	32	ND	ND	ND
Sum PCBs				ND	ND	ND
Sum NOAA 18 PCBs**				ND	ND	ND

Due to the nature of matrix interferences, sample and/or sample extract was diluted prior to preparation. The MDL and MRL were raised due to the dilution; * - MISSING ANALYTES. ** - Sum NOAA 18 includes the sum of PCB congeners 8, 18, 28, 44, 52, 66, 101, 105, 118, 128, 138, 153, 170, 180, 187, 195, 206, and 209. ND indicates measured value was below method detection limit.

3.2.4 Chemistry Line of Evidence

The chemistry results were analyzed using two indices: the California Logistic Regression Model (CA LRM) and the Chemical Score Index (CSI), shown in

Table 15. Integration of these two indices yields the Chemistry LOE (SCCWRP, 2014) under CASQO. The integrated results showed that all three stations had Minimal Exposure.

Table 15 Chemistry indices and Overall Integrated Chemistry LOE for sediment monitoring stations. Categories are Minimal Exposure (Min. Exp.), Low Exposure, Moderate Exposure, and High Exposure.

Chemistry Index		Station ID		
		MA1	MA2	E3
CA LRM	Score	0.06	0.07	0.26
	Category	Min. Exp.	Min. Exp.	Min. Exp.
CSI	Score	1.00	1.00	1.00
	Category	Min. Exp.	Min. Exp.	Min. Exp.
Integrated Chemistry Indicator		**Min. Exp.**	**Min. Exp.**	**Min. Exp.**

3.2.5 Quality Control Results

All QC parameters were within the established control limits.

The RL for all metal analyses were below the established CASQO max RL except for cadmium. The analytical laboratory confirmed that the increased cadmium RL was a result of the dry weight correction factor and not a result of an interference.

The RLs for all organic analyses were above the established CASQO max RL due to the nature of matrix interferences. The samples and/or sample extracts were diluted prior to preparation and the MDL and MRL were raised due to the dilution.

3.3 Toxicity Tests

3.3.1 10-day Amphipod Survival Test

The amphipod 10-day whole sediment toxicity test resulted in controls that met test acceptability criteria of 90% survival. All water quality parameters measured were within the recommended range for the duration of the test. Mean survival was 100, 98 and 100% for stations MA1, MA2 and E3, respectively (

Table 16, Figure 8). Mean percent survival was greater than 90% for all samples, and thus all were deemed Non-toxic. Bench water quality and count sheets associated with the toxicity tests are provided in Appendix C.

Table 16 Mean percent survival for the 10-day whole sediment acute exposure test with *E. estuarius*.

Station ID	Mean % Survival	% Difference from Control	Toxic Response
Control Sediment	100	-	-
MA1	100	0.0%	Non-toxic
MA2	98	-2.0%	Non-toxic
E3	100	0.0%	Non-toxic

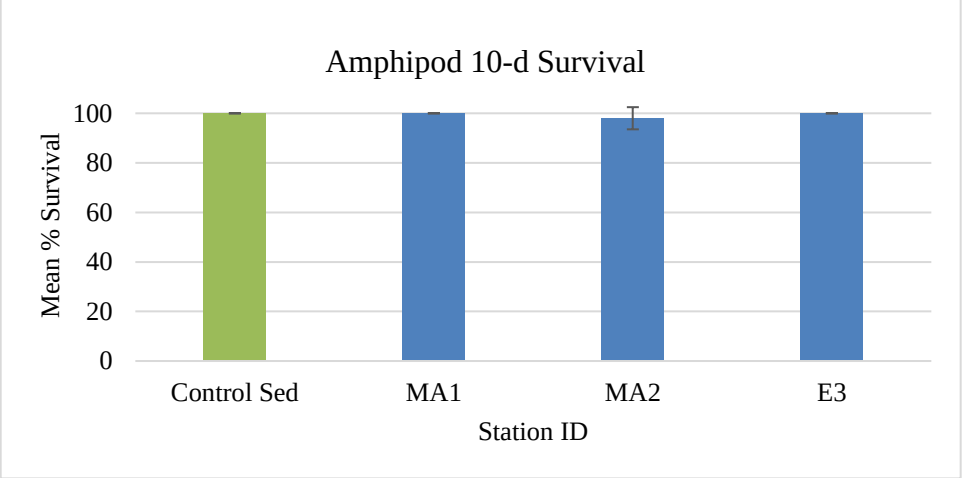


Figure 8 Mean percent survival for the 10-day whole sediment acute exposure test with *E. estuarius*. Control Sed – control sediment.

3.3.2 2-day Sediment-Water Interface Test with Bivalve Embryos

The Mediterranean mussel 2-day SWI toxicity test resulted in controls that met or exceeded test acceptability criteria of 80% normal (

Table 17). Mean PNA was 84.9, 88.9 and 83.0% for stations M1, M2 and E3, respectively (

Table 17). All water quality parameters were within the recommended range for the duration of the test. For this monitoring event, all samples resulted in non-normalized PNA of greater than 80%, therefore all samples were deemed Non-toxic, and further assessment from the flow chart was not needed. Category score results are shown in Table 17. Bench water quality and count sheets associated with the toxicity tests are provided in Appendix C.

Table 17 Summary of Statistical Results for 2-day Sediment-Water Interface Test with *M. galloprovincialis.*

Station ID	Mean PNA (%)	% Difference from Control	Toxic Response
Screen Tube Control	91.9	-	-
MA1	84.9	-7.6%	Non-toxic
MA2	88.9	-3.3%	Non-toxic
E3	83.0	-9.7%	Non-toxic

PNA – Percent Normal Alive

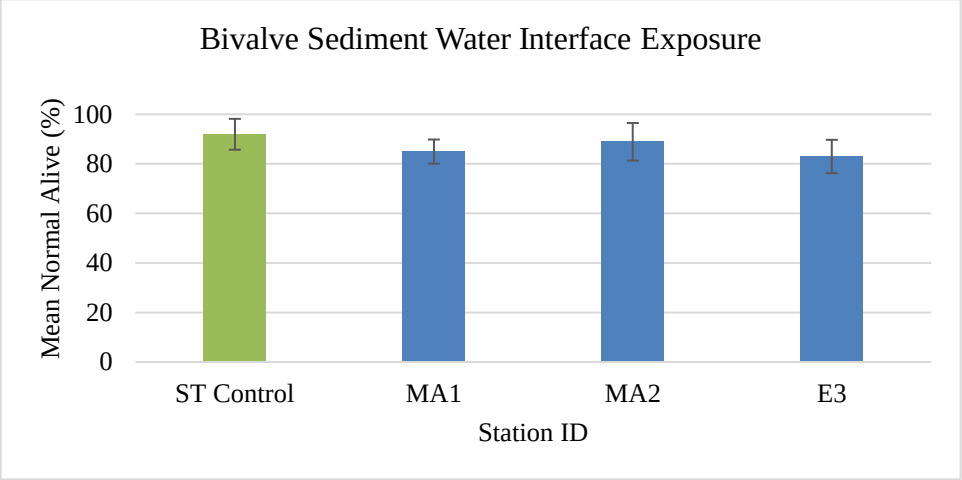


Figure 9 Mean PNA for the 2-day SWI exposure with *M. galloprovincialis*. ST – screen tube control.

3.3.3 Integration of Toxicity Test Results

To determine the overall Toxicity LOE for each station, numeric category scores were applied to each sample based on the response (Non-toxic = 1, Low Toxicity = 2, Moderate Toxicity = 3, High Toxicity = 4; SCCWRP 2014). Then the numeric category scores from each individual toxicity test were averaged. For the three stations tested, all were deemed Non-toxic with LOE category scores of 1 (

Table 18).

Table 18 Toxicity Line of Evidence.

Station ID	Numeric Category Score		Overall Toxicity LOE Category
	10-day Whole Sediment Test	2-day Sediment-Water Interface Test	
MA1	1	1	1 – Non-toxic
MA2	1	1	1 – Non-toxic
E3	1	1	1 – Non-toxic

3.3.4 Toxicity QA/QC

A few QA/QC deviations from USEPA and internal protocols that occurred during testing were noted on raw data sheets. A thorough review of the data and test procedures did not identify any likely impacts on test results as a result of these deviations; therefore, all presented data were deemed acceptable.

All tests were conducted within the recommended 1-month holding time. Temperatures of the samples were within the USEPA recommend range of 0-6°C. Control test acceptability criteria were met for both the amphipod whole-sediment test and the bivalve SWI toxicity test. Total ammonia concentrations were below those that would be anticipated to be toxic to the test endpoints, with overlying water concentrations less than 1.2 mg/L in both tests (Appendix C). A glossary of the qualifier codes used on the test datasheets is provided at the end of Appendix C.

3.3.5 Reference Toxicant Testing

A 4-day and a 2-day reference toxicant test using cadmium chloride ($CdCl_2$) and copper sulfate ($CuSO_4$) were conducted concurrently for the amphipods and Mediterranean mussels, respectively. The laboratory controls associated with these tests met test acceptability criteria. Statistical analyses were conducted using Comprehensive Environmental Toxicity Information System (CETIS) Software, Version 1.9.7.9 (Tidepool Scientific Software). For the amphipod reference toxicant test, the median lethal concentration (LC_{50}) was 11.3 µg/L which fell within two standard deviations of the laboratory's historical means (8.91 ± 5.8 µg/L), indicating sensitivity to cadmium was consistent with that historically observed for amphipods. In addition, for the Mediterranean mussel reference toxicant test, the median effective concentration (EC_{50}) for the PNA was 6.12 µg/L which fell within two standard deviations of the laboratory's historical means (8.2 ± 3.9 µg/L), indicating sensitivity to copper was consistent with that historically observed for Mediterranean mussels.

3.4 Sediment CASQO Assessment and Receiving Sediment Monitoring Evaluation

The analytical chemistry, toxicity, and benthic community LOE results for each sediment sampling location were used to determine an overall station evaluation of sediment quality. The CASQO MLOE category was assigned to each sample using the lookup tables in the CASQO CalcTool V5.5.xls with guidance from the CASQO Technical Support Manual (SCCWRP, 2014). The individual LOE and overall MLOE for each station are shown in Table 19. The three stations at SMRE exhibited minimal chemistry indicators, were all non-toxic, and showed moderate to high disturbance categories for the benthic community using CASQO indices (but low disturbance using the M-AMBI). Overall, these stations were all categorized as "Likely Unimpacted".

Table 19 Individual chemistry, toxicity, and benthic community LOE and overall station CASQO assessment based on integrated MLOE.

Line of Evidence	Station ID		
	MA1	**MA2**	**E3**
Integrated Chemistry Indicator	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Toxicity	Non-toxic	Non-toxic	Non-toxic
Integrated Benthic Indicator	High Disturbance	Moderate Disturbance	High Disturbance
CASQO Weight of Evidence	**Likely Unimpacted**	**Likely Unimpacted**	**Likely Unimpacted**

Table 20 shows the overall CASQO assessment using the M-AMBI BCA analyses. All three stations were categorized as Unimpacted with this approach.

Table 20 CASQO assessment incorporating the M-AMBI benthic community line of evidence.

Line of Evidence	Station ID		
	MA1	**MA2**	**E3**
CASQO Weight of Evidence with M-AMBI BCA	**Unimpacted**	**Unimpacted**	**Unimpacted**

4. COMPARISON OF 2022 RESULTS TO HISTORICAL MONITORING RESULTS

4.1 Comparison of 2022 Benthic Community Analysis to Historical Monitoring Results

Historic BCA individual indices and integrated scores ranged from low to high among sites and within a given year. Between 2010 and 2016, the mean integrated score across all three stations was ranked as moderate to high disturbance levels (Table 21). Note, a BCA analysis was not performed in monitoring year 2009 (CDM, 2009). In addition, it should be noted, that between 2014-2016, the overall CASQO benthic LOE was not calculated (CH2M, 2016). Values presented in those years were interpreted values by the study team in 2019 (CH2M, 2019). However, these interpreted values do align with a similar pattern of improvement over time that was reported for other parameters within the Estuary for those monitoring years (CH2M, 2019). This is further supported by a similar decrease in disturbance levels following the 2017 Estuary reset event. Finally, decreased disturbance levels were reported throughout the Estuary between 2017-2019. It should be noted, that this same trend (i.e. improvement in Estuary conditions following Estuary reset events) has been reported in other separate studies of the Estuary between 2015-2020 (Katz et al., 2016; Sorensen et al., 2020). Overall the 2022 BCA scores are consistent with what has reported historically for these locations (CH2M, 2019; Sorensen et al, 2022).

Table 21 Mean Integrated Benthic Community Score by year (2010-2022).

Year	Mean Integrated Score[1]
2010	Moderate
2011	Moderate
2012	Moderate
2013	High
2014*	Moderate
2015*	Moderate
2016*	High
2017	Moderate
2018	Low
2019	Low
2022	Moderate

Notes:

(1) Mean disturbance level of three monitoring stations reported for that year

(2) * SQO not calculated in this year, indicates these were interpreted values by author (CH2M, 2019)

(3) Table generated from data previously reported in CH2M, 2019

4.2 Comparison of 2022 Sediment Chemistry to Historical Monitoring Results

Overall, the 2022 sediment chemistry concentrations are consistent with what has been reported historically for these sites within the Estuary (CH2M, 2019).

4.2.1 PAHs, Pesticides and PCBs

Over the 10-year monitoring period, the ambient bay monitoring results, with a few exceptions, showed that all PAHs and synthetic pyrethroids were either not-detected or at a concentration which fell below the RL but above the MDL (i.e. an estimated but relatively low value). A qualitative summary of parameters which were measured above the RL and MRL is provided in

Table 22 below. Note, a summary of PCBs is not included in this table as the presence of PCBs in estuary sediment samples historically has not been detected. All measured values were for the most part below the NOAA marine sediment screening ERL and ERM values for inorganic and organic contaminants (Buchman, 2008).

Table 22 Estuary Sediment Contaminant Parameters reported above Method Reporting Limits (2009-2022).

Parameter	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene												
Acenaphthylene			x	x								
Anthracene												
Benzo(a)anthracene											x	
Benzo(b)fluoranthene	x									x		
Benzo(k)fluoranthene												
Benzo(g,h,i)perylene										x		
Benzo(a)pyrene												
Chrysene										x	x	
Dibenz(a,h)anthracene												
Fluoranthene										x	x	
Fluorene				x								
Indeno(1,2,3-cd)pyrene												
Naphthalene			x					x				
Phenanthrene			x							x	x	
Pyrene										x	x	
Synthetic Pyrethroids												
Allethrin												
Bifenthrin	x		x									
Cyfluthrin												
Cypermethrin			x									
Danitol (Fenpropathrin)												
Deltamethrin												
L-Cyhalothrin												
cis-Permethrin												
trans-Permethrin												
Prallethrin												
Fluvalinate												
Esfenvalerate/Fenvalerate												

Notes:

(1) x indicates parameter detected in at least 1 of the 3 sites at concentration above reporting limit (RL)

(2) Blank cells indicate parameter report at all sites as either non detect or below RL but above method detection limit (estimated value)

(3) Table adapted from data reported in CH2M, 2019

(4) 2022 data added for comparative purposes

4.2.2 Metals

Between 2009 and 2016, several measured sediment metal concentrations remained relatively constant (e.g. copper, zinc, and nickel) while others appeared to gradually increase (e.g. arsenic and lead). As a result of the January 2017 Estuary reset event, substantial reductions in sediment metal concentrations were observed in 2017. Overall, measured concentrations were half that of concentrations reported in 2009. Between 2017-2019, overall metal concentrations stayed below previously reported concentrations and were fairly consistent throughout this period. Table 23 provides a summary of measured metals in the Estuary. Concentrations provided represent the highest concentrations measured amongst the three

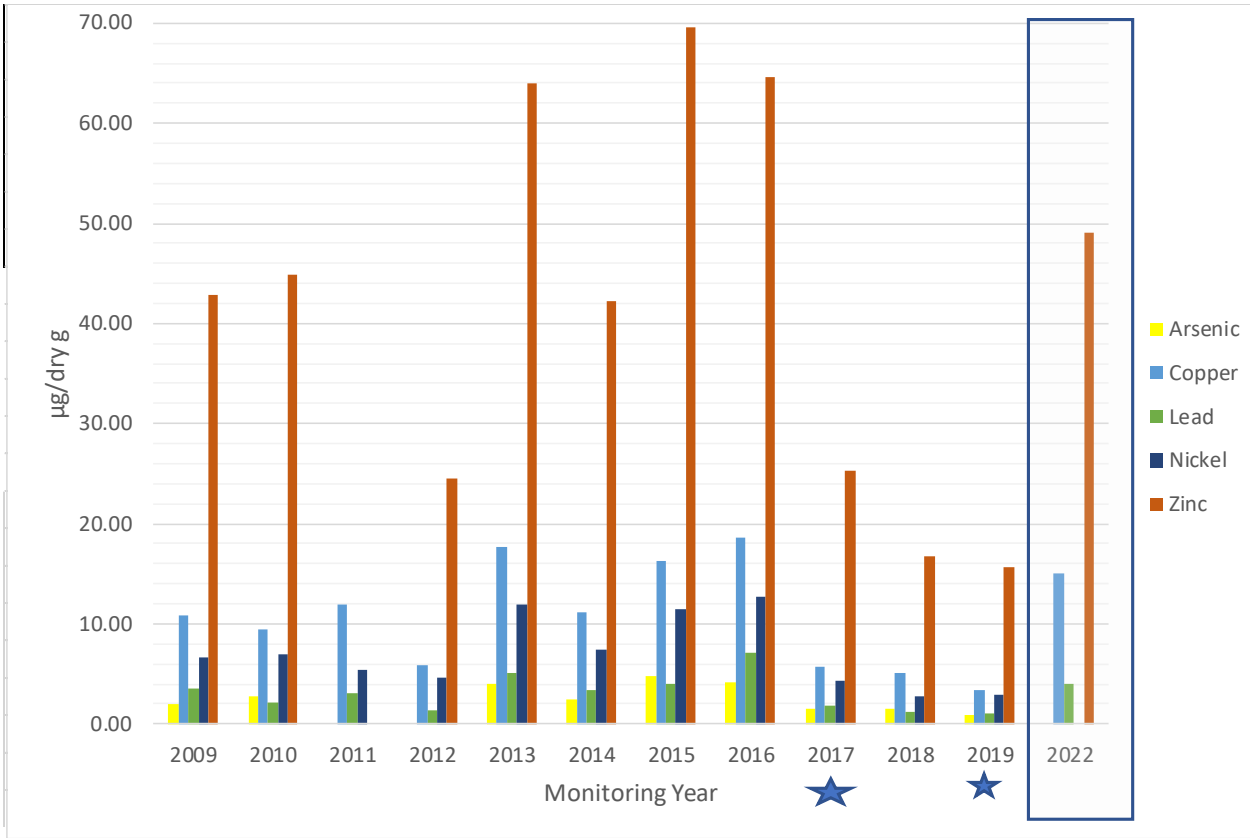
monitoring stations for that monitoring year. Overall, the 2022 metal concentrations are consistent with what has been reported historically for these sites within the Estuary (CH2M, 2019).

Table 23 Summary of historic Estuary Sediment Metal Concentrations (2009-2022).

Parameter	Units	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022
Antimony	µg/dry g	0.09	<0.042	<4.9-5.1	<6.2-6.5	0.19	0.10	0.21	0.16	0.12	0.12	0.08	*
Arsenic	µg/dry g	2.01	2.72	<2.5	<1.2-1.3	4.02	2.49	4.70	4.16	1.54	1.50	0.84	*
Cadmium	µg/dry g	0.10	<0.042	<2.5	<0.6-0.7	0.16	0.85	0.12	0.13	0.05	0.04	0.03	*
Chromium	µg/dry g	18.18	17.20	14.00	14.90	51.38	21.98	34.60	31.23	27.24	11.30	13.90	*
Copper	µg/dry g	10.89	9.45	12.00	5.90	17.65	11.22	16.28	18.64	5.75	5.11	3.36	15.00
Lead	µg/dry g	3.55	2.17	3.10	1.40	5.11	3.44	3.96	7.13	1.77	1.22	1.07	4.00
Nickel	µg/dry g	6.71	6.91	5.40	4.60	11.99	7.37	11.49	12.68	4.35	2.77	2.85	*
Selenium	µg/dry g	0.11	0.03	<4.9-5.1	<6.2-6.5	0.22	0.13	0.31	0.24	0.09	0.17	0.07	*
Zinc	µg/dry g	42.93	44.90	<4.9-5.1	24.50	63.96	42.27	69.55	64.61	25.24	16.80	15.70	49.00

Notes:
(1) Highest concentration recorded in any of the three stations sampled that year presented in table
(2) < indicates vaue was below RL but above MDL (estimated value)
(3) Table adapted from CH2M, 2019 and includes data collected in 2022
(4) * indicates metal not measured for this year

An example of metal concentrations trends is provided in Figure 10. For a more detailed description of observed individual metal concentrations by monitoring station and year, refer to prior annual municipal monitoring reports (CDM, 2009; CH2M, 2016; CH2M, 2018; CH2M, 2019).



Notes:

(1) Star indicates signifanct rain event occured resulting in high volume river flow (> 25,000 cubic feet per second (CFS)
(2) Presented values are highest concentration recorded in any of the three stations sampled that year
(3) Figure generated from data previously reported in CH2M, 2019
(4) Data collected in this 2022 has been included and is highlighted with shaded box.

Figure 10 Estuary Sediment Concentration Trends for Arsenic, Copper, Lead, Nickel and Zinc (2009-2022).

When comparing all of the sediment chemistry results, overall, the 2022 sediment chemistry LOE scores are consistent with what has been reported historically for these sites within the Estuary (CH2M, 2019).

4.3 Comparison of 2022 Sediment Toxicity to Historical Monitoring Results

Historic sediment toxicity in the Estuary from 2010 through 2022, based on average percent survival per year, are summarized in

Table 24. Note, no sediment toxicity data were reported for 2009 (CDM, 2009). Excluding 2011, mean survival rates have general increased with the average between the three stations ranging between 90-99%. In some years, individual station mean survival was below the laboratory negative control survival, but were generally not below the CASQO set mean for normally developed larvae of 82.1 to

92% with control of 91%. For 2022, the average was 99%. Thus, based on CASQO standards, Estuary sediments for all monitoring years except 2011 have been classified as non-toxic (CH2M, 2019).

Table 24 Historic Estuary Sediment Toxicity (Average Mean % Survival) between 2010-2022.

Year	Average[1] Mean (%) Survival
2010	90
2011	74*
2012	90*
2013	93
2014	94
2015	96
2016	98
2017	99
2018	96
2019	93
2022	99

Notes:
(1) Average acrossed 3 monitoring stations
(2) *Indicates at leat one or more of the three stations had a value that was statistically significant reduction from the laboratory control.
(3) Table generated from data previously reported in CH2M, 2019
(4) Average of 2022 data added for comparison

4.4 Comparison of 2022 CASQO Assessment to Historic Monitoring Results

Finally, a CASQO MLOE analysis was performed for each of the three monitoring sites from 2009 to 2019. In general, when looking across all 10 monitoring years, sediment toxicity was categorized as "non-toxic" or "low toxicity". The benthic community integrated scores between sites has shown a little more variability, ranging from low to high disturbance. With few exceptions (2015, one site), all monitoring sites within the Estuary over the years have been reported as "minimal exposure" to chemical contaminants. This minimal exposure classification means that the level of contamination is unlikely to result in adverse effects to marine organisms (Bay et al., 2013). The overall CASQO calculation per location assessment has remained relatively consistent over the years, with a classification of as either "Unimpacted" or "Likely Unimpacted". Table 25 shows historical CASQO assessments for sites SME-1, SME-2 and SME-3. For comparison purposes, 2022 station MA1 is in close proximity with historical station SME-3 and MA2 is in close proximity to historical station SME-1. Thus, results of the 2022 study are consistent with previous assessments of the SMRE in that the Estuary is considered Likely Unimpacted when using the CASQO MLOE or Unimpacted when applying the M-AMBI with other sediment lines of evidence.

Table 25 Historical CASQO assessment at sites within the SMRE (Table adapted from CH2M, 2019).

Sampling Year	Station ID[A]	CASQO Assessment
2009	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2010	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2011	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2012	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2013	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2014*	SME-1	Likely Unimpacted
	SME-2	Unimpacted
	SME-3	Likely Unimpacted*
2015*	SME-1	Possibly Impacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted*
2016*	SME-1	Likely Unimpacted*
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2017	SME-1	Likely Unimpacted
	SME-2	Likely Unimpacted
	SME-3	Likely Unimpacted
2018	SME-1	Unimpacted
	SME-2	Unimpacted
	SME-3	Likely Unimpacted
2019	SME-1	Unimpacted
	SME-2	Unimpacted
	SME-3	Unimpacted
2022	MA1 / W1	Likely Unimpacted
	MA2 / W8	Likely Unimpacted
	E3	Likely Unimpacted

[A] – Historical station SME-1 is comparable to station MA2; Historical station SME-3 is comparable to station MA1 * Some BMI index scores were not calculated by the CASQO calculator because there were too few taxa or organisms; however, a manual calculation or interpretation of these indices, consistent with the CASQO guidance, is presented.

5. CONCLUSIONS

This report described results of a 2022 sediment monitoring effort conducted in the SMRE located on MCBCP. This work was performed on behalf of the MCBCP ES staff as part of their Municipal Watershed Monitoring Program. The MCBCP Municipal Watershed Monitoring program has been in effect since 2009 and specific components, including ambient lagoon (Estuary) monitoring requirements, were outlined in their 2016, Municipal Watershed Monitoring Program Guidebook (MCBCP, 2016). The overall ambient bay monitoring requirement was designed to provide an overview of the Estuary's health and consists of water chemistry, sediment toxicity, sediment chemistry, and benthic infauna sampling. Previous monitoring seasons completed under MCBCP's Municipal Watershed Monitoring Program occurred in 2002-2004, 2005-2006, and 2008-2019 (CDM, 2009; CH2M, 2016; CH2M, 2018; CH2M, 2019).

For 2022, similar to prior years, sediment monitoring efforts were conducted at three (3) locations in the Estuary during the summer index growth period. In keeping with the CASQO MLOE approach and current monitoring requirements under Investigative Order No. R9-2019-0007 (SDRWB, 2019; Weston, 2019a), sediment samples from each location were analyzed for standard sediment quality characteristics, BCA and toxicity testing (SCCWRP 2014; Weston, 2019a & b). An LOE score for each of the three components was calculated for each site and combined to calculate an overall site-specific sediment quality assessment.

The 2022 results are summarized in the following. For the sediment quality/chemistry LOE, all three sites were characterized as "minimal exposure," indicating that exposure to these sediments is unlikely to result in adverse effects to marine organisms. For the BCA LOE, under the CASQO calculations, the three sites were ranked from moderate to high disturbance levels. However, applying the M-AMBI calculation to the BCA LOE evaluation, all three sites were ranked at low level disturbance. For the sediment toxicity LOE, all three sites were classified as non-toxic. Finally, the overall site-specific sediment quality evaluation categorized all three sites as "Likely Unimpacted" using the CASQO guidance or "Unimpacted" applying the M-AMBI approach.

Finally, results of this year's sediment analysis yield similar results to what has been reported previously under the MCBCP Municipal Watershed Monitoring Program. Sediment toxicity has generally been categorized as non-toxic, BCA has been variable, and chemical contamination has been generally categorized as minimal exposure, with the resultant overall sediment quality remaining relatively consistent over the years, with a classification of as either "Unimpacted" or "Likely Unimpacted".

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APPENDIX A – SEDIMENT BENTHIC COMMUNITY REPORT

ECOANALYSTS, INC.

BENTHIC COMMUNITY CONDITION ANALYSIS IN SUPPORT OF THE SANTA MARGARITA RIVER ESTUARY INVESTIGATIVE ORDER (NO. R9-2019-0007) MONITORING AND ASSESSMENT PROGRAM: YEAR 3

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EcoAnalysts Report ID: PG101822.01

All results herein are consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and EcoAnalysts is not responsible for use of less than the complete report. The results summarized in this report apply only to the sample(s) evaluated. This document is uncontrolled when printed or accessed from electronic distribution.

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ACRONYMS AND ABBREVIATIONS

AMBI:	AZTI Marine Biotic Index
BCA:	Benthic Community Analysis
BRI:	Benthic Response Index
CASQO:	California Sediment Quality Objectives
CoC:	Chain of Custody
EG:	Ecological Group
ft:	Feet
IBI:	Index of Biotic Integrity
LOE:	Line of Evidence (in reference to CASQO)
LPTL:	Lowest Practicable Taxon Level
M-AMBI:	Multivariate AZTI Marine Biotic Index
MCBCP:	Marine Corps Base Camp Pendleton
m:	Meter
mm:	Millimeter
NIT:	Negative Indicator Taxa
NIWC PAC:	Naval Information Warfare Center Pacific
PIT:	Positive Indicator taxa
QA/QC:	Quality Assurance / Quality Control
RBI:	Relative Benthic Index
RIVPACS:	River Invertebrate Prediction and Classification System
SCCWRP:	Southern California Coastal Water Research Project
SDI:	Swartz Dominance Index
SMRE:	Santa Margarita River Estuary
TWV:	Taxa Weighted Value

EXECUTIVE SUMMARY

Marine Corps Base Camp Pendleton (MCBCP) is monitoring water quality and biological condition of sediments within the Santa Margarita River Estuary (SMRE) to determine the overall health of the ecosystem as part of a 4-year investigative order (No. R9-2019-0007). As part of the program, a benthic community assessment is to be conducted each year. The results that follow document the third year of the monitoring program.

For Year 3, the benthic community sample collection occurred on July 12, 2022. All samples were collected by personnel from the Energy and Environmental Sciences Group of the Naval Information Warfare Center Pacific (NIWC PAC). A total of nine stations were sampled, with three stations in each of the main estuary locations: below the I-5 bridge (and closest to the mouth), above the Stuart Mesa bridge (and furthest upstream), and between these two bridges. The stations were selected to equally represent each of the three estuary hydrographic regimes. Each infaunal sample was collected using a 4-inch diameter (0.008 m^2) Multi-Substrate Subtidal Sampler (SUBS-Sampler; NC 110686 Patent Pending) and sieved onsite by a representative from EcoAnalysts.

Once processed, specimens from benthic infauna samples were identified to the lowest practicable level by qualified taxonomists and enumerated. Under California Sediment Quality Objectives (CASQO) guidance, benthic community data were analyzed using standard diversity and evenness measures as well as the following indices: the Index of Biotic Integrity (IBI), the Relative Benthic Index (RBI), the Benthic Response Index (BRI), and the River Invertebrate Prediction and Classification System (RIVPACS). The integration of these indices is accomplished by calculating the median value for the four scores, which was then categorized into an overall level of disturbance known as the Integrated Benthic Indicator. Additionally, the data was analyzed using the Multivariate AZTI Marine Biotic Index (M-AMBI) which has been recently calibrated and updated for California estuarine habitats.

Overall, the benthic communities of the 2022 survey had high abundance and moderate taxa richness. Most were dominated by a handful of brackish amphipods. Survey-wide, stations averaged 696 individuals per 0.008 m^2, and ranged from 33 to 1240 individuals per 0.008 m^2. The highest abundance was at station MA2 (above the Stuart Mesa bridge), while the lowest abundance was at station MA1 (nearest the estuary mouth). Station MA2 and MA3 had the highest taxa richness (20 taxa) while station M8 and MA5.5 had the lowest (9 taxa). Similar to prior surveys, the communities that were present were notably different below the I-5 bridge and above the Stuart Mesa bridge. The samples collected closer to the mouth of the estuary contained more mollusks and marine-tolerant taxa while those further upstream above the Stuart Mesa bridge contained stress-tolerant taxa that thrive in brackish conditions.

Of the nine stations, none were categorized at a reference or low level of disturbance based on the CASQO integrated score. Five stations were categorized at a moderate level of disturbance (MA2, MA3, MA4, M8, and MA5) while four stations were of high level of disturbance (MA1, E3, E5, and MA5.5). Similar to prior years, the individual CASQO indices ranged widely in categorization of the stations.

For the Year 3 (2022) dataset, the M-AMBI ranked two stations (E5 and MA5.5) at a reference level, four stations at a low level of disturbance (MA1, MA2, M8, and E3), and three stations at a moderate level of disturbance (MA3, MA4, and MA5). None of the stations were classified as being highly disturbed by the M-AMBI. While both the CASQOs and M-AMBI agreed that stations MA3, MA4, and MA5 were moderately impacted, they disagreed on the level of impact at all other stations, especially at those located above the Stuart Mesa Bridge.

1. INTRODUCTION

As part of a continuing commitment to monitoring and maintaining healthy water quality conditions within the Santa Margarita River Estuary (SMRE), Marine Corps Base Camp Pendleton (MCBCP) evaluates present and future conditions within the estuary to assess if water quality goals are being met. An investigative order (No. R9-2019-0007) was issued by the San Diego Regional Water Quality Control Board in 2019 to monitor water quality and nutrient loading reductions over a 4-year period. Samples were collected by the Energy and Environmental Sciences Group of the Naval Information Warfare Center Pacific (NIWC PAC) at SMRE stations throughout the summer and fall months of 2021 and analyzed for an assortment of nutrient-specific chemistry analytes as well as benthic community condition in accordance with the California Sediment Quality Objectives (CASQO). The biological results for Year 3 of the investigative order monitoring are included in this report.

2. METHODS

2.1 Sample Collection

All sediment samples were collected by representatives from NIWC Pacific and processed onsite by a senior scientist from EcoAnalysts. Nine stations were sampled for benthic community analysis (BCA) on July 12, 2022 (Table 2-1). One sample was collected at each station using a Multi-Substrate Subtidal Sampler (SUBS-Sampler; NC 110686 Patent Pending) with a 4-inch diameter (0.008 m^2) core barrel, as per Bight Regional Monitoring suggestions for brackish estuarine sampling. This sampler design was chosen due to the shallow water depth of the SMRE stations (averaging approximately 1 ft), requiring manual operation which prevented the use of a large grab sampler.

An overview map of all benthic community stations is presented in Figure 2-1 (plotted from station coordinates at time of collection: due to the dynamic nature of the estuary, some stations may appear to be on land). Three stations were sampled from each location within the estuary. Station MA1, MA2, and MA3 were below the I-5 bridge and closest to the mouth of the estuary. Stations E3, E5, and MA5.5 (E7) were furthest upstream and located above the Stuart Mesa Bridge. Stations MA4, M8, and MA5 were located in the middle of the estuary between the two bridges.

Table 2-1: Benthic Community Sample Collection Summary

Location	Station	Latitude (°N)	Longitude (°W)	Depth (ft)	Collection Date	Collection Time
Below I-5 Bridge	MA1	33.23401	-117.41337	1.6	7/12/22	0940
	MA2	33.23546	-117.40857	1.9	7/12/22	1042
	MA3	33.23453	-117.40858	0.8	7/12/22	0910
Between Bridges	MA4	33.23622	-117.4024	1.3	7/12/22	1213
	M8	33.23744	-117.39791	0.5	7/12/22	1303
	MA5	33.23781	-117.39543	2.2	7/12/22	1320
Above Stuart Mesa Bridge	E3	33.23787	-117.39352	1.0	7/12/22	1530
	E5	33.23714	-117.38986	0.7	7/12/22	1500
	MA5.5 (E7)	33.23747	-117.38808	0.8	7/12/22	1442

Figure 2-1: Benthic Community Stations of SMRE

2.2 Sample Processing

After collection, benthic infauna samples were brought to shore and sieved through a 0.5-mm mesh screen to remove sediment fines. All residual sediment, debris, shells, and benthic organisms remaining on the screen were carefully collected into labelled wide-mouth bottles. Samples were "fixed" on-site in 10% buffered formalin and diluted by seawater to create a 5% formalin preservative. The benthic samples were stored at ambient temperature throughout transit and shipped to the EcoAnalysts benthic laboratory in Moscow, ID.

2.3 Benthic Sample Sorting and Taxonomy

Benthic samples arrived at the Moscow EcoAnalysts facility in good condition. All benthic samples were processed by EcoAnalysts using the CASQO and Bight 2018 protocols for identification of benthic macroinvertebrates (SCCWRP 2014 and 2018). At the laboratory, samples were transferred to 70% ethanol for long-term preservation and storage. The sorting process entailed placing small quantities of sample in a petri dish, removing all organisms under a dissecting microscope, and placing them into vials according to major taxon categories (e.g. mollusks, crustaceans, annelids, etc.). This process was continued until 100% of the sample was sorted. Sorted material was then transferred back to the original sample container and underwent a quality assurance (QA) check to control for thoroughness and consistency in sample sorting. During the sorting QA, 10% of each sample was re-sorted to ensure a 95% organism removal efficacy. This sorting review was performed by staff who did not initially sort the sample.

All specimens were identified by qualified taxonomists to the lowest practicable taxonomic level (LPTL) and enumerated (SCAMIT 2021). In most cases this was genus or species level; those organisms identified to a higher taxonomic level were due to a qualifier, such as damage or immaturity of the specimen. As a quality control (QC) check, a full taxonomic re-analysis of two samples was performed by taxonomists who did not originally identify the organisms. Any significant identification discrepancies and their resolutions were noted in the QC report. If taxonomy results between the original and QC IDs were >10% different, a reconciliation between the taxonomists occurred. All benthic data and results of the taxonomy QC are presented in Appendix A.

2.4 Statistical Analysis

All benthic data were reviewed for adherence to the CASQO Line of Evidence (LOE) framework. CASQO statistical analyses and calculations were performed using the Data Integration Tool v. 5.7 and the RIVPACS Benthic Index Calculator Tool, both of which are available through the Southern California Coastal Water Research Project (SCCWRP) website (www.sccwrp.org). These calculators categorize and compare the data with a SCCWRP reference database based on sample location (latitude and longitude) as well as collection depth. Diversity and evenness indices were calculated using PRIMER v. 7 software (Clarke and Gorley 2015) whereas dominance scores were calculated in Excel. An additional Multivariate AZTI Marine Biotic Index (M-AMBI) analysis was conducted using the newly developed R software script calibrated to CASQO conditions (Gillett et al. 2019) and using R v. 4.0.3 (R Core Team 2020). This script is available for download through the SCCRP website.

Prior to any statistical analysis, all benthic identifications with qualifiers (such as from damaged or juvenile specimens lacking key identifying features) and which were marked as "non-distinct" taxa by the taxonomists were aggregated with similar or higher-level taxa to avoid artificial inflation of community richness and diversity indices. All epifauna, such as corals or sponges, were noted if present (annotated as "large/rare" in the dataset) but not included in any statistical analyses.

2.4.1 SQO Benthic Community Condition

The LOE for determination of benthic community condition closely followed CASQO guidance and was investigated using four indices: the Index of Biotic Integrity (IBI), the Relative Benthic Index (RBI), the Benthic Response Index (BRI), and the River Invertebrate Prediction and Classification System (RIVPACS). The outcome of these independent indices characterizes the sample into one of four categories of disturbance: Reference, Low, Moderate, and High. An integrated result from these four indices is created by calculating the median value of the four category scores. This creates one categorical value known as the Integrated Benthic Indicator. If this score falls between two categories, the value is rounded up to the next highest integer, as per SQO guidance (SCCWRP 2014).

2.4.1.1 Index of Biotic Integrity

The IBI compares four metrics for a sample against the ranges as expected under reference conditions (Table 2-2). A sample metric that falls outside of its reference range is given a score of 1, while those that are within range are given a score of 0. The sum value of these four metrics indicates the level of disturbance for a sample (Table 2-3).

Table 2-2: IBI Metrics and Reference Ranges

Metric	Reference Range
Total Number of Taxa	13 to 99
Number of Mollusk Taxa	2 to 25
Abundance of *Notomastus sp.*	0 to 59
Percentage of Sensitive Taxa	19 to 47.1

Table 2-3: IBI Score Thresholds

IBI Score	Category	Category Score
0	Reference	1
1	Low Disturbance	2
2	Moderate Disturbance	3
3 or 4	High Disturbance	4

2.4.1.2 Relative Benthic Index

The RBI compares a weighted sum of multiple community metrics with the sample abundance of positive indicator taxa (PIT; *Monocorophium insidiosum*, *Asthenothaerus diegensis*, and *Goniada littorea*) which are typically found in healthier habitats and the presence/absence of negative indicator taxa (NIT; *Capitella capitata* complex and Oligochaeta) which are more tolerant of stressful conditions within impacted areas. The results are compared against predictive disturbance level categories. Prior to calculations, the taxa richness and abundance data per sample is normalized in relation to the habitat and the values are scaled accordingly. These scaled metrics are combined to create a Taxa Weighted Value (TWV). Samples that contain the NIT in any abundance receive a -0.1 NIT value for each NIT taxa present (if both NIT are present, the NIT value = -0.2). The PIT value is obtained through the following equation (where *N* is abundance):

$$PIT = \frac{\sqrt[4]{N_{M.insidiosum}}}{\sqrt[4]{473}} + \frac{\sqrt[4]{N_{A.diegensis}}}{\sqrt[4]{27}} + \frac{\sqrt[4]{N_{G.littorea}}}{\sqrt[4]{15}}$$

Using these values, the Raw RBI score is then calculated and converted to a final RBI Score, which is compared against the RBI disturbance level categories (Table 2-4):

$$Raw\ RBI\ =\ TWV\ +\ NIT\ +\ (2\ \times\ PIT)$$

$$RBI\ Score\ =\ \frac{Raw\ RBI\ -\ 0.03}{4.69}$$

Table 2-4: RBI Score Thresholds

RBI Score	Category	Category Score
> 0.27	Reference	1
> 0.16 - ≤ 0.27	Low Disturbance	2
> 0.08 - ≤ 0.16	Moderate Disturbance	3
≥ 0.08	High Disturbance	4

2.4.1.3 Benthic Response Index

The BRI weighs the abundance of pollution-tolerant taxa within a sample against the predictive disturbance level categories. The pollution tolerance score (*P*) is obtained for each species using the most current literature (SCCWRP Species List 2022). The BRI score is then calculated with the following equation:

$$BRI\ Score = \frac{\sum(\sqrt[4]{N_i}\ \times\ P_i)}{\sum \sqrt[4]{N_i}}$$

Where *N* is abundance of a species (*i*). This score is compared against the BRI disturbance level categories to determine level of community impact (Table 2-5).

Table 2-5: BRI Score Thresholds

BRI Score	Category	Category Score
< 39.96	Reference	1
≥ 39.96 - < 49.15	Low Disturbance	2
≥ 49.15 - < 73.27	Moderate Disturbance	3
≥ 73.27	High Disturbance	4

2.4.1.4 River Invertebrate Prediction and Classification System

The RIVPACS is a predictive model that compares the number of observed taxa present (*O*) in a sample to that expected (*E*) under minimal disturbance conditions (i.e. reference locations). This is done in a three-step calculation. First, the model determines the probability of the test sample belonging to a reference sample group from one of twelve Southern California marine bays due to physical features (such as depth, latitude, and longitude). Second, the taxa and abundance lists are determined for the expected (*E*) sample community based on the distribution of reference taxa as well as the probabilities calculated in the first step. Lastly, the observed number of reference taxa (*O*) in the test sample is counted and the *O/E* (Observed/Expected) RIVPACS score is calculated. This value is then compared to disturbance level categories (Table 2-6).

Table 2-6: RIVPACS Score Thresholds

RIVPACS Score	Category	Category Score
> 0.90 - < 1.10	Reference	1
> 0.74 - ≤ 0.90 or ≥ 1.10 - < 1.26	Low Disturbance	2
> 0.32 - ≤ 0.74 or ≥ 1.26	Moderate Disturbance	3
≤ 0.32	High Disturbance	4

2.4.2 Diversity and Evenness Indices

In addition to taxa richness (the number of unique taxa in a sample) and total abundance (the sum of organisms in a sample), three standard biodiversity measures were used to calculate benthic community diversity and evenness: the Shannon-Wiener Diversity Index, Pielou's Evenness Index, and Swartz Dominance Index.

2.4.2.1 Shannon-Wiener Diversity Index

This index is a quantitative measure of the biodiversity within a sample based on the number of different types of species (taxa) that occur. The result of this diversity index increases both when abundance and evenness increases. The measure is depicted as H' and is calculated based on the following formula:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

Where *R* is the richness of the dataset in terms of total number of different taxa, p_i is the proportion of individuals belonging to the *ith* species in the dataset.

2.4.2.2 Pielou's Evenness Index

Evenness is a measure of biodiversity that quantifies how equivalent the community is numerically. The evenness index (*J'*) describes how close in abundance each species is within a given taxonomic group for a given sample. The evenness of a population can be represented by Pielou's evenness index:

$$J' = \frac{H'}{\log_e S}$$

Where *S* is abundance of organisms and *H'* is Shannon-Wiener diversity. *J'* is constrained between 0 and 1, with more evenly distributed communities having higher *J'* values.

2.4.2.3 Swartz Dominance Index

Swartz Dominance Index (SDI) is a community evenness index that ranks taxa accounting for 75% of a sample's total abundance (taxa ranked from most to least abundant, with the first taxon for which the cumulative percentage is greater than 75% is the last organism included). The higher the SDI value, the less likely a community is experiencing stress.

2.4.3 M-AMBI Analyses

In an effort to determine whether community effects as deemed by the CASQOs are due to potentially anthropogenic disturbance or are environmentally driven, an additional analysis was conducted on Year 3 data. This Multivariate AZTI Marine Biotic Index (M-AMBI) is a benthic community index more suitable for dynamic estuaries such as SMRE. Commonly used in European surveys and recently calibrated for West Coast waters (Gillet et al. 2015, Pelletier et al. 2018, and Gillett et al. 2019), the M-AMBI is more inclusive of benthic assemblages unique to lower saline environments and those in which a natural salinity gradient is present. It is also designed for continental-scale applicability.

Each taxon in a sample is assigned an Ecological Group (EG) from I to V that corresponds to its tolerance level. The EG reference database was recalibrated for US and West Coast taxa (Gillett et al. 2015) and employed for AZTI Marine Biotic Index (AMBI) scoring. The AMBI score is a calculation based on the abundance of taxa within each EG (Borja et al. 2000). The M-AMBI is then a weighted tolerance index that combines a site's diversity, richness, and AMBI score via a factor analysis and compared to salinity-driven thresholds to create a M-AMBI score ranging from 0 (bad) to 1.0 (good). This score is then categorized to determine a site's condition and level of disturbance (Table 2-7). For the SMRE monitoring program, the updated M-AMBI condition categories that are "CASQO compatible" were used (Gillett et al. 2019).

Salinity inputs for each station were 24-hr averages taken over the BCA collection period during a full tidal cycle from the nearest water quality monitoring station to capture extremes in salinity exposure within the estuary (Table 2-8). Taxa that did not have EG values assigned at the species level were bumped back to genus level if an EG value was available.

Table 2-7: M-AMBI Score Thresholds

M-AMBI Score	Category
≥ 0.58	Reference
< 0.58 - ≥ 0.48	Low Disturbance
< 0.48 - ≥ 0.39	Moderate Disturbance
< 0.39	High Disturbance

Table 2-8: M-AMBI Salinity Inputs

Station	Avg 24-hr Salinity (ppt)	Water Quality Monitoring Station Location
MA1	32.1	Estuary Mouth (MA1)
MA2	34.2	I-5 Bridge
MA3		
MA4		
M8	31.0	Stuart Mesa Bridge
MA5		
E3		
E5	17.4	Farthest Upstream (MA5.5)
MA5.5 (E7)		

3. BENTHIC COMMUNITY RESULTS

The CASQO analysis of community condition, univariate results from the benthic community metrics, and M-AMBI results are presented in the following sections. The taxonomy QC samples passed, achieving an average 95.8-97.7% similarity between the original and QC identifications. All benthic community data, metrics, and taxonomy QC results are presented in Appendix A while the sample Chain of Custody (CoC) is provided in Appendix B.

3.1 Diversity and Evenness Indices

The total abundance of organisms, taxa richness, and community composition indices were calculated for each station (Table 3-1). Abundance ranged from 33 to 1240 individuals per 0.008 m^2, with station MA2 being the most abundant and station MA1 being the least. The average abundance across all stations was 696 individuals per 0.008 m^2.

Station MA2 and MA3 had 20 taxa per 0.008 m^2, which was the highest taxa richness in the survey. Station M8 and MA5.5 had the lowest taxa richness (9 taxa per 0.008 m^2). The average richness across all stations was 14 taxa. Diversity ranged from a score of 1.16 (station MA4) to 1.80 (station E5 and MA5.5). Dominance scores were similar at most stations, generally measuring 3 to 4. Stations MA3 and MA4 had the lowest dominance with a score of 2.

Table 3-1: Diversity, Taxa Richness, and Evenness Results for SMRE Stations

	Stations								
	Below I-5 Bridge			Between Bridges			Above Stuart Mesa Bridge		
Benthic Community Index	**MA1**	**MA2**	**MA3**	**MA4**	**M8**	**MA5**	**E3**	**E5**	**MA5.5 (E7)**
Total Abundance (no of indiv. per 0.008 m^2)	33	1240	369	466	729	1176	678	1071	500
Richness (no of taxa per 0.008 m^2)	12	20	20	16	9	12	15	12	9
Shannon-Wiener Diversity	1.75	1.54	1.19	1.16	1.42	1.45	1.77	1.80	1.80
Pielou's Evenness	0.70	0.51	0.40	0.42	0.65	0.58	0.65	0.73	0.82
Swartz Dominance	4	3	2	2	3	3	4	4	4

3.2 Community Condition Indices and CASQO Line of Evidence

All four indices in the CASQO LOE scored all stations with a broad range of disturbance levels from reference to high disturbance (Table 3-2 through Table 3-4). The Integrated Benthic Indicator summarizes the four index results into one category by calculating the median of the four category scores. None of the SMRE survey stations were categorized at a reference or low level of disturbance.

Five stations were categorized at a moderate level of disturbance (MA2, MA3, MA4, M8, and MA5) while four stations were of a high level of disturbance (MA1, E3, E5, and MA5.5).

Table 3-2: CASQO Metrics for Stations Below I-5 Bridge

		Station		
Benthic Community Index		**MA1**	**MA2**	**MA3**
IBI	**Score**	2	1	0
	Disturbance Category	Moderate	Low	Reference
RBI	**Score**	0.05	0.58	0.10
	Disturbance Category	High	Reference	Moderate
BRI	**Score**	47.44	66.52	68.43
	Disturbance Category	Low	Moderate	Moderate
RIVPACS	**Score**	0.19	0.52	0.69
	Disturbance Category	High	Moderate	Moderate
Integrated Benthic Indicator (Overall Disturbance)		**High**	**Moderate**	**Moderate**

Table 3-3: CASQO Metrics for Stations Between Bridges

		Station		
Benthic Community Index		**MA4**	**M8**	**MA5**
IBI	**Score**	1	1	1
	Disturbance Category	Low	Low	Low
RBI	**Score**	0.07	0.40	0.50
	Disturbance Category	High	Reference	Reference
BRI	**Score**	68.52	116.27	91.31
	Disturbance Category	Moderate	High	High
RIVPACS	**Score**	0.57	0.38	0.38
	Disturbance Category	Moderate	Moderate	Moderate
Integrated Benthic Indicator (Overall Disturbance)		**Moderate**	**Moderate**	**Moderate**

Table 3-4: CASQO Metrics for Stations Above Stuart Mesa Bridge

		Station		
Benthic Community Index		**E3**	**E5**	**MA5.5 (E7)**
IBI	**Score**	3	2	3
	Disturbance Category	High	Moderate	High
RBI	**Score**	0.25	0.46	0.24
	Disturbance Category	Low	Reference	Low
BRI	**Score**	77.80	95.15	92.67
	Disturbance Category	High	High	High
RIVPACS	**Score**	0.38	0.19	0.38
	Disturbance Category	Moderate	High	Moderate
Integrated Benthic Indicator (Overall Disturbance)		**High**	**High**	**High**

3.3 M-AMBI Results

For the Year 3 dataset, M-AMBI consistently scored with a range of conditions (Table 3-5). Those furthest upstream (E5 and MA5.5) were classified as reference. The stations closest to the mouth of the estuary (MA1 and MA2) as well as one station in the middle of the estuary (M8) and one upstream station (E3) were categorized at a low level of disturbance. Stations MA3, MA4, and MA5 were classified as having moderate disturbance. None of the stations were scored at a high disturbance level.

Table 3-5: M-AMBI Results for Year 3 Dataset

		Year 3 (2022)	
		M-AMBI Score	**M-AMBI Condition**
Station	**MA1**	0.53	Low Disturbance
	MA2	0.53	Low Disturbance
	MA3	0.44	Moderate Disturbance
	MA4	0.42	Moderate Disturbance
	M8	0.54	Low Disturbance
	MA5	0.47	Moderate Disturbance
	E3	0.52	Low Disturbance
	E5	0.78	Reference
	MA5.5 (E7)	0.67	Reference

4. DISCUSSION

Similar to the Year 2 2021 survey, the Year 3 survey resulted in a high abundance at all but one station (MA1) with a moderate level of taxa richness at all stations. Most communities were somewhat evenly composed with the exception of MA3 and MA4. These stations were dominated by only two taxa. There was little agreement between the CASQO indices for SMRE stations located throughout the estuary; most stations were assigned a mixture of disturbance categories for the same sample (such as Reference, Low Disturbance, and High Disturbance). In Year 3, the CASQO Integrated Benthic Indicator for all stations is above the "bad" threshold of moderate to high disturbance (Figure 4-1). None of the stations were classified under the "good" threshold of reference to low disturbance. Overall, CASQO results were similar to those seen in the Year 1 survey.

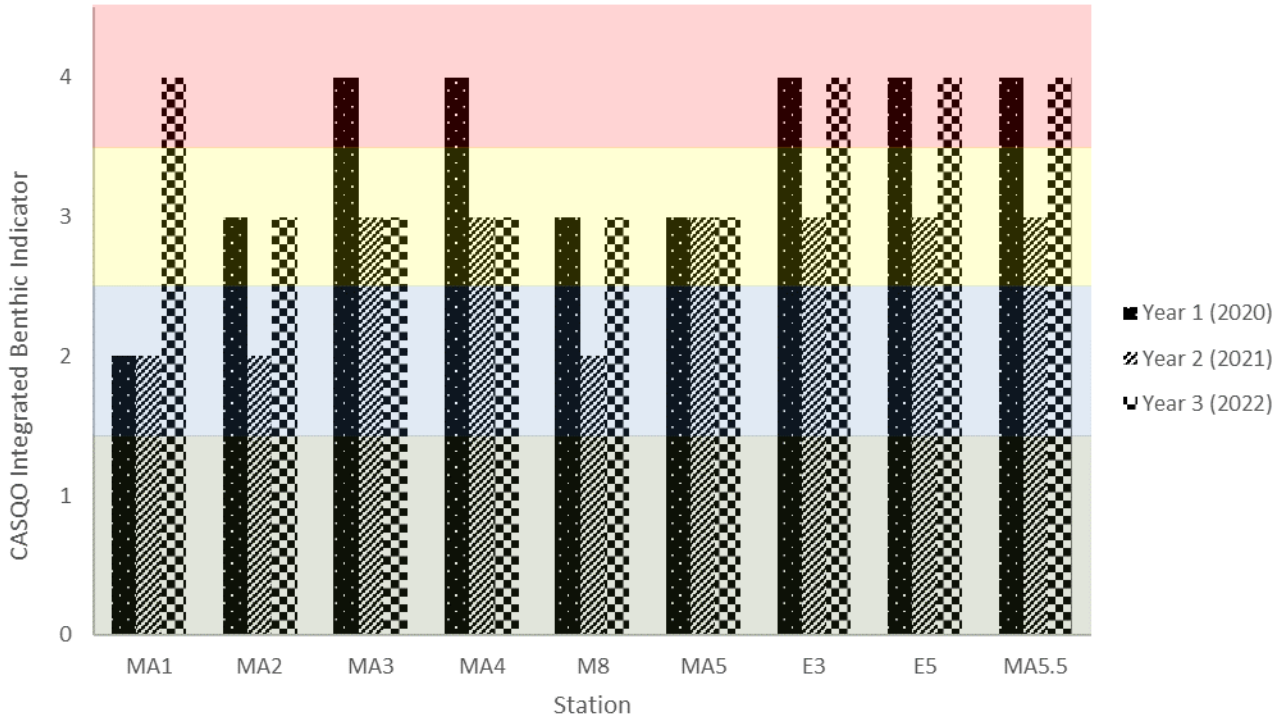

Figure 4-1: CASQO Integrated Benthic Indicator Rankings and Condition Categories for SMRE Stations in Years 1 through 3

(Red: High Disturbance, Yellow: Moderate Disturbance, Blue: Low Disturbance, Green: Reference)

It's important to note that the CASQO benthic indices are currently calibrated for only two California habitat types: San Francisco polyhaline and southern California marine bays (SCCWRP 2014). The Santa Margarita Estuary is neither of these and is a dynamic watershed that experiences a range of temperatures and salinities within a small area. As such, the SMRE survey benthic dataset was compared against reference communities of which it has little similarity. Additional multivariate analyses (M-AMBI) were thus conducted to provide another line of evidence alongside the CASQOs that may be more applicable to the dynamic estuarine environment these communities are a component of. Similar to Years 1 and 2, this approach was conducted on this year's dataset (Year 3) to provide consistency across the multiyear program (Figure 4-2).

The M-AMBI ranked all but three of the 2022 Year 3 stations into higher disturbance categories than the Year 2 2021 survey (Figure 4-2). However, few stations were categorized within the "bad" threshold of moderate to high disturbance, with the exception of MA3, MA, and MA5 (none of which were classified as highly disturbed). All three of the stations above the Stuart Mesa Bridge (E3, E5 and MA5.5) improved over the Year 1 2020 survey, two of which (E5 and MA5.5) are classified at a reference level. In addition, the M-AMBI consistently categorized stations at a lower level of disturbance than the CASQOs (Table 4-1). In the Year 3 survey, stations MA3, MA4, and MA5 were the only stations to be similarly categorized by M-AMBI and the CASQOs at a moderate disturbance level.

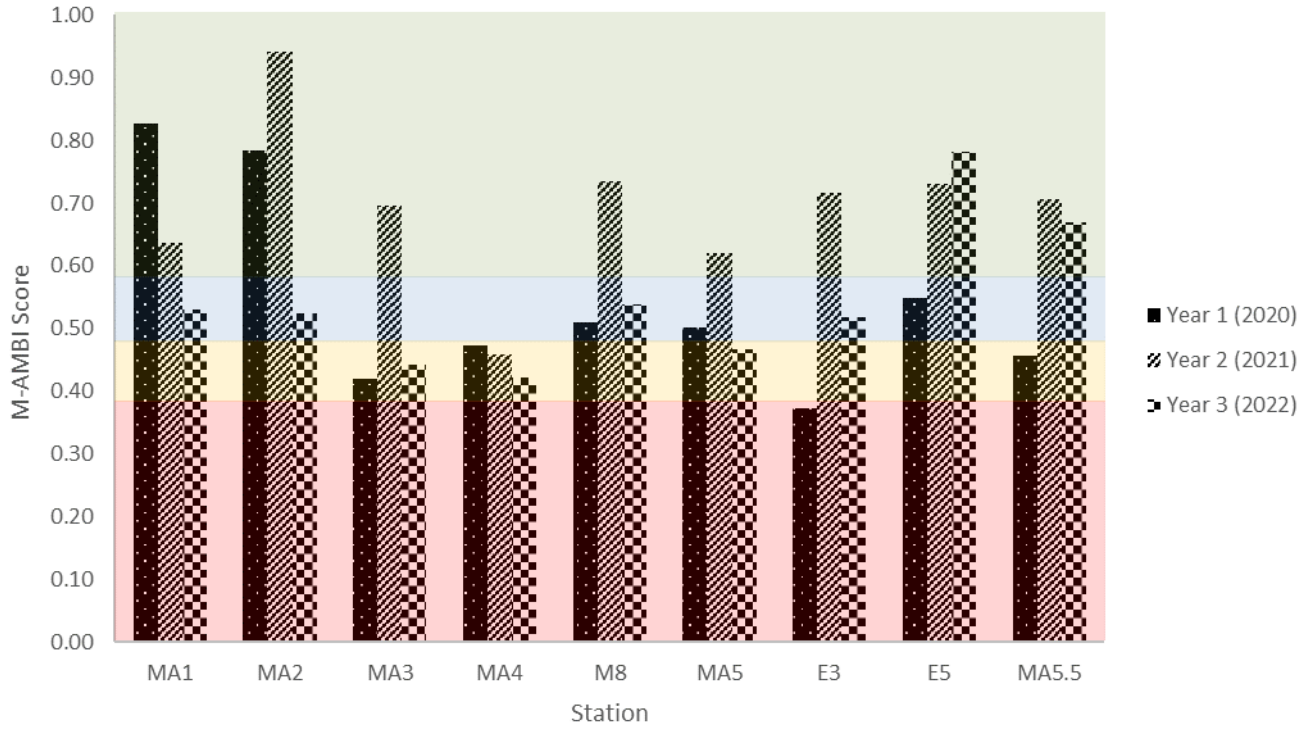

Figure 4-2: M-AMBI Scores and Condition Categories for SMRE Stations in Years 1 through 3
(Red: High Disturbance, Yellow: Moderate Disturbance, Blue: Low Disturbance, Green: Reference)

Table 4-1: M-AMBI vs CASQO Condition Categories for Year 3 (2022)

		Year 3 (2022)	
		M-AMBI Condition Category	**CASQO Condition Category**
Station	**MA1**	Low Disturbance	High Disturbance
	MA2	Low Disturbance	Moderate Disturbance
	MA3	Moderate Disturbance	Moderate Disturbance
	MA4	Moderate Disturbance	Moderate Disturbance
	M8	Low Disturbance	Moderate Disturbance
	MA5	Moderate Disturbance	Moderate Disturbance
	E3	Low Disturbance	Moderate Disturbance
	E5	Reference	High Disturbance
	MA5.5 (E7)	Reference	High Disturbance

Similar to prior surveys, the community compositions of the three sampling areas in the estuary in Year 3 were noticeably different from one another. Below the I-5 bridge, stations contained more marine-tolerant taxa and mollusks than stations furthest upstream, with the additional appearance of the brackish amphipods *Grandidierella japonica*, *Monocorphium acherusicum*, and *Monocorphium insidiosum*. Stations MA2 and MA3 contained the highest number of taxa in this year's survey with communities composed of different polychaete taxa, mollusks, crustaceans, and other taxa groups. Stations that were furthest upstream above the Stuart Mesa bridge contained organisms more tolerant of brackish conditions, including *Trionia imitator* (a small brackish snail), *Capitella capitata* (an opportunistic, sedentary polychaete that is tolerant of stressful conditions), *M. insidiosum*, and *Cerithidea californica* (a common marine snail found in salt marshes and tidal flats in California). Stations located between both bridges contained a mix of marine and brackish taxa that were more common to upstream locations and were dominated by *G. japonica*, *C. capitata*, *M. insidiosum*, and *C. californica*. Clusters of small sea anemones were collected at stations in both the middle of the estuary as well as those above the Stuart Mesa Bridge. Overall, these results mirror those obtained from previous surveys in which the communities were symptomatic of a strong salinity gradient, with higher numbers of taxa that are more tolerant of large swings in conductivity thriving upstream.

The high numbers of oligochaetes present at most stations between both bridges as well as those above the Stuart Mesa Bridge may contribute to the moderate to high disturbance rankings expressed by the CASQOs, as all oligochaetes are numerically considered to be tolerant taxa via SCCWRP protocol and are thus left at the subclass level of Oligochaeta (SCCWRP 2014). The calibrated M-AMBI drops this higher-level taxon due to the abundance of both tolerant and intolerant oligochaete species within transitional ecosystems.

5. CONCLUSION

Most of the stations sampled in the Year 3 SMRE survey had high abundance and a moderate taxa richness. Benthic assemblages were dominated at most stations by brackish amphipods. The CASQOs categorized most stations in the Year 3 survey at a moderate level of disturbance and four stations (MA1, E3, E5, and MA5.5) at a high level of disturbance. The M-AMBI ranked the stations furthest upstream (E5 and MA5.5) at a reference level. Stations located closest to the mouth of the estuary (MA1 and MA2) were of low disturbance while those located in the middle of the estuary were a mix of low to moderate disturbance.

For the Year 3 dataset, the M-AMBI results agreed with the CASQO ranking at three stations (MA3, MA4, and MA5) with a moderate level of disturbance. All other stations were consistently categorized lower in disturbance than the CASQOs, however.

Similar to previous years, the westernmost sampling area below the I-5 bridge and those upstream above the Mesa Stuart bridge contained different benthic communities in the Year 3 survey, with westernmost stations being composed primarily of marine polychaetes, crustaceans and mollusks while stations in eastern part of the estuary contained high numbers of opportunistic brackish water crustaceans and stress-tolerant taxa (such as oligochaetes, the polychaete *Capitella capitata* and the amphipod *Monocorphium insidiosum)*.

6. REFERENCES

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APPENDIX A

Benthic Community Data

Benthic Indices

Taxonomy QC Report

ECO ANALYSTS, INC.
LIFE IN WATER

2022 Taxa List with EG Assignments

Taxa Group	Taxa	Ecological Group (EG) via Gillett 2015 and Gillett 2019	EXCLUDE from Dataset Entirely (not relevant to benthic community)	MA1	MA2	MA3	MA4	M8	MA5	E3	E5	MA 5.5 (E7)
Annelida	Armandia brevis	IV		1	0	1	0	0	0	0	0	0
	Boccardiella hamata	III		0	0	1	0	0	0	0	0	0
	Capitella capitata Complex	IV		0	0	0	0	1	197	107	275	119
	Caulleriella hamata	NOT ASSIGNED		0	1	0	0	0	0	0	0	0
	Caulleriella pacifica	II		0	0	0	1	0	0	0	0	0
	Ctenodrilus sp.	NOT ASSIGNED		0	0	0	2	0	0	0	0	0
	Dorvilleidae	NOT ASSIGNED		0	0	0	0	0	1	0	1	0
	Hesionura elongata	II		1	0	0	0	0	0	0	0	0
	Mediomastus ambiseta	IV		0	3	0	0	0	0	0	0	0
	Mediomastus sp.	III		0	0	4	0	0	0	0	0	0
	Oligochaeta	EXCLUDE		0	0	0	6	0	153	215	0	133
	Orbinia johnsoni	I (as Orbinia)		1	0	0	0	0	0	0	0	0
	Piscicolidae	NOT ASSIGNED		0	0	0	0	0	0	0	3	0
	Polydora cirrosa	II		0	0	0	0	0	9	167	115	55
	Prionospio sp.	III		17	2	1	0	0	0	0	0	0
	Pseudopolydora paucibranchiata	IV		0	1	0	0	0	0	0	0	0
	Scoletoma sp.	II		0	2	0	0	0	0	0	0	0
	Scoloplos acmeceps	I		0	0	0	5	0	0	0	0	0
	Spio filicornis	III		0	0	1	0	0	0	0	0	0
	Spiophanes duplex	III		0	0	2	0	0	0	0	0	0
	Spirorbinae	NOT ASSIGNED		0	175	0	0	0	0	0	0	0
Bivalvia	Bivalvia	NOT ASSIGNED		2	1	10	5	0	0	0	0	0
	Cryptomya californica	II		1	0	0	0	0	0	0	0	0
	Laevicardium substriatum	II		0	0	1	0	0	0	0	0	0
	Modiolus modiolus	II		0	21	0	0	0	0	0	0	0
	Solen rostriformis	II		0	0	0	1	0	0	0	1	0
	Venerupis philippinarum	III		0	0	1	0	0	0	0	0	0
Gastropoda	Acteocina inculta	II		0	0	1	4	1	0	0	0	0
	Acteocina sp.	II		0	0	0	0	0	0	1	0	55
	Bulla gouldiana	I		0	0	0	0	0	5	0	0	0
	Cerithidea californica	II		0	0	3	4	47	109	78	47	78
	Gastropoda	NOT ASSIGNED		0	1	0	3	2	0	3	0	5
	Haminoea sp.	II		0	1	0	0	0	0	0	0	0
	Mytilus edulis complex	III (as Mytilus edulis)		0	0	0	0	0	0	0	2	0
	Truncatelloidea	NOT ASSIGNED		0	0	0	0	0	24	0	0	0
	Tryonia imitator	I (as Tryonia)		0	0	0	0	0	0	0	62	0
Crustacea	Ericthonius brasiliensis	II		0	137	0	0	0	6	0	0	0
	Grandidierella japonica	III		5	14	240	201	29	26	1	77	2
	Mayerella acanthopoda	II		0	1	1	0	0	0	0	0	0
	Monocorophium acherusicum	III		1	205	84	222	0	0	0	0	0
	Monocorophium insidiosum	III		0	624	0	0	254	627	51	355	49
	Oxyurostylis pacifica	I		1	0	0	0	0	0	0	0	0
	Pachygrapsus crassipes	NOT ASSIGNED		0	0	0	0	0	0	1	0	0
	Paradexamine sp.	III		0	9	0	0	0	1	0	0	0
	Podocerus cristatus	III		0	3	0	0	0	0	0	0	0
	Pontogeneia inermis	NOT ASSIGNED		1	23	3	3	220	18	6	23	4
	Rudilemboides stenopropodus	II		0	0	0	1	0	0	0	0	0
Other Organisms	Actiniaria	NOT ASSIGNED		0	0	3	6	174	0	40	110	0
	Branchiostoma californiense	I		1	0	0	0	0	0	0	0	0
	Leptosynapta sp.	II		0	0	0	1	0	0	0	0	0
	Lineidae	II		0	0	0	0	0	0	5	0	0
	Maculaura alaskensis Cmplx	II		0	13	6	0	0	0	1	0	0
	Nematoda	III	Yes (meiofauna)	3	50	17	4	0	0	0	0	0
	Nemertea	EXCLUDE		0	0	0	0	1	0	0	0	0
	Paranemertes californica	III		0	0	1	1	0	0	1	0	0
	Parviplana hymani	NOT ASSIGNED		1	0	3	0	0	0	0	0	0
	Phoronis sp.	II		0	0	2	0	0	0	0	0	0
	Stylochus exiguus	NOT ASSIGNED		0	3	0	0	0	0	0	0	0
	Zygonemertes virescens	II		0	0	0	0	0	0	1	0	0
	RAW ABUNDANCE			**36**	**1290**	**386**	**470**	**729**	**1176**	**678**	**1071**	**500**
	ADJUSTED ABUNDANCE			**33**	**1240**	**369**	**466**	**729**	**1176**	**678**	**1071**	**500**
	RICHNESS			**12**	**20**	**20**	**16**	**9**	**12**	**15**	**12**	**9**
	DOMINANCE			**4**	**3**	**2**	**2**	**3**	**3**	**4**	**4**	**4**

PG - Stetson Santa Margarita Estuary 2020-2023

EcoAnalysts, Inc.
LIFE IN WATER

	Below I-5 Bridge			Between Bridges			Above Stuart Mesa Bridge		
Sample ID	**MA1**	**MA2**	**MA3**	**MA4**	**M8**	**MA5**	**E3**	**E5**	**MA5.5**
Time	**940**	**1042**	**910**	**1213**	**1303**	**1320**	**1530**	**1500**	**1442**
Collection Date	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**	**07-12-2022**
Percent Subsampled	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
EcoAnalysts Sample ID	**8235.2-2**	**8235.2-3**	**8235.2-1**	**8235.2-4**	**8235.2-5**	**8235.2-6**	**8235.2-9**	**8235.2-8**	**8235.2-7**
CASQO Benthos Metrics									
BRI Score	47.44	66.52	68.43	68.52	116.27	91.31	77.80	95.15	92.67
BRI Category	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance
IBI Score	2	1	0	1	1	1	3	2	3
IBI Category	Moderate Disturbance	Low Disturbance	Reference	Low Disturbance	Low Disturbance	Low Disturbance	High Disturbance	Moderate Disturbance	High Disturbance
RBI Score	0.05	0.58	0.10	0.07	0.40	0.50	0.25	0.46	0.24
RBI Category	High Disturbance	Reference	Moderate Disturbance	High Disturbance	Reference	Reference	Low Disturbance	Reference	Low Disturbance
RIVPACS Score	0.19	0.52	0.69	0.57	0.38	0.38	0.38	0.19	0.38
RIVPACS Category	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance
Integrated Benthic Indicator	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	High Disturbance	High Disturbance

Year 3 (2022) Benthic Community Evenness and Diversity

	Evenness	Diversity
MA1	0.70	1.75
MA2	0.51	1.54
MA3	0.40	1.19
MA4	0.42	1.16
M8	0.65	1.42
MA5	0.58	1.45
E3	0.65	1.77
E5	0.73	1.80
MA5.5	0.82	1.80

Year 3 2022 M-AMBI Output via R

	StationID	Replicate	SampleDate	Latitude	Longitude	SalZone	AMBI_Score	MAMBI_Score	Orig_MAMBI_Condition	New_MAMBI_Condition	Use_MAMBI	Use_AMBI	YesEG
1	MA1	1	7/12/2022	33.23401	-117.4134	WEH	2.318181818	0.53	Good	Low Disturbance	Yes	Yes	87.87879
2	MA2	1	7/12/2022	33.23546	-117.4086	WEH	2.299596774	0.525	Moderate	Low Disturbance	Yes	Yes	83.54839
3	MA3	1	7/12/2022	33.23453	-117.4086	WEH	2.792682927	0.442	Moderate	Moderate Disturbance	Yes	Yes	94.85095
4	MA4	1	7/12/2022	33.23622	-117.4024	WEH	2.845493562	0.422	Moderate	Moderate Disturbance	Yes	Yes	95.92275
5	M8	1	7/12/2022	33.23744	-117.3979	WEH	1.263374486	0.539	Good	Low Disturbance	Yes	Not Recommended	45.40466
6	MA5	1	7/12/2022	33.23781	-117.3954	WEH	2.607142857	0.467	Moderate	Moderate Disturbance	Yes	With Care	79.59184
7	E3	1	7/12/2022	33.23787	-117.3935	WEH	2.685840708	0.519	Moderate	Low Disturbance	Yes	With Care	76.10619
8	E5	1	7/12/2022	33.23714	-117.3899	MH	1.443977591	0.781	High	Reference	Yes	With Care	55.7423
9	MA5.5	1	7/12/2022	33.23747	-117.3881	MH	2.466	0.669	Good	Reference	Yes	With Care	74.4

Stetson Santa Margarita Benthos 2022
Sort Report

EcoAnalysts, Inc.
LIFE IN WATER

EcoA Sample ID	Sample ID	Collection Date	Sorter	% Subsampled	Primary Matrix	Estimated Pre-Rinse Volume (L)	Estimated Post-Rinse Volume (L)	QC Sorter	Estimated %Efficacy
8235.2-1	MA3	07/12/2022	C. Barrett	100	Fine Organic	1.61	0.01	C. Barbour	100
8235.2-2	MA1	07/12/2022	C. Barrett	100	Fine Organic	1.4	0.5	C. Barbour	100
8235.2-3	MA2	07/12/2022	C. Barrett	100	Vegetation	0.24	0.12	C. Barbour	98.93
8235.2-4	MA4	07/12/2022	C. Barrett	100	Inorganic	1.15	0.01	C. Barbour	100
8235.2-5	M8	07/12/2022	M. Reuscher	100	Filamentous Al	0.13	0.08	C. Barbour	97.37
8235.2-6	MA5	07/12/2022	C. Bertolli	100	Coarse Organi	0.46	0.13	C. Barbour	98.26
8235.2-7	MA5.5	07/12/2022	C. Bertolli	100	Filamentous Al	2	0.1	C. Barbour	100
8235.2-8	E5	07/12/2022	C. Bertolli	100	Filamentous Al	2.45	0.1	C. Barbour	96.53
8235.2-9	E3	07/12/2022	C. Bertolli	100	Coarse Organi	1.55	0.1	C. Barbour	96.12

EcoAnalysts, Inc.
LIFE IN WATER

Taxonomy ID QC Percent Similarity

8235.2-2 Comparison Date: 10/11/2022 11:14:25

Component: Crustacea

Collection Date	Sample ID	Time
07/12/2022	MA1	940

			Original Taxonomist - D. Drumm				QC Taxonomist - M. Hill					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
5555	Grandidierella japonica		5	5	0	0	5	5	0	0		0
6463	Monocorophium acherusicum		1	1	0	0	1	1	0	0		0
9801	Oxyurostylis pacifica		1	1	0	0	1	1	0	0		0
10891	Pontogeneia inermis		1	1	0	0	1	1	0	0		0
			8				8				Difference =	0
											Percent Similarity =	100.00

8235.2-2 Comparison Date: 10/11/2022 10:21:32

Component: General

Collection Date	Sample ID	Time
07/12/2022	MA1	940

			Original Taxonomist - S. Hengen				QC Taxonomist - M. Hill					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
1401	Bivalvia		2	2	0	0	2	2	0	0		0
11208	Branchiostoma californiense		1	1	0	0	1	1	0	0		0
6851	Cryptomya californica		0	0	0	0	1	1	0	0		-1
4387	Mya arenaria		1	1	0	0	0	0	0	0		1
67	Nematoda		3	3	0	0	3	3	0	0		0
10657	Parviplana hymani		1	1	0	0	1	1	0	0		0
			8				8				Difference =	0
											Percent Similarity =	87.50

8235.2-2 Comparison Date: 10/12/2022 11:10:23

Component: Annelids

Collection Date	Sample ID	Time
07/12/2022	MA1	940

			Original Taxonomist - L. Flaherty				QC Taxonomist - C. Barrett					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
6550	Armandia brevis		1	1	0	0	1	1	0	0		0
9290	Hesionura elongata		1	1	0	0	1	1	0	0		0
14416	Orbinia johnsoni		1	1	0	0	1	1	0	0		0
6338	Prionospio		17	17	0	0	17	17	0	0	1 from reject vial	0
			20				20				Difference =	0
											Percent Similarity =	100.00

MA1 Taxonomy QC AVG % (all groups):	95.8

Taxonomy ID QC Percent Similarity (cont)

8235.2-9 Comparison Date: 10/11/2022 11:33:45

Component: Crustacea

Collection Date	Sample ID	Time
07/12/2022	E3	1530

			Original Taxonomist - D. Drumm				QC Taxonomist - M. Hill					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
5555	Grandidierella japonica		1	1	0	0	1	1	0	0		0
7157	Monocorophium insidiosum		51	51	0	0	51	51	0	0		0
14413	Pachygrapsus crassipes		1	1	0	0	1	1	0	0		0
10891	Pontogeneia inermis		6	6	0	0	6	6	0	0		0
			59				59				Difference =	0
											Percent Similarity =	100.00

8235.2-9 Comparison Date: 10/11/2022 11:45:13

Component: General

Collection Date	Sample ID	Time
07/12/2022	E3	1530

			Original Taxonomist - S. Hengen				QC Taxonomist - M. Hill					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
6648	Acteocina		0	0	0	0	1	1	0	0		-1
4045	Actiniaria		40	40	0	0	43	43	0	0		-3
12432	Cerithidea californica		78	78	0	0	78	78	0	0		0
77	Gastropoda		3	3	0	0	3	3	0	0		0
6813	Lineidae		1	1	0	0	5	5	0	0		-4
8163	Maculaura alaskensis Cmplx		0	0	0	0	1	1	0	0		-1
1381	Nemertea		7	7	0	0	0	0	0	0		7
9691	Paranemertes californica		1	1	0	0	1	1	0	0		0
7475	Zygonemertes virescens		1	1	0	0	1	1	0	0		0
			131				133				Difference =	-2
											Percent Similarity =	93.70

8235.2-9 Comparison Date: 10/13/2022 12:58:04

Component: Annelids

Collection Date	Sample ID	Time
07/12/2022	E3	1530

			Original Taxonomist - M. Reuscher				QC Taxonomist - C. Barrett					
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.
9762	Capitella capitata Complex		107	107	0	0	103	103	0	0		4
4	Oligochaeta		215	215	0	0	211	211	0	0		4
9807	Polydora cirrosa		167	167	0	0	168	168	0	0		-1
			489				482				Difference =	7
											Percent Similarity =	99.30

MA1 Taxonomy QC AVG % (all groups): 97.7

APPENDIX B

Benthic Infauna Sample CoC

CHAIN OF CUSTODY

EcoAnalysts
LIFE IN WATER

EcoAnalysts, Inc.
4770 NE View Dr., Port Gamble, WA. 98364
Tel: (360) 297-6040

Destination: EcoAnalysts	Sample Originator (Organization): EcoAnalysts	Report Results To: Michelle Knowlen	Phone:
Destination Contact: Michelle Knowlen	PERSON WHO COLLECTED SAMPLE: Michelle Knowlen	Contact Name:	Fax:
Date: 7/13/22	Address: 4770 NE View Dr. Port Gamble WA 98364	Lab Address:	Email:
Turn-Around-Time: Std.			
Project Name: SMRE Yr.3 (Stetson)	Phone: 360-297-6040 ex 6056	Analyses:	Invoicing To:
Contract/PO:	Fax: —		Comments or Special Instructions: Full sort & ID. QA/QC on 2 samples (CASQO). Field processed on 0.5mm sieve
	E-mail: mknowlen@ecoanalysts.com		

No.	Sample ID	Matrix	Volume & Type of Container	Date & Time	Sort + ID	Preservation	Sample Temp Upon Receipt	LAB ID
1	MA3	sed	2L x1, ½L x1	7/12/22 0940	X	Formalin		
2	MA1		½L x1	7/12/22 0940	X			
3	MA2		1L x1	7/12/22 1042	X			
4	MA4		2L x1	7/12/22 1213	X			
5	MA6		1L x1	7/12/22 1303	X			
6	MA5		2L x1	7/12/22 1320	✓			
7	MA5.5		4L x1	7/12/22 1442	X			
8	ES		4L x1, ½L x1	7/12/22 1500	X			
9	E3		4L x1	7/12/22 1530	X			
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Relinquished by:	Received by:	Relinquished by:	Received by:	Matrix Codes
Print Name: Michelle Knowlen	Print Name: Max Rios	Print Name:	Print Name:	FW = Fresh Water
Signature:	Signature:	Signature:	Signature:	SB = Salt & Brackish Water
Affiliation: EcoAnalysts	Affiliation: EcoAnalysts, Inc.	Affiliation:	Affiliation:	SS = Soil & Sediment
Date/Time: 7/13/22 1000	Date/Time: 7/18/22 1100	Date/Time:	Date/Time:	

APPENDIX B – SEDIMENT CHEMISTRY ANALYTICAL REPORT

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 2G14040

Project: SME Sediment Monitoring

Attn: Cassandra Sosa

Client: U.S. Naval Information Warfare Center Pacific
53475 Strothe Rd., Bldg. 111 Code 71760
San Diego, CA 92152

Report Date: 1/05/2023
Received Date: 7/14/2022
Turnaround Time: Normal
Phones: (619) 221-5296
Fax:
P.O. #:
Billing Code:

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Cassandra Sosa,

Enclosed are the results of analyses for samples received 7/14/22 with the Chain-of-Custody document. The samples were received in good condition, at 5.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
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53475 Strothe Rd., Bldg. 111 Code 71760
San Diego, CA 92152

Project Number: SME Sediment Monitoring

Project Manager: Cassandra Sosa

Reported:
01/05/2023 17:58

Case Narrative

Report revised with additional SVOC analytes requested. -CSS 1/5/23

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
MA1	Nicholas Hayman	2G14040-01	Solid	07/12/22 09:25	
MA2	Nicholas Hayman	2G14040-02	Solid	07/12/22 10:35	
E3	Nicholas Hayman	2G14040-03	Solid	07/12/22 14:40	

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
EPA 160.3M in Solid			
% Solids		✓	
EPA 9060A in Solid			
Total Organic Carbon (TOC)		✓	
GC/MS/MS in Solid			
PCB-3	2051-62-9	✓	
PCB-8	34883-43-7	✓	
PCB-18	37680-65-2	✓	
PCB-33	38444-86-9	✓	
PCB-52	35693-99-3	✓	
PCB-49	41464-40-8	✓	
PCB-44	41464-39-5	✓	
PCB-37	38444-90-5	✓	
PCB-74	32690-93-0	✓	
PCB-70	32598-11-1	✓	
PCB-95	38379-99-6	✓	
PCB-66	32598-10-0	✓	
PCB-101	37680-73-2	✓	
PCB-99	38380-01-7	✓	
PCB-119	56558-17-9	✓	
PCB-97	41464-51-1	✓	
PCB-87	38380-02-8	✓	
PCB-81	70362-50-4	✓	
PCB-110	38380-03-9	✓	
PCB-77	32598-13-3	✓	
PCB-151	52663-63-5	✓	
PCB-149	38380-04-0	✓	
PCB-123	65510-44-3	✓	
PCB-118	31508-00-6	✓	
PCB-114	74472-37-0	✓	
PCB-168	59291-65-5	✓	
PCB-105	32598-14-4	✓	
PCB-141	52712-04-6	✓	
PCB-138	35065-28-2	✓	

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Analyses Accreditation Summary

(Continued)

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
GC/MS/MS in Solid (Continued)			
PCB-158	74472-42-7	✓	
PCB-126	57465-28-8	✓	
PCB-187	52663-68-0	✓	
PCB-183	52663-69-1	✓	
PCB-128	38380-07-3	✓	
PCB-167	52663-72-6	✓	
PCB-174	38411-25-5	✓	
PCB-177	52663-70-4	✓	
PCB-156	38380-08-4	✓	
PCB-201	40186-71-8	✓	
PCB-157	69782-90-7	✓	
PCB-180	35065-29-3	✓	
PCB-169	32774-16-6	✓	
PCB-170	35065-30-6	✓	
PCB-203	52663-76-0	✓	
PCB-189	39635-31-9	✓	
PCB-195	52663-78-2	✓	
PCB-194	35694-08-7	✓	
PCB-206	40186-72-9	✓	
PCB-209	2051-24-3	✓	
1,3-Dimethyl-2-nitrobenzene	81-20-9	✓	
Triphenyl phosphate	115-86-6	✓	

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Project Number: SME Sediment Monitoring

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Reported: 01/05/2023 17:58

Sample Results

Sample: MA1

2G14040-01 (Solid)

Sampled: 07/12/22 9:25 by Nicholas Hayman

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chlorinated Pesticides and/or PCBs by GC/ECD						
Method: EPA 8081A		**Instr:** GC07				
Batch ID: W2G1134 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/19/22 08:10				**Analyst:** RJG
2,4'-DDD	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDE	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDT	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDD	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDE	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDT	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Aldrin	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
alpha-BHC	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
alpha-Chlordane	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
beta-BHC	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Chlordane (tech)	ND	1200	ug/kg dry	5	07/29/22	M-02, M-04
delta-BHC	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Dieldrin	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan I	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan II	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan sulfate	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Endrin	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Endrin aldehyde	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
gamma-BHC (Lindane)	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
gamma-Chlordane	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor epoxide	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Methoxychlor	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Toxaphene	ND	1800	ug/kg dry	5	07/29/22	M-02, M-04
trans-Nonachlor	ND	61	ug/kg dry	5	07/29/22	M-02, M-04
Surrogate(s)						
Decachlorobiphenyl	*75%*	*Conc: 72.6*	*21-125*		*07/29/22*	
Tetrachloro-meta-xylene	*55%*	*Conc: 53.5*	*23-138*		*07/29/22*	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: EPA 160.3M		**Instr:** BAL04				
Batch ID: W2G1058 **Preparation:** _NONE (METALS)		**Prepared:** 07/18/22 09:29				**Analyst:** chc
% Solids	**72.5**	0.100	% by Weight	1	07/19/22	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Cadmium, Total	ND	0.28	mg/kg dry	1	07/19/22	

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Project Manager: Cassandra Sosa

Reported: 01/05/2023 17:58

Sample Results

(Continued)

Sample: MA1

Sampled: 07/12/22 9:25 by Nicholas Hayman

2G14040-01 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods (Continued)						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Copper, Total	**3.1**	0.69	mg/kg dry	1	07/22/22	
Lead, Total	**1.2**	0.69	mg/kg dry	1	07/19/22	
Zinc, Total	**9.7**	6.9	mg/kg dry	1	07/22/22	
Method: EPA 7471A		**Instr:** HG03				
Batch ID: W2G1177 **Preparation:** EPA 7471A		**Prepared:** 07/19/22 09:24				**Analyst:** KVM
Mercury, Total	ND	0.014	mg/kg dry	1	07/20/22	
Organic Carbon In Soil/Solid by EPA 9060A						
Method: EPA 9060A		**Instr:** TOC02				
Batch ID: W2H0270 **Preparation:** EPA 9060M		**Prepared:** 08/03/22 08:16				**Analyst:** ajc
Total Organic Carbon (TOC)	**845**	200	mg/kg	1	08/03/22	
PCB Congener Screen by GCMS SIM						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-101	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-105	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-110	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-114	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-118	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-119	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-123	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-126	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-128	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-132/153	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-138	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-141	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-149	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-151	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-156	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-157	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-158	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-167	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-168	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-169	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-170	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-174	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-177	ND	32	ug/kg dry	1	08/03/22	M-02

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Sample Results

(Continued)

Sample: MA1

Sampled: 07/12/22 9:25 by Nicholas Hayman

2G14040-01 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
PCB Congener Screen by GCMS SIM (Continued)						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-18	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-180	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-183	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-187	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-189	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-194	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-195	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-199	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-201	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-203	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-206	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-209	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-28/31	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-3	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-33	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-37	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-44	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-49	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-52	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-56/60	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-66	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-70	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-74	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-77	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-8	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-81	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-87	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-95	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-97	ND	32	ug/kg dry	1	08/03/22	M-02
PCB-99	ND	32	ug/kg dry	1	08/03/22	M-02
Surrogate(s)						
1,3-Dimethyl-2-nitrobenzene	*60%*	*Conc: 158*	*0.1-141*		*08/03/22*	
Triphenyl phosphate	*149%*	*Conc: 392*	*15-179*		*08/03/22*	

Semivolatile Organics - Low Level by GC/MS SIM Mode

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Sample Results

(Continued)

Sample: MA1

Sampled: 07/12/22 9:25 by Nicholas Hayman

2G14040-01 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Semivolatile Organics - Low Level by GC/MS SIM Mode (Continued)						
Method: EPA 8270C SIM		**Instr:** GCMS06				
Batch ID: W2G1434 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:53				**Analyst:** rmr
1-Methylnaphthalene	ND	97	ug/kg dry	1	07/28/22	M-02
1-Methylphenanthrene	ND	97	ug/kg dry	1	07/28/22	M-02
2,6-Dimethylnaphthalene	ND	97	ug/kg dry	1	07/28/22	M-02
2-Methylnaphthalene	ND	97	ug/kg dry	1	07/28/22	M-02
Acenaphthene	ND	97	ug/kg dry	1	07/28/22	M-02
Acenaphthylene	ND	97	ug/kg dry	1	07/28/22	M-02
Anthracene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (a) anthracene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (a) pyrene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (b) fluoranthene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (e) pyrene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (g,h,i) perylene	ND	97	ug/kg dry	1	07/28/22	M-02
Benzo (k) fluoranthene	ND	97	ug/kg dry	1	07/28/22	M-02
Biphenyl	ND	97	ug/kg dry	1	07/28/22	M-02
Chrysene	ND	97	ug/kg dry	1	07/28/22	M-02
Dibenzo (a,h) anthracene	ND	97	ug/kg dry	1	07/28/22	M-02
Fluoranthene	ND	97	ug/kg dry	1	07/28/22	M-02
Fluorene	ND	97	ug/kg dry	1	07/28/22	M-02
Indeno (1,2,3-cd) pyrene	ND	97	ug/kg dry	1	07/28/22	M-02
Naphthalene	ND	97	ug/kg dry	1	07/28/22	M-02
Perylene	ND	97	ug/kg dry	1	07/28/22	M-02
Phenanthrene	ND	97	ug/kg dry	1	07/28/22	M-02
Pyrene	ND	97	ug/kg dry	1	07/28/22	M-02

Surrogate(s)

2-Fluorobiphenyl	*70%*	*Conc: 3420*	*0.1-109*	*07/28/22*
Nitrobenzene-d5	*69%*	*Conc: 3350*	*0.1-107*	*07/28/22*
Terphenyl-d14	*83%*	*Conc: 4020*	*28-128*	*07/28/22*

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Sample Results

(Continued)

Sample: MA2
2G14040-02 (Solid)

Sampled: 07/12/22 10:35 by Nicholas Hayman

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chlorinated Pesticides and/or PCBs by GC/ECD						
Method: EPA 8081A		**Instr:** GC07				
Batch ID: W2G1134 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/19/22 08:10				**Analyst:** RJG
2,4'-DDD	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDE	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDT	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDD	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDE	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDT	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Aldrin	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
alpha-BHC	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
alpha-Chlordane	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
beta-BHC	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Chlordane (tech)	ND	1500	ug/kg dry	5	07/29/22	M-02, M-04
delta-BHC	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Dieldrin	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan I	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan II	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan sulfate	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Endrin	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Endrin aldehyde	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
gamma-BHC (Lindane)	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
gamma-Chlordane	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor epoxide	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Methoxychlor	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Toxaphene	ND	2300	ug/kg dry	5	07/29/22	M-02, M-04
trans-Nonachlor	ND	76	ug/kg dry	5	07/29/22	M-02, M-04
Surrogate(s)						
Decachlorobiphenyl	*70%*	*Conc: 85.9*	*21-125*		*07/29/22*	
Tetrachloro-meta-xylene	*53%*	*Conc: 64.8*	*23-138*		*07/29/22*	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: EPA 160.3M		**Instr:** BAL04				
Batch ID: W2G1058 **Preparation:** _NONE (METALS)		**Prepared:** 07/18/22 09:29				**Analyst:** chc
% Solids	**68.7**	0.100	% by Weight	1	07/19/22	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Cadmium, Total	ND	0.29	mg/kg dry	1	07/19/22	

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Project Manager: Cassandra Sosa

Reported: 01/05/2023 17:58

Sample Results

(Continued)

Sample: MA2

Sampled: 07/12/22 10:35 by Nicholas Hayman

2G14040-02 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods (Continued)						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Copper, Total	**3.5**	0.73	mg/kg dry	1	07/22/22	
Lead, Total	**0.87**	0.73	mg/kg dry	1	07/19/22	
Zinc, Total	**12**	7.3	mg/kg dry	1	07/22/22	
Method: EPA 7471A		**Instr:** HG03				
Batch ID: W2G1177 **Preparation:** EPA 7471A		**Prepared:** 07/19/22 09:24				**Analyst:** KVM
Mercury, Total	ND	0.015	mg/kg dry	1	07/20/22	
Organic Carbon In Soil/Solid by EPA 9060A						
Method: EPA 9060A		**Instr:** TOC02				
Batch ID: W2H0270 **Preparation:** EPA 9060M		**Prepared:** 08/03/22 08:16				**Analyst:** ajc
Total Organic Carbon (TOC)	**4660**	200	mg/kg	1	08/03/22	
PCB Congener Screen by GCMS SIM						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-101	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-105	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-110	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-114	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-118	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-119	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-123	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-126	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-128	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-132/153	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-138	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-141	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-149	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-151	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-156	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-157	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-158	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-167	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-168	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-169	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-170	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-174	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-177	ND	81	ug/kg dry	2	08/03/22	M-02, M-04

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Project Number: SME Sediment Monitoring

Project Manager: Cassandra Sosa

Reported: 01/05/2023 17:58

Sample Results

(Continued)

Sample: MA2

Sampled: 07/12/22 10:35 by Nicholas Hayman

2G14040-02 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
PCB Congener Screen by GCMS SIM (Continued)						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-18	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-180	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-183	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-187	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-189	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-194	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-195	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-199	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-201	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-203	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-206	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-209	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-28/31	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-3	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-33	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-37	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-44	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-49	ND	81	ug/kg dry	2	08/03/22	M-04, M-02
PCB-52	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-56/60	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-66	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-70	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-74	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-77	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-8	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-81	ND	81	ug/kg dry	2	08/03/22	M-04, M-02
PCB-87	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-95	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-97	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
PCB-99	ND	81	ug/kg dry	2	08/03/22	M-02, M-04
Surrogate(s)						
1,3-Dimethyl-2-nitrobenzene	*56%*	*Conc: 188*	*0.1-141*		*08/03/22*	
Triphenyl phosphate	*108%*	*Conc: 365*	*15-179*		*08/03/22*	
Semivolatile Organics - Low Level by GC/MS SIM Mode						

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Project Manager: Cassandra Sosa

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Sample Results

(Continued)

Sample: MA2

Sampled: 07/12/22 10:35 by Nicholas Hayman

2G14040-02 (Solid)

(Continued)

Semivolatile Organics - Low Level by GC/MS SIM Mode (Continued)

Method: EPA 8270C SIM **Instr:** GCMS06

Batch ID: W2G1434 **Preparation:** EPA 3546/Microwave **Prepared:** 07/21/22 10:53 **Analyst:** rmr

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
1-Methylnaphthalene	ND	120	ug/kg dry	1	07/28/22	M-02
1-Methylphenanthrene	ND	120	ug/kg dry	1	07/28/22	M-02
2,6-Dimethylnaphthalene	ND	120	ug/kg dry	1	07/28/22	M-02
2-Methylnaphthalene	ND	120	ug/kg dry	1	07/28/22	M-02
Acenaphthene	ND	120	ug/kg dry	1	07/28/22	M-02
Acenaphthylene	ND	120	ug/kg dry	1	07/28/22	M-02
Anthracene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (a) anthracene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (a) pyrene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (b) fluoranthene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (e) pyrene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (g,h,i) perylene	ND	120	ug/kg dry	1	07/28/22	M-02
Benzo (k) fluoranthene	ND	120	ug/kg dry	1	07/28/22	M-02
Biphenyl	ND	120	ug/kg dry	1	07/28/22	M-02
Chrysene	ND	120	ug/kg dry	1	07/28/22	M-02
Dibenzo (a,h) anthracene	ND	120	ug/kg dry	1	07/28/22	M-02
Fluoranthene	ND	120	ug/kg dry	1	07/28/22	M-02
Fluorene	ND	120	ug/kg dry	1	07/28/22	M-02
Indeno (1,2,3-cd) pyrene	ND	120	ug/kg dry	1	07/28/22	M-02
Naphthalene	ND	120	ug/kg dry	1	07/28/22	M-02
Perylene	ND	120	ug/kg dry	1	07/28/22	M-02
Phenanthrene	ND	120	ug/kg dry	1	07/28/22	M-02
Pyrene	ND	120	ug/kg dry	1	07/28/22	M-02

Surrogate(s)

2-Fluorobiphenyl	*69%*	*Conc: 4110*	*0.1-109*	*07/28/22*
Nitrobenzene-d5	*67%*	*Conc: 3980*	*0.1-107*	*07/28/22*
Terphenyl-d14	*81%*	*Conc: 4830*	*28-128*	*07/28/22*

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Sample Results

(Continued)

Sample: E3
2G14040-03 (Solid)

Sampled: 07/12/22 14:40 by Nicholas Hayman

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Chlorinated Pesticides and/or PCBs by GC/ECD						
Method: EPA 8081A		**Instr:** GC07				
Batch ID: W2G1134 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/19/22 08:10				**Analyst:** RJG
2,4'-DDD	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDE	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
2,4'-DDT	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDD	ND	80	ug/kg dry	5	07/29/22	M-04, M-02
4,4´-DDE	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
4,4´-DDT	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Aldrin	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
alpha-BHC	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
alpha-Chlordane	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
beta-BHC	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Chlordane (tech)	ND	1600	ug/kg dry	5	07/29/22	M-02, M-04
delta-BHC	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Dieldrin	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan I	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan II	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Endosulfan sulfate	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Endrin	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Endrin aldehyde	ND	80	ug/kg dry	5	07/29/22	M-04, M-02
gamma-BHC (Lindane)	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
gamma-Chlordane	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Heptachlor epoxide	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Methoxychlor	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Toxaphene	ND	2400	ug/kg dry	5	07/29/22	M-02, M-04
trans-Nonachlor	ND	80	ug/kg dry	5	07/29/22	M-02, M-04
Surrogate(s)						
Decachlorobiphenyl	*69%*	*Conc: 88.6*	*21-125*		*07/29/22*	
Tetrachloro-meta-xylene	*63%*	*Conc: 80.8*	*23-138*		*07/29/22*	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: EPA 160.3M		**Instr:** BAL04				
Batch ID: W2G1058 **Preparation:** _NONE (METALS)		**Prepared:** 07/18/22 09:29				**Analyst:** chc
% Solids	**64.6**	0.100	% by Weight	1	07/19/22	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Cadmium, Total	ND	0.31	mg/kg dry	1	07/19/22	

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Sample Results

(Continued)

Sample: E3

Sampled: 07/12/22 14:40 by Nicholas Hayman

2G14040-03 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods (Continued)						
Method: EPA 6020		**Instr:** ICPMS05				
Batch ID: W2G0976 **Preparation:** EPA 3050B		**Prepared:** 07/15/22 09:50				**Analyst:** ALN
Copper, Total	**15**	0.77	mg/kg dry	1	07/22/22	
Lead, Total	**4.0**	0.77	mg/kg dry	1	07/19/22	
Zinc, Total	**49**	7.7	mg/kg dry	1	07/22/22	
Method: EPA 7471A		**Instr:** HG03				
Batch ID: W2G1177 **Preparation:** EPA 7471A		**Prepared:** 07/19/22 09:24				**Analyst:** KVM
Mercury, Total	ND	0.015	mg/kg dry	1	07/20/22	
Organic Carbon In Soil/Solid by EPA 9060A						
Method: EPA 9060A		**Instr:** TOC02				
Batch ID: W2H0270 **Preparation:** EPA 9060M		**Prepared:** 08/03/22 08:16				**Analyst:** ajc
Total Organic Carbon (TOC)	**893**	200	mg/kg	1	08/03/22	
PCB Congener Screen by GCMS SIM						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-101	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-105	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-110	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-114	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-118	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-119	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-123	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-126	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-128	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-132/153	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-138	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-141	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-149	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-151	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-156	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-157	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-158	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-167	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-168	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-169	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-170	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-174	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-177	ND	41	ug/kg dry	1	08/03/22	M-02

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Sample Results

(Continued)

Sample: E3

Sampled: 07/12/22 14:40 by Nicholas Hayman

2G14040-03 (Solid)

(Continued)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
PCB Congener Screen by GCMS SIM (Continued)						
Method: GC/MS/MS		**Instr:** GCMS15				
Batch ID: W2G1437 **Preparation:** EPA 3546/Microwave		**Prepared:** 07/21/22 10:56				**Analyst:** EFC
PCB-18	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-180	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-183	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-187	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-189	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-194	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-195	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-199	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-201	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-203	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-206	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-209	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-28/31	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-3	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-33	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-37	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-44	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-49	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-52	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-56/60	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-66	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-70	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-74	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-77	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-8	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-81	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-87	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-95	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-97	ND	41	ug/kg dry	1	08/03/22	M-02
PCB-99	ND	41	ug/kg dry	1	08/03/22	M-02
Surrogate(s)						
1,3-Dimethyl-2-nitrobenzene	*61%*	*Conc: 211*	*0.1-141*		*08/03/22*	
Triphenyl phosphate	*119%*	*Conc: 410*	*15-179*		*08/03/22*	
Semivolatile Organics - Low Level by GC/MS SIM Mode						

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Sample Results

(Continued)

Sample: E3

Sampled: 07/12/22 14:40 by Nicholas Hayman

2G14040-03 (Solid)

(Continued)

Semivolatile Organics - Low Level by GC/MS SIM Mode (Continued)

Method: EPA 8270C SIM **Instr:** GCMS06

Batch ID: W2G1434 **Preparation:** EPA 3546/Microwave **Prepared:** 07/21/22 10:53 **Analyst:** rmr

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
1-Methylnaphthalene	ND	110	ug/kg dry	1	07/28/22	M-02
1-Methylphenanthrene	ND	110	ug/kg dry	1	07/28/22	M-02
2,6-Dimethylnaphthalene	ND	110	ug/kg dry	1	07/28/22	M-02
2-Methylnaphthalene	ND	110	ug/kg dry	1	07/28/22	M-02
Acenaphthene	ND	110	ug/kg dry	1	07/28/22	M-02
Acenaphthylene	ND	110	ug/kg dry	1	07/28/22	M-02
Anthracene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (a) anthracene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (a) pyrene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (b) fluoranthene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (e) pyrene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (g,h,i) perylene	ND	110	ug/kg dry	1	07/28/22	M-02
Benzo (k) fluoranthene	ND	110	ug/kg dry	1	07/28/22	M-02
Biphenyl	ND	110	ug/kg dry	1	07/28/22	M-02
Chrysene	ND	110	ug/kg dry	1	07/28/22	M-02
Dibenzo (a,h) anthracene	ND	110	ug/kg dry	1	07/28/22	M-02
Fluoranthene	ND	110	ug/kg dry	1	07/28/22	M-02
Fluorene	ND	110	ug/kg dry	1	07/28/22	M-02
Indeno (1,2,3-cd) pyrene	ND	110	ug/kg dry	1	07/28/22	M-02
Naphthalene	ND	110	ug/kg dry	1	07/28/22	M-02
Perylene	ND	110	ug/kg dry	1	07/28/22	M-02
Phenanthrene	ND	110	ug/kg dry	1	07/28/22	M-02
Pyrene	ND	110	ug/kg dry	1	07/28/22	M-02

Surrogate(s)

2-Fluorobiphenyl	*63%*	*Conc: 3380*	*0.1-109*	*07/28/22*
Nitrobenzene-d5	*61%*	*Conc: 3300*	*0.1-107*	*07/28/22*
Terphenyl-d14	*74%*	*Conc: 3970*	*28-128*	*07/28/22*

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Quality Control Results

Chlorinated Pesticides and/or PCBs by GC/ECD

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1134 - EPA 8081A										
Blank (W2G1134-BLK1)				**Prepared: 07/19/22 Analyzed: 07/29/22**						
2,4'-DDD	ND	2.5	ug/kg wet							
2,4'-DDE	ND	2.5	ug/kg wet							
2,4'-DDT	ND	2.5	ug/kg wet							
4,4´-DDD	ND	2.5	ug/kg wet							
4,4´-DDE	ND	2.5	ug/kg wet							
4,4´-DDT	ND	2.5	ug/kg wet							
Aldrin	ND	2.5	ug/kg wet							
alpha-BHC	ND	2.5	ug/kg wet							
alpha-Chlordane	ND	2.5	ug/kg wet							
beta-BHC	ND	2.5	ug/kg wet							
Chlordane (tech)	ND	50	ug/kg wet							
delta-BHC	ND	2.5	ug/kg wet							
Dieldrin	ND	2.5	ug/kg wet							
Endosulfan I	ND	2.5	ug/kg wet							
Endosulfan II	ND	2.5	ug/kg wet							
Endosulfan sulfate	ND	2.5	ug/kg wet							
Endrin	ND	2.5	ug/kg wet							
Endrin aldehyde	ND	2.5	ug/kg wet							
gamma-BHC (Lindane)	ND	2.5	ug/kg wet							
gamma-Chlordane	ND	2.5	ug/kg wet							
Heptachlor	ND	2.5	ug/kg wet							
Heptachlor epoxide	ND	2.5	ug/kg wet							
Methoxychlor	ND	2.5	ug/kg wet							
Toxaphene	ND	75	ug/kg wet							
trans-Nonachlor	ND	2.5	ug/kg wet							
Surrogate(s)										
Decachlorobiphenyl	*15.7*		*ug/kg wet*	*20.0*		*79*	*21-125*			
Tetrachloro-meta-xylene	*13.8*		*ug/kg wet*	*20.0*		*69*	*23-138*			
LCS (W2G1134-BS1)				**Prepared: 07/19/22 Analyzed: 07/29/22**						
4,4´-DDD	15.6	2.5	ug/kg wet	20.0		78	46-126			
4,4´-DDE	16.9	2.5	ug/kg wet	20.0		84	52-124			
4,4´-DDT	20.3	2.5	ug/kg wet	20.0		102	49-147			
Aldrin	15.1	2.5	ug/kg wet	20.0		76	49-117			
alpha-BHC	14.9	2.5	ug/kg wet	20.0		75	49-125			
alpha-Chlordane	16.7	2.5	ug/kg wet	20.0		84	48-124			
beta-BHC	17.0	2.5	ug/kg wet	20.0		85	50-128			
Chlordane (tech)	ND	50	ug/kg wet				49-150			
delta-BHC	18.0	2.5	ug/kg wet	20.0		90	49-139			
Dieldrin	15.6	2.5	ug/kg wet	20.0		78	48-116			

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Project Manager: Cassandra Sosa

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Quality Control Results

(Continued)

Chlorinated Pesticides and/or PCBs by GC/ECD (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1134 - EPA 8081A (Continued)										
LCS (W2G1134-BS1)				**Prepared: 07/19/22 Analyzed: 07/29/22**						
Endosulfan I	10.3	2.5	ug/kg wet	20.0		52	35-114			
Endosulfan II	12.4	2.5	ug/kg wet	20.0		62	41-121			
Endosulfan sulfate	20.4	2.5	ug/kg wet	20.0		102	52-139			
Endrin	17.2	2.5	ug/kg wet	20.0		86	52-140			
Endrin aldehyde	15.3	2.5	ug/kg wet	20.0		77	32-113			
gamma-BHC (Lindane)	15.0	2.5	ug/kg wet	20.0		75	50-126			
gamma-Chlordane	16.8	2.5	ug/kg wet	20.0		84	49-123			
Heptachlor	16.7	2.5	ug/kg wet	20.0		84	50-132			
Heptachlor epoxide	16.1	2.5	ug/kg wet	20.0		81	49-122			
Methoxychlor	25.3	2.5	ug/kg wet	20.0		127	48-147			
Toxaphene	ND	75	ug/kg wet				66-142			
Surrogate(s)										
Decachlorobiphenyl	*16.8*		*ug/kg wet*	*20.0*		*84*	*21-125*			
Tetrachloro-meta-xylene	*14.7*		*ug/kg wet*	*20.0*		*74*	*23-138*			
Matrix Spike (W2G1134-MS1)	**Source: 2G14040-01**			**Prepared: 07/19/22 Analyzed: 07/29/22**						
4,4´-DDD	60.1	63	ug/kg dry	101	ND	60	45-124			M-02, M-04
4,4´-DDE	63.9	63	ug/kg dry	101	ND	63	29-139			M-02, M-04
4,4´-DDT	70.3	63	ug/kg dry	101	ND	70	12-141			M-02, M-04
Aldrin	55.7	63	ug/kg dry	101	ND	55	19-140			M-02, M-04
alpha-BHC	55.6	63	ug/kg dry	101	ND	55	29-136			M-02, M-04
beta-BHC	81.3	63	ug/kg dry	101	ND	81	32-143			M-02, M-04
delta-BHC	67.9	63	ug/kg dry	101	ND	68	37-148			M-04, M-02
Dieldrin	60.2	63	ug/kg dry	101	ND	60	30-126			M-02, M-04
Endosulfan I	38.3	63	ug/kg dry	101	ND	38	24-121			M-02, M-04
Endosulfan II	47.5	63	ug/kg dry	101	ND	47	28-128			M-02, M-04
Endosulfan sulfate	78.1	63	ug/kg dry	101	ND	78	40-140			M-02, M-04
Endrin	63.6	63	ug/kg dry	101	ND	63	37-143			M-02, M-04
Endrin aldehyde	70.3	63	ug/kg dry	101	ND	70	10-132			M-02, M-04
gamma-BHC (Lindane)	56.5	63	ug/kg dry	101	ND	56	28-142			M-02, M-04
Heptachlor	62.8	63	ug/kg dry	101	ND	62	27-146			M-04, M-02
Heptachlor epoxide	59.1	63	ug/kg dry	101	ND	59	37-126			M-02, M-04
Methoxychlor	94.5	63	ug/kg dry	101	ND	94	13-157			M-02, M-04
Surrogate(s)										
Decachlorobiphenyl	*73.4*		*ug/kg dry*	*101*		*73*	*21-125*			
Tetrachloro-meta-xylene	*58.7*		*ug/kg dry*	*101*		*58*	*23-138*			
Matrix Spike Dup (W2G1134-MSD1)	**Source: 2G14040-01**			**Prepared: 07/19/22 Analyzed: 07/29/22**						
4,4´-DDD	59.7	62	ug/kg dry	99.2	ND	60	45-124	0.5	25	M-02, M-04
4,4´-DDE	63.2	62	ug/kg dry	99.2	ND	64	29-139	1	25	M-02, M-04
4,4´-DDT	68.1	62	ug/kg dry	99.2	ND	69	12-141	3	25	M-02, M-04

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Quality Control Results (Continued)

Chlorinated Pesticides and/or PCBs by GC/ECD (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1134 - EPA 8081A (Continued)										
Matrix Spike Dup (W2G1134-MSD1)	**Source: 2G14040-01**			**Prepared: 07/19/22**	**Analyzed: 07/29/22**					
Aldrin	56.0	62	ug/kg dry	99.2	ND	57	19-140	0.7	25	M-02, M-04
alpha-BHC	55.2	62	ug/kg dry	99.2	ND	56	29-136	0.8	25	M-04, M-02
beta-BHC	83.5	62	ug/kg dry	99.2	ND	84	32-143	3	25	M-02, M-04
delta-BHC	67.7	62	ug/kg dry	99.2	ND	68	37-148	0.3	25	M-02, M-04
Dieldrin	59.5	62	ug/kg dry	99.2	ND	60	30-126	1	25	M-02, M-04
Endosulfan I	37.7	62	ug/kg dry	99.2	ND	38	24-121	1	25	M-02, M-04
Endosulfan II	46.8	62	ug/kg dry	99.2	ND	47	28-128	2	25	M-02, M-04
Endosulfan sulfate	77.4	62	ug/kg dry	99.2	ND	78	40-140	0.9	25	M-02, M-04
Endrin	63.3	62	ug/kg dry	99.2	ND	64	37-143	0.5	25	M-02, M-04
Endrin aldehyde	71.3	62	ug/kg dry	99.2	ND	72	10-132	1	25	M-02, M-04
gamma-BHC (Lindane)	56.2	62	ug/kg dry	99.2	ND	57	28-142	0.6	25	M-02, M-04
Heptachlor	61.9	62	ug/kg dry	99.2	ND	62	27-146	1	25	M-02, M-04
Heptachlor epoxide	60.1	62	ug/kg dry	99.2	ND	61	37-126	2	25	M-02, M-04
Methoxychlor	92.6	62	ug/kg dry	99.2	ND	93	13-157	2	25	M-04, M-02
Surrogate(s)										
Decachlorobiphenyl	*73.4*		*ug/kg dry*	*99.2*		*74*	*21-125*			
Tetrachloro-meta-xylene	*57.5*		*ug/kg dry*	*99.2*		*58*	*23-138*			

Quality Control Results (Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1058 - EPA 160.3M										
Duplicate (W2G1058-DUP1)	**Source: 2G14040-01**			**Prepared: 07/18/22**	**Analyzed: 07/19/22**					
% Solids	72.3	0.100	% by Weight		72.5			0.4	20	

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Quality Control Results

(Continued)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G0976 - EPA 6020										
Blank (W2G0976-BLK1)				**Prepared: 07/15/22 Analyzed: 07/19/22**						
Cadmium, Total	ND	0.20	mg/kg wet							
Copper, Total	ND	0.50	mg/kg wet							
Lead, Total	ND	0.50	mg/kg wet							
Zinc, Total	ND	5.0	mg/kg wet							
LCS (W2G0976-BS1)				**Prepared: 07/15/22 Analyzed: 07/19/22**						
Cadmium, Total	50.8	0.20	mg/kg wet	50.0		102	80-120			
Copper, Total	48.0	0.50	mg/kg wet	50.0		96	80-120			
Lead, Total	51.3	0.50	mg/kg wet	50.0		103	80-120			
Zinc, Total	45.8	5.0	mg/kg wet	50.0		92	80-120			
Matrix Spike (W2G0976-MS1)	**Source: 2G14083-01**			**Prepared: 07/15/22 Analyzed: 07/19/22**						
Cadmium, Total	52.9	0.20	mg/kg wet	50.2	ND	106	75-125			
Copper, Total	43.5	0.50	mg/kg wet	50.2	1.25	84	75-125			
Lead, Total	51.6	0.50	mg/kg wet	50.2	ND	103	75-125			
Zinc, Total	42.5	5.0	mg/kg wet	50.2	ND	85	75-125			
Matrix Spike Dup (W2G0976-MSD1)	**Source: 2G14083-01**			**Prepared: 07/15/22 Analyzed: 07/19/22**						
Cadmium, Total	53.0	0.20	mg/kg wet	50.3	ND	105	75-125	0.1	20	
Copper, Total	49.4	0.50	mg/kg wet	50.3	1.25	96	75-125	13	20	
Lead, Total	52.0	0.50	mg/kg wet	50.3	ND	104	75-125	0.8	20	
Zinc, Total	46.8	5.0	mg/kg wet	50.3	ND	93	75-125	10	20	
Batch: W2G1177 - EPA 7471A										
Blank (W2G1177-BLK1)				**Prepared: 07/19/22 Analyzed: 07/20/22**						
Mercury, Total	ND	0.010	mg/kg wet							
LCS (W2G1177-BS1)				**Prepared: 07/19/22 Analyzed: 07/20/22**						
Mercury, Total	0.0890	0.010	mg/kg wet	0.0824		108	80-120			
Matrix Spike (W2G1177-MS1)	**Source: 2G12049-01**			**Prepared: 07/19/22 Analyzed: 07/20/22**						
Mercury, Total	0.0919	0.010	mg/kg wet	0.0846	ND	109	47-138			
Matrix Spike Dup (W2G1177-MSD1)	**Source: 2G12049-01**			**Prepared: 07/19/22 Analyzed: 07/20/22**						
Mercury, Total	0.0875	0.010	mg/kg wet	0.0829	ND	106	47-138	5	20	

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Quality Control Results

(Continued)

Organic Carbon In Soil/Solid by EPA 9060A

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2H0270 - EPA 9060A										
Blank (W2H0270-BLK1)				**Prepared & Analyzed: 08/03/22**						
Total Organic Carbon (TOC)	ND	200	mg/kg							
LCS (W2H0270-BS1)				**Prepared & Analyzed: 08/03/22**						
Total Organic Carbon (TOC)	414000	200	mg/kg	400000		103	80-120			
Matrix Spike (W2H0270-MS1)	**Source: 2G14040-01**			**Prepared & Analyzed: 08/03/22**						
Total Organic Carbon (TOC)	41000	200	mg/kg	42000	845	96	62-131			
Matrix Spike Dup (W2H0270-MSD1)	**Source: 2G14040-01**			**Prepared & Analyzed: 08/03/22**						
Total Organic Carbon (TOC)	49300	200	mg/kg	49600	845	98	62-131	18	20	

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS										
Blank (W2G1437-BLK1)				**Prepared: 07/21/22 Analyzed: 08/03/22**						
PCB-101	ND	6.0	ug/kg wet							
PCB-105	ND	6.0	ug/kg wet							
PCB-110	ND	6.0	ug/kg wet							
PCB-114	ND	6.0	ug/kg wet							
PCB-118	ND	6.0	ug/kg wet							
PCB-119	ND	6.0	ug/kg wet							
PCB-123	ND	6.0	ug/kg wet							
PCB-126	ND	6.0	ug/kg wet							
PCB-128	ND	6.0	ug/kg wet							
PCB-132/153	ND	6.0	ug/kg wet							
PCB-138	ND	6.0	ug/kg wet							
PCB-141	ND	6.0	ug/kg wet							
PCB-149	ND	6.0	ug/kg wet							
PCB-151	ND	6.0	ug/kg wet							
PCB-156	ND	6.0	ug/kg wet							
PCB-157	ND	6.0	ug/kg wet							
PCB-158	ND	6.0	ug/kg wet							
PCB-167	ND	6.0	ug/kg wet							
PCB-168	ND	6.0	ug/kg wet							
PCB-169	ND	6.0	ug/kg wet							
PCB-170	ND	6.0	ug/kg wet							
PCB-174	ND	6.0	ug/kg wet							
PCB-177	ND	6.0	ug/kg wet							
PCB-18	ND	6.0	ug/kg wet							
PCB-180	ND	6.0	ug/kg wet							
PCB-183	ND	6.0	ug/kg wet							
PCB-187	ND	6.0	ug/kg wet							
PCB-189	ND	6.0	ug/kg wet							
PCB-194	ND	6.0	ug/kg wet							
PCB-195	ND	6.0	ug/kg wet							
PCB-199	ND	6.0	ug/kg wet							
PCB-201	ND	6.0	ug/kg wet							
PCB-203	ND	6.0	ug/kg wet							
PCB-206	ND	6.0	ug/kg wet							
PCB-209	ND	6.0	ug/kg wet							
PCB-28/31	ND	6.0	ug/kg wet							
PCB-3	ND	6.0	ug/kg wet							
PCB-33	ND	6.0	ug/kg wet							
PCB-37	ND	6.0	ug/kg wet							

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
Blank (W2G1437-BLK1)				**Prepared: 07/21/22 Analyzed: 08/03/22**						
PCB-44	ND	6.0	ug/kg wet							
PCB-49	ND	6.0	ug/kg wet							
PCB-52	ND	6.0	ug/kg wet							
PCB-56/60	ND	6.0	ug/kg wet							
PCB-66	ND	6.0	ug/kg wet							
PCB-70	ND	6.0	ug/kg wet							
PCB-74	ND	6.0	ug/kg wet							
PCB-77	ND	6.0	ug/kg wet							
PCB-8	ND	6.0	ug/kg wet							
PCB-81	ND	6.0	ug/kg wet							
PCB-87	ND	6.0	ug/kg wet							
PCB-95	ND	6.0	ug/kg wet							
PCB-97	ND	6.0	ug/kg wet							
PCB-99	ND	6.0	ug/kg wet							
Surrogate(s)										
1,3-Dimethyl-2-nitrobenzene	*33.0*		*ug/kg wet*	*50.0*		*66*	*0.1-141*			
Triphenyl phosphate	*58.2*		*ug/kg wet*	*50.0*		*116*	*15-179*			
LCS (W2G1437-BS1)				**Prepared: 07/21/22 Analyzed: 08/03/22**						
PCB-101	4.35	6.0	ug/kg wet	5.00		87	61-182			
PCB-105	4.37	6.0	ug/kg wet	5.00		87	36-185			
PCB-110	4.38	6.0	ug/kg wet	5.00		88	50-150			
PCB-114	4.48	6.0	ug/kg wet	5.00		90	53-175			
PCB-118	4.44	6.0	ug/kg wet	5.00		89	41-178			
PCB-119	4.24	6.0	ug/kg wet	5.00		85	50-150			
PCB-123	4.48	6.0	ug/kg wet	5.00		90	41-178			
PCB-126	4.26	6.0	ug/kg wet	5.00		85	56-180			
PCB-128	3.96	6.0	ug/kg wet	5.00		79	63-173			
PCB-132/153	8.86	6.0	ug/kg wet	10.0		89	50-150			
PCB-138	4.01	6.0	ug/kg wet	5.00		80	60-175			
PCB-141	4.02	6.0	ug/kg wet	5.00		80	50-150			
PCB-149	4.50	6.0	ug/kg wet	5.00		90	50-150			
PCB-151	4.31	6.0	ug/kg wet	5.00		86	50-150			
PCB-156	4.07	6.0	ug/kg wet	5.00		81	64-182			
PCB-157	4.06	6.0	ug/kg wet	5.00		81	38-194			
PCB-158	3.93	6.0	ug/kg wet	5.00		79	50-150			
PCB-167	4.18	6.0	ug/kg wet	5.00		84	65-172			
PCB-168	4.46	6.0	ug/kg wet	5.00		89	50-150			
PCB-169	4.61	6.0	ug/kg wet	5.00		92	64-176			
PCB-170	4.69	6.0	ug/kg wet	5.00		94	59-178			

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
LCS (W2G1437-BS1)				**Prepared: 07/21/22 Analyzed: 08/03/22**						
PCB-174	4.16	6.0	ug/kg wet	5.00		83	50-150			
PCB-177	4.18	6.0	ug/kg wet	5.00		84	50-150			
PCB-18	3.86	6.0	ug/kg wet	5.00		77	29-182			
PCB-180	4.36	6.0	ug/kg wet	5.00		87	58-189			
PCB-183	4.00	6.0	ug/kg wet	5.00		80	50-150			
PCB-187	4.08	6.0	ug/kg wet	5.00		82	64-168			
PCB-189	4.37	6.0	ug/kg wet	5.00		87	55-182			
PCB-194	4.42	6.0	ug/kg wet	5.00		88	50-150			
PCB-195	4.31	6.0	ug/kg wet	5.00		86	56-179			
PCB-199	4.48	6.0	ug/kg wet	5.00		90	50-150			
PCB-201	3.86	6.0	ug/kg wet	5.00		77	50-150			
PCB-203	4.50	6.0	ug/kg wet	5.00		90	50-150			
PCB-206	4.36	6.0	ug/kg wet	5.00		87	67-177			
PCB-209	4.07	6.0	ug/kg wet	5.00		81	45-200			
PCB-28/31	7.92	6.0	ug/kg wet	10.0		79	50-150			
PCB-3	3.63	6.0	ug/kg wet	5.00		73	50-150			
PCB-33	4.00	6.0	ug/kg wet	5.00		80	50-150			
PCB-37	4.23	6.0	ug/kg wet	5.00		85	50-150			
PCB-44	4.03	6.0	ug/kg wet	5.00		81	50-185			
PCB-49	4.04	6.0	ug/kg wet	5.00		81	50-150			
PCB-52	4.18	6.0	ug/kg wet	5.00		84	48-179			
PCB-56/60	8.72	6.0	ug/kg wet	10.0		87	50-150			
PCB-66	4.11	6.0	ug/kg wet	5.00		82	40-178			
PCB-70	4.32	6.0	ug/kg wet	5.00		86	50-150			
PCB-74	4.23	6.0	ug/kg wet	5.00		85	50-150			
PCB-77	4.42	6.0	ug/kg wet	5.00		88	42-155			
PCB-8	3.80	6.0	ug/kg wet	5.00		76	37-186			
PCB-81	4.43	6.0	ug/kg wet	5.00		89	50-174			
PCB-87	4.39	6.0	ug/kg wet	5.00		88	50-150			
PCB-95	4.10	6.0	ug/kg wet	5.00		82	50-150			
PCB-97	4.42	6.0	ug/kg wet	5.00		88	50-150			
PCB-99	4.32	6.0	ug/kg wet	5.00		86	50-150			
Surrogate(s)										
1,3-Dimethyl-2-nitrobenzene	*36.6*		*ug/kg wet*	*50.0*		*73*	*0.1-141*			
Triphenyl phosphate	*72.3*		*ug/kg wet*	*50.0*		*145*	*15-179*			
Matrix Spike (W2G1437-MS1)	**Source: 2G14040-01**			**Prepared: 07/21/22 Analyzed: 08/03/22**						
PCB-101	23.4	41	ug/kg dry	33.8	ND	69	77-164			M-02, MS-01
PCB-105	25.0	41	ug/kg dry	33.8	ND	74	52-184			M-02
PCB-110	24.1	41	ug/kg dry	33.8	ND	71	50-150			M-02

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Project Manager: Cassandra Sosa

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
Matrix Spike (W2G1437-MS1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 08/03/22**					
PCB-114	25.3	41	ug/kg dry	33.8	ND	75	56-174			M-02
PCB-118	24.3	41	ug/kg dry	33.8	ND	72	44-179			M-02
PCB-119	23.7	41	ug/kg dry	33.8	ND	70	50-150			M-02
PCB-123	25.0	41	ug/kg dry	33.8	ND	74	44-179			M-02
PCB-126	24.9	41	ug/kg dry	33.8	ND	74	49-181			M-02
PCB-128	22.2	41	ug/kg dry	33.8	ND	66	60-182			M-02
PCB-132/153	49.8	41	ug/kg dry	67.6	ND	74	50-150			M-02
PCB-138	22.0	41	ug/kg dry	33.8	ND	65	58-183			M-02
PCB-141	22.8	41	ug/kg dry	33.8	ND	67	50-150			M-02
PCB-149	24.2	41	ug/kg dry	33.8	ND	72	50-150			M-02
PCB-151	23.1	41	ug/kg dry	33.8	ND	68	50-150			M-02
PCB-156	24.0	41	ug/kg dry	33.8	ND	71	48-200			M-02
PCB-157	23.3	41	ug/kg dry	33.8	ND	69	54-194			M-02
PCB-158	23.1	41	ug/kg dry	33.8	ND	68	50-150			M-02
PCB-167	23.6	41	ug/kg dry	33.8	ND	70	58-187			M-02
PCB-168	25.0	41	ug/kg dry	33.8	ND	74	50-150			M-02
PCB-169	26.1	41	ug/kg dry	33.8	ND	77	69-188			M-02
PCB-170	26.6	41	ug/kg dry	33.8	ND	79	59-198			M-02
PCB-174	23.3	41	ug/kg dry	33.8	ND	69	50-150			M-02
PCB-177	23.8	41	ug/kg dry	33.8	ND	71	50-150			M-02
PCB-18	19.6	41	ug/kg dry	33.8	ND	58	57-161			M-02
PCB-180	24.7	41	ug/kg dry	33.8	ND	73	54-195			M-02
PCB-183	23.0	41	ug/kg dry	33.8	ND	68	50-150			M-02
PCB-187	23.7	41	ug/kg dry	33.8	ND	70	56-177			M-02
PCB-189	25.3	41	ug/kg dry	33.8	ND	75	60-198			M-02
PCB-194	25.4	41	ug/kg dry	33.8	ND	75	50-150			M-02
PCB-195	25.3	41	ug/kg dry	33.8	ND	75	58-182			M-02
PCB-199	24.3	41	ug/kg dry	33.8	ND	72	50-150			M-02
PCB-201	21.4	41	ug/kg dry	33.8	ND	63	50-150			M-02
PCB-203	24.2	41	ug/kg dry	33.8	ND	72	50-150			M-02
PCB-206	25.3	41	ug/kg dry	33.8	ND	75	56-195			M-02
PCB-209	23.7	41	ug/kg dry	33.8	ND	70	53-201			M-02
PCB-28/31	41.8	41	ug/kg dry	67.6	ND	62	50-150			M-02
PCB-3	18.5	41	ug/kg dry	33.8	ND	55	50-150			M-02
PCB-33	21.4	41	ug/kg dry	33.8	ND	63	50-150			M-02
PCB-37	23.0	41	ug/kg dry	33.8	ND	68	50-150			M-02
PCB-44	21.4	41	ug/kg dry	33.8	ND	63	58-163			M-02
PCB-49	21.8	41	ug/kg dry	33.8	ND	65	50-150			M-02
PCB-52	21.9	41	ug/kg dry	33.8	ND	65	56-163			M-02

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
Matrix Spike (W2G1437-MS1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 08/03/22**					
PCB-56/60	48.1	41	ug/kg dry	67.6	ND	71	50-150			M-02
PCB-66	23.3	41	ug/kg dry	33.8	ND	69	53-186			M-02
PCB-70	23.6	41	ug/kg dry	33.8	ND	70	50-150			M-02
PCB-74	23.4	41	ug/kg dry	33.8	ND	69	50-150			M-02
PCB-77	24.9	41	ug/kg dry	33.8	ND	74	57-144			M-02
PCB-8	19.3	41	ug/kg dry	33.8	ND	57	51-163			M-02
PCB-81	25.2	41	ug/kg dry	33.8	ND	75	59-178			M-02
PCB-87	24.5	41	ug/kg dry	33.8	ND	73	50-150			M-02
PCB-95	22.1	41	ug/kg dry	33.8	ND	65	50-150			M-02
PCB-97	24.5	41	ug/kg dry	33.8	ND	73	50-150			M-02
PCB-99	23.3	41	ug/kg dry	33.8	ND	69	50-150			M-02
Surrogate(s)										
1,3-Dimethyl-2-nitrobenzene	*173*		*ug/kg dry*	*338*		*51*	*0.1-141*			
Triphenyl phosphate	*413*		*ug/kg dry*	*338*		*122*	*15-179*			
Matrix Spike Dup (W2G1437-MSD1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 08/03/22**					
PCB-101	16.9	38	ug/kg dry	31.6	ND	54	77-164	200	30	M-02, MS-01, R-03
PCB-105	17.8	38	ug/kg dry	31.6	ND	56	52-184	200	30	M-02, R-03
PCB-110	17.7	38	ug/kg dry	31.6	ND	56	50-150	200	30	M-02, R-03
PCB-114	18.2	38	ug/kg dry	31.6	ND	57	56-174	200	30	M-02, R-03
PCB-118	17.9	38	ug/kg dry	31.6	ND	57	44-179	200	30	M-02, R-03
PCB-119	17.5	38	ug/kg dry	31.6	ND	56	50-150	200	30	M-02, R-03
PCB-123	17.9	38	ug/kg dry	31.6	ND	57	44-179	200	30	M-02, R-03
PCB-126	16.8	38	ug/kg dry	31.6	ND	53	49-181	200	30	M-02, R-03
PCB-128	15.9	38	ug/kg dry	31.6	ND	50	60-182	200	30	M-02, MS-01, R-03
PCB-132/153	35.1	38	ug/kg dry	63.2	ND	56	50-150	35	30	M-02, R-02
PCB-138	15.7	38	ug/kg dry	31.6	ND	50	58-183	200	30	M-02, MS-01, R-03
PCB-141	16.0	38	ug/kg dry	31.6	ND	50	50-150	200	30	M-02, R-03
PCB-149	17.2	38	ug/kg dry	31.6	ND	54	50-150	200	30	M-02, R-03
PCB-151	16.9	38	ug/kg dry	31.6	ND	53	50-150	200	30	M-02, R-03
PCB-156	16.4	38	ug/kg dry	31.6	ND	52	48-200	200	30	M-02, R-03
PCB-157	15.9	38	ug/kg dry	31.6	ND	50	54-194	200	30	M-02, MS-01, R-03
PCB-158	15.9	38	ug/kg dry	31.6	ND	50	50-150	200	30	M-02, R-03
PCB-167	16.4	38	ug/kg dry	31.6	ND	52	58-187	200	30	M-02, MS-01, R-03
PCB-168	18.1	38	ug/kg dry	31.6	ND	57	50-150	200	30	M-02, R-03

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
Matrix Spike Dup (W2G1437-MSD1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 08/03/22**					
PCB-169	18.0	38	ug/kg dry	31.6	ND	57	69-188	200	30	M-02, MS-01, R-03
PCB-170	18.5	38	ug/kg dry	31.6	ND	59	59-198	200	30	M-02, R-03
PCB-174	16.7	38	ug/kg dry	31.6	ND	53	50-150	200	30	M-02, R-03
PCB-177	16.3	38	ug/kg dry	31.6	ND	51	50-150	200	30	M-02, R-03
PCB-18	14.3	38	ug/kg dry	31.6	ND	45	57-161	200	30	M-02, MS-01, R-03
PCB-180	17.0	38	ug/kg dry	31.6	ND	54	54-195	200	30	M-02, R-03
PCB-183	15.3	38	ug/kg dry	31.6	ND	48	50-150	200	30	M-02, MS-01, R-03
PCB-187	16.5	38	ug/kg dry	31.6	ND	52	56-177	200	30	M-02, MS-01, R-03
PCB-189	18.2	38	ug/kg dry	31.6	ND	58	60-198	200	30	M-02, MS-01, R-03
PCB-194	17.7	38	ug/kg dry	31.6	ND	56	50-150	200	30	M-02, R-03
PCB-195	17.7	38	ug/kg dry	31.6	ND	56	58-182	200	30	M-02, MS-01, R-03
PCB-199	17.2	38	ug/kg dry	31.6	ND	54	50-150	200	30	M-02, R-03
PCB-201	15.0	38	ug/kg dry	31.6	ND	47	50-150	200	30	M-02, MS-01, R-03
PCB-203	16.6	38	ug/kg dry	31.6	ND	53	50-150	200	30	M-02, R-03
PCB-206	17.8	38	ug/kg dry	31.6	ND	56	56-195	200	30	M-02, R-03
PCB-209	16.8	38	ug/kg dry	31.6	ND	53	53-201	200	30	M-02, R-03
PCB-28/31	30.5	38	ug/kg dry	63.2	ND	48	50-150	31	30	M-02, MS-01, R-02
PCB-3	13.4	38	ug/kg dry	31.6	ND	42	50-150	200	30	M-02, MS-01, R-03
PCB-33	15.3	38	ug/kg dry	31.6	ND	49	50-150	200	30	MS-01, R-03, M-02
PCB-37	16.9	38	ug/kg dry	31.6	ND	53	50-150	200	30	M-02, R-03
PCB-44	15.7	38	ug/kg dry	31.6	ND	50	58-163	200	30	M-02, MS-01, R-03
PCB-49	16.1	38	ug/kg dry	31.6	ND	51	50-150	200	30	M-02, R-03
PCB-52	15.8	38	ug/kg dry	31.6	ND	50	56-163	200	30	M-02, MS-01, R-03
PCB-56/60	34.8	38	ug/kg dry	63.2	ND	55	50-150	32	30	M-02, R-02
PCB-66	16.8	38	ug/kg dry	31.6	ND	53	53-186	200	30	M-02, R-03
PCB-70	17.2	38	ug/kg dry	31.6	ND	54	50-150	200	30	M-02, R-03
PCB-74	16.8	38	ug/kg dry	31.6	ND	53	50-150	200	30	M-02, R-03

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Quality Control Results

(Continued)

PCB Congener Screen by GCMS SIM (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1437 - GC/MS/MS (Continued)										
Matrix Spike Dup (W2G1437-MSD1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 08/03/22**					
PCB-77	17.8	38	ug/kg dry	31.6	ND	56	57-144	200	30	M-02, MS-01, R-03
PCB-8	14.0	38	ug/kg dry	31.6	ND	44	51-163	200	30	M-02, MS-01, R-03
PCB-81	18.3	38	ug/kg dry	31.6	ND	58	59-178	200	30	M-02, MS-01, R-03
PCB-87	18.0	38	ug/kg dry	31.6	ND	57	50-150	200	30	M-02, R-03
PCB-95	15.7	38	ug/kg dry	31.6	ND	50	50-150	200	30	M-02, R-03
PCB-97	18.0	38	ug/kg dry	31.6	ND	57	50-150	200	30	M-02, R-03
PCB-99	17.0	38	ug/kg dry	31.6	ND	54	50-150	200	30	M-02, R-03
Surrogate(s)										
1,3-Dimethyl-2-nitrobenzene	*128*		*ug/kg dry*	*316*		*41*	*0.1-141*			
Triphenyl phosphate	*308*		*ug/kg dry*	*316*		*97*	*15-179*			

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Quality Control Results

(Continued)

Semivolatile Organics - Low Level by GC/MS SIM Mode

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1434 - EPA 8270C SIM										
Blank (W2G1434-BLK1)				**Prepared: 07/21/22 Analyzed: 07/28/22**						
1-Methylnaphthalene	ND	20	ug/kg wet							
1-Methylphenanthrene	ND	20	ug/kg wet							
2,6-Dimethylnaphthalene	ND	20	ug/kg wet							
2-Methylnaphthalene	ND	20	ug/kg wet							
Acenaphthene	ND	20	ug/kg wet							
Acenaphthylene	ND	20	ug/kg wet							
Anthracene	ND	20	ug/kg wet							
Benzo (a) anthracene	ND	20	ug/kg wet							
Benzo (a) pyrene	ND	20	ug/kg wet							
Benzo (b) fluoranthene	ND	20	ug/kg wet							
Benzo (e) pyrene	ND	20	ug/kg wet							
Benzo (g,h,i) perylene	ND	20	ug/kg wet							
Benzo (k) fluoranthene	ND	20	ug/kg wet							
Biphenyl	ND	20	ug/kg wet							
Chrysene	ND	20	ug/kg wet							
Dibenzo (a,h) anthracene	ND	20	ug/kg wet							
Fluoranthene	ND	20	ug/kg wet							
Fluorene	ND	20	ug/kg wet							
Indeno (1,2,3-cd) pyrene	ND	20	ug/kg wet							
Naphthalene	ND	20	ug/kg wet							
Perylene	ND	20	ug/kg wet							
Phenanthrene	ND	20	ug/kg wet							
Pyrene	ND	20	ug/kg wet							
Surrogate(s)										
2-Fluorobiphenyl	*728*		*ug/kg wet*	*1000*		*73*	*0.1-109*			
Nitrobenzene-d5	*714*		*ug/kg wet*	*1000*		*71*	*0.1-107*			
Terphenyl-d14	*1000*		*ug/kg wet*	*1000*		*100*	*28-128*			
LCS (W2G1434-BS1)				**Prepared: 07/21/22 Analyzed: 07/28/22**						
Acenaphthene	1500	20	ug/kg wet	2000		75	27-103			
Acenaphthylene	1490	20	ug/kg wet	2000		75	29-112			
Anthracene	1460	20	ug/kg wet	2000		73	31-119			
Benzo (a) anthracene	1460	20	ug/kg wet	2000		73	26-132			
Benzo (a) pyrene	1340	20	ug/kg wet	2000		67	19-146			
Benzo (b) fluoranthene	1300	20	ug/kg wet	2000		65	40-120			AN-IP
Benzo (g,h,i) perylene	1130	20	ug/kg wet	2000		57	18-135			
Benzo (k) fluoranthene	1360	20	ug/kg wet	2000		68	40-120			AN-IP
Chrysene	1480	20	ug/kg wet	2000		74	40-120			
Dibenzo (a,h) anthracene	1210	20	ug/kg wet	2000		60	20-137			
Fluoranthene	1480	20	ug/kg wet	2000		74	33-123			

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Quality Control Results

(Continued)

Semivolatile Organics - Low Level by GC/MS SIM Mode (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1434 - EPA 8270C SIM (Continued)										
LCS (W2G1434-BS1)				**Prepared: 07/21/22 Analyzed: 07/28/22**						
Fluorene	1520	20	ug/kg wet	2000		76	33-106			
Indeno (1,2,3-cd) pyrene	1110	20	ug/kg wet	2000		55	16-136			
Naphthalene	1430	20	ug/kg wet	2000		71	22-98			
Phenanthrene	1430	20	ug/kg wet	2000		71	32-110			
Pyrene	1520	20	ug/kg wet	2000		76	34-122			
Surrogate(s)										
2-Fluorobiphenyl	*787*		*ug/kg wet*	*1000*		*79*	*0.1-109*			
Nitrobenzene-d5	*785*		*ug/kg wet*	*1000*		*79*	*0.1-107*			
Terphenyl-d14	*894*		*ug/kg wet*	*1000*		*89*	*28-128*			
Matrix Spike (W2G1434-MS1)	**Source: 2G14040-01**			**Prepared: 07/21/22 Analyzed: 07/28/22**						
Acenaphthene	9010	120	ug/kg dry	11900	ND	76	5-115			M-02
Acenaphthylene	8910	120	ug/kg dry	11900	ND	75	8-111			M-02
Anthracene	8740	120	ug/kg dry	11900	ND	74	3-132			M-02
Benzo (a) anthracene	8020	120	ug/kg dry	11900	ND	67	14-125			M-02
Benzo (a) pyrene	7980	120	ug/kg dry	11900	ND	67	2-138			M-02
Benzo (b) fluoranthene	7760	120	ug/kg dry	11900	ND	65	20-150			M-02, AN-IP
Benzo (g,h,i) perylene	7000	120	ug/kg dry	11900	ND	59	9-129			M-02
Benzo (k) fluoranthene	8150	120	ug/kg dry	11900	ND	69	20-150			M-02, AN-IP
Chrysene	9000	120	ug/kg dry	11900	ND	76	20-150			M-02
Dibenzo (a,h) anthracene	7510	120	ug/kg dry	11900	ND	63	10-144			M-02
Fluoranthene	8940	120	ug/kg dry	11900	ND	75	11-127			M-02
Fluorene	9160	120	ug/kg dry	11900	ND	77	4-125			M-02
Indeno (1,2,3-cd) pyrene	6790	120	ug/kg dry	11900	ND	57	3-137			M-02
Naphthalene	8550	120	ug/kg dry	11900	ND	72	0.1-117			M-02
Phenanthrene	8610	120	ug/kg dry	11900	ND	72	10-122			M-02
Pyrene	8950	120	ug/kg dry	11900	ND	75	10-128			M-02
Surrogate(s)										
2-Fluorobiphenyl	*4590*		*ug/kg dry*	*5940*		*77*	*0.1-109*			
Nitrobenzene-d5	*4650*		*ug/kg dry*	*5940*		*78*	*0.1-107*			
Terphenyl-d14	*5130*		*ug/kg dry*	*5940*		*86*	*28-128*			
Matrix Spike Dup (W2G1434-MSD1)	**Source: 2G14040-01**			**Prepared: 07/21/22 Analyzed: 07/28/22**						
Acenaphthene	9110	120	ug/kg dry	11700	ND	78	5-115	1	30	M-02
Acenaphthylene	8940	120	ug/kg dry	11700	ND	76	8-111	0.3	30	M-02
Anthracene	8820	120	ug/kg dry	11700	ND	75	3-132	0.9	30	M-02
Benzo (a) anthracene	7350	120	ug/kg dry	11700	ND	63	14-125	9	30	M-02
Benzo (a) pyrene	7380	120	ug/kg dry	11700	ND	63	2-138	8	30	M-02
Benzo (b) fluoranthene	7350	120	ug/kg dry	11700	ND	63	20-150	5	30	M-02, AN-IP
Benzo (g,h,i) perylene	6640	120	ug/kg dry	11700	ND	57	9-129	5	30	M-02

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U.S. Naval Information Warfare Center Pacific
53475 Strothe Rd., Bldg. 111 Code 71760
San Diego, CA 92152

Project Number: SME Sediment Monitoring

Project Manager: Cassandra Sosa

Reported:
01/05/2023 17:58

Quality Control Results

(Continued)

Semivolatile Organics - Low Level by GC/MS SIM Mode (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W2G1434 - EPA 8270C SIM (Continued)										
Matrix Spike Dup (W2G1434-MSD1)	**Source: 2G14040-01**			**Prepared: 07/21/22**	**Analyzed: 07/28/22**					
Benzo (k) fluoranthene	7680	120	ug/kg dry	11700	ND	66	20-150	6	30	M-02, AN-IP
Chrysene	8990	120	ug/kg dry	11700	ND	77	20-150	0.2	30	M-02
Dibenzo (a,h) anthracene	7080	120	ug/kg dry	11700	ND	61	10-144	6	30	M-02
Fluoranthene	8630	120	ug/kg dry	11700	ND	74	11-127	4	30	M-02
Fluorene	9200	120	ug/kg dry	11700	ND	79	4-125	0.4	30	M-02
Indeno (1,2,3-cd) pyrene	6470	120	ug/kg dry	11700	ND	55	3-137	5	30	M-02
Naphthalene	8660	120	ug/kg dry	11700	ND	74	0.1-117	1	30	M-02
Phenanthrene	8670	120	ug/kg dry	11700	ND	74	10-122	0.6	30	M-02
Pyrene	8570	120	ug/kg dry	11700	ND	73	10-128	4	30	M-02
Surrogate(s)										
2-Fluorobiphenyl	*4670*		*ug/kg dry*	*5840*		*80*	*0.1-109*			
Nitrobenzene-d5	*4770*		*ug/kg dry*	*5840*		*82*	*0.1-107*			
Terphenyl-d14	*4880*		*ug/kg dry*	*5840*		*84*	*28-128*			

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U.S. Naval Information Warfare Center Pacific
53475 Strothe Rd., Bldg. 111 Code 71760
San Diego, CA 92152

Project Number: SME Sediment Monitoring

Project Manager: Cassandra Sosa

Reported:
01/05/2023 17:58

Notes and Definitions

Item	Definition
AN-IP	Sample results for structural isomers may have contribution from their isomeric pair.
M-02	Due to the nature of matrix interferences, sample was diluted prior to preparation. The MDL and MRL were raised due to the dilution.
M-04	Due to the nature of matrix interferences, sample extract was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
R-02	The RPD was outside of QC acceptance limits due to possible matrix interference.
R-03	The RPD is not applicable for result below the reporting limit (either ND or J value).
%REC	Percent Recovery
Dil	Dilution
dry	Sample results reported on a dry weight basis
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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BL

WECK LABORATORIES, INC.
Analytical Laboratory Service - Since 1964
14859 Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

Standard CHAIN OF CUSTODY RECORD

WECK WKO# 2G14040

CLIENT NAME:	PROJECT:
NIWC Pacific	SME Sediment Monitoring
ADDRESS: 53560 Hull St. San Diego, CA 92152	PHONE: 619-221-5296 FAX: EMAIL: cassandra.sosa1@spawar.navy.mil
PROJECT MANAGER: Kara Sorenson, Cass Sosa	SAMPLER: Nicholas Hayman

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	See quote	ANALYSES REQUESTED
	07/12/22	9:25 AM	Set Grab	N	MA1		x	
	07/12/22	10:35 AM	Set Grab	N	MA2		x	
	07/12/22	2:40 PM	Set Grab	N	E3		x	

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
[signature]	7/13/22 1600		
FEDEX			07/14/22 1000

SAMPLE CONDITION:

Actual Temperature: 5.6c, 7.0c, 6.9c

Received On Ice	Y / N
Preserved	Y / N
Evidence Seals Present	Y / N
Container Attacked	Y / N
Preserved at Lab	Y / N

SAMPLE TYPE CODE:

AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

WECK LABORATORIES, INC.

Analytical Service Quotation

Contact: Cassandra Sosa
Client Name: U.S. Naval Information Warfare Center Pacific
Address: 53475 Strothe Rd., Bldg. 111 Code 71760
San Diego, CA 92152
Phone: (619) 553-2788
Fax:

Printed: 7/1/2022
Effective: 07/01/22
Expires: 12/31/22

Project: _Blanket

Code		Qty	TAT * (workdays)	Unit Price	Extended Price
Solid					
8270C Soil PAH Low SIM	EPA 8270C SIM	3	10	$180.00	$540.00
Cadmium - EPA 6020	EPA 6020	3	10	$16.00	$48.00
Copper - EPA 6020	EPA 6020	3	10	$16.00	$48.00
EPA 8081A - Organochlorine Pesticides	EPA 8081A	3	10	$175.00	$525.00
Lead - EPA 6020	EPA 6020	3	10	$16.00	$48.00
Mercury - EPA 7471	EPA 7471A	3	10	$35.00	$105.00
Moisture, Percent	EPA 160.3M	3	10	$30.00	$90.00
Organic Carbon in Soil/Solid - EPA 9060M	EPA 9060A	3	10	$95.00	$285.00
Particle size distribution - Laser	ASTM D422/4464	3	10	$250.00	$750.00
PCB Congeners by GCMSMS	GC/MS/MS	3	10	$325.00	$975.00
Zinc - EPA 6020	EPA 6020	3	10	$16.00	$48.00
Additional Items (If requested or applicable, will be charged at listed rates)					
Digestion for total metals		3		$20.00	$60.00

Bid Total: $3,522.00

Comments:
Dry-Weight report.

Leo C Raab

Leo Raab
National Sales Manager

* Subject to Capacity

Payment terms are NET 30 days from invoice date. New accounts require payment prior to the release of test results until a credit application has been approved. Weck Laboratories accepts credit card payments (VISA/Master Card, American Express). Credit application/credit card approval form and Weck Laboratories' terms & conditions can be found at www.wecklabs.com under Resources. Paperless reports (PDF) are included while mailed paper reports are available at additional cost.

Method Reporting Limits (MRL) and Method Detection Limits (MDL) are based upon specified sample volume or weight. When matrix interferences are apparent, sample amounts may be reduced during the preparation step and/or may be diluted prior to analysis. This is done to reduce analytical interference and instrumental contamination and will result in elevated MRL/MDL on the test report.

Afterhours fees apply to analytical processing that includes but is not limited to test set-up, extractions, digestions, transfers, analyses or readings. Special Courier Services afterhours, weekends, holidays, rush or large item transport are available on a per project quote basis. Field Services (courier or sampling) that are not cancelled 48 hours in advance are subject to charges covering travel and restocking expenses. Changes in analytical project requirements after work is underway in the lab or has been reported that necessitates re-analysis or re-processing of deliverables may incure additional fees.

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WECK LABORATORIES, INC.

Sample Receipt Checklist

Weck WKO: 2G14040
WKO Logged by: Jerico Bolotano
Samples Checked by: JB

Date/Time Received: 07/14/22 @ 10:00
# of Samples: 03
Delivered by: Fedex

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	☒	☐		
	COC properly completed?	☒	☐		
	COC matches sample labels?	☒	☐		
	Project Manager notified?	☐	☐	☒	
Receipt Information	Sample Temperature	5.6°C			
	Samples received on ice?	☒	☐		
	Ice Type (Blue/Wet)	Wet			
	All samples intact?	☒	☐		
	Samples in proper containers?	☒	☐		
	Sufficient sample volume?	☒	☐		
	Samples intact?	☒	☐		
	Received within holding time?	☒	☐		
	Project Manager notified?	☐	☐	☒	
Sample Preservation Verification?	Sample labels checked for correct preservation?	☒	☐	☐	
	VOC Headspace: none, <6mm/<Pea size? 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	☐	☐	☒	
	pH verified upon receipt? Metals <2; H2SO4 pres tests <2; 522<4; TOC <2; 525.2<2; 6710B<2; 608.3 5-9	☐	☐	☒	pH paper Lot# 1071586
	Free Chlorine Tested <0.1	☐	☐	☒	Cl Test Strip Lot# 020821
	O&G pH <2 verified?	☐	☐	☐	pH paper Lot# pH Reading:
	pH adjusted for O&G	☐	☐	☐	Acid Lot# Amt added:
	Project Manager notified?	☐	☐	☐	

PM Comments

Sample Receipt Checklist Prepared by:

Signature: JB Date: 07/14/22

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Calscience
2841 Dow Avenue, Suite 100
Tustin, CA 92780
Tel: (714)895-5494

Laboratory Job ID: 570-108193-1
Client Project/Site: 2G14040

For:
Weck Laboratories, Inc.
14859 E. Clark Avenue
City of Industry, California 91745

Attn: Chris Samatmanakit

Authorized for release by:
9/15/2022 6:49:19 AM

Don Burley, Senior Project Manager
(657)212-3033
Donald.Burley@et.eurofinsus.com

Table of Contents

Definitions/Glossary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Qualifiers

Geotechnical

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 570-108193-1

Laboratory: Eurofins Calscience

Narrative

Job Narrative
570-108193-1

Comments
No additional comments.

Receipt
The samples were received on 8/31/2022 9:50 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.0º C.

Organic Prep
Method D4464: The sample duplicate precision associated with analytical batch 570-264193 was flagged as being outside control limits due to a LIMS. limitation. The mean grain size for the sample and sample duplicate were within RPD acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Client Sample ID: 2G14040-01/MA1 — Lab Sample ID: 570-108193-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Clay (less than 0.00391 mm)	0.34		0.01		%	1		D4464	Total/NA
Coarse Sand (0.5mm to 1mm)	10.00		0.01		%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	26.41		0.01		%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	61.91		0.01		%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	0.22		0.01		%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	0.56		0.01		%	1		D4464	Total/NA
Very Coarse Sand (1 to 2mm)	0.18		0.01		%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	0.94		0.01		%	1		D4464	Total/NA

Client Sample ID: 2G14040-02/MA2 — Lab Sample ID: 570-108193-2

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Clay (less than 0.00391 mm)	0.21		0.01		%	1		D4464	Total/NA
Coarse Sand (0.5mm to 1mm)	13.56		0.01		%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	26.85		0.01		%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	56.42		0.01		%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	0.33		0.01		%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	0.55		0.01		%	1		D4464	Total/NA
Very Coarse Sand (1 to 2mm)	1.32		0.01		%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	1.30		0.01		%	1		D4464	Total/NA

Client Sample ID: 2G14040-03/E3 — Lab Sample ID: 570-108193-3

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Clay (less than 0.00391 mm)	0.62		0.01		%	1		D4464	Total/NA
Coarse Sand (0.5mm to 1mm)	3.67		0.01		%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	44.42		0.01		%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	28.76		0.01		%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	4.35		0.01		%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	4.97		0.01		%	1		D4464	Total/NA
Very Coarse Sand (1 to 2mm)	0.01		0.01		%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	18.16		0.01		%	1		D4464	Total/NA

This Detection Summary does not include radiochemical test results.

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Client Sample ID: 2G14040-01/MA1
Date Collected: 07/12/22 09:25
Date Received: 08/31/22 09:50

Lab Sample ID: 570-108193-1
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Clay (less than 0.00391 mm)	0.34		0.01		%			09/14/22 15:14	1
Coarse Sand (0.5mm to 1mm)	10.00		0.01		%			09/14/22 15:14	1
Fine Sand (0.125 to 0.25mm)	26.41		0.01		%			09/14/22 15:14	1
Gravel (greater than 2 mm)	ND		0.01		%			09/14/22 15:14	1
Medium Sand (0.25 to 0.5 mm)	61.91		0.01		%			09/14/22 15:14	1
Silt (0.00391 to 0.0625mm)	0.22		0.01		%			09/14/22 15:14	1
Total Silt and Clay (0 to 0.0626mm)	0.56		0.01		%			09/14/22 15:14	1
Very Coarse Sand (1 to 2mm)	0.18		0.01		%			09/14/22 15:14	1
Very Fine Sand (0.0625 to 0.125 mm)	0.94		0.01		%			09/14/22 15:14	1

Client Sample ID: 2G14040-02/MA2
Date Collected: 07/12/22 10:35
Date Received: 08/31/22 09:50

Lab Sample ID: 570-108193-2
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Clay (less than 0.00391 mm)	0.21		0.01		%			09/14/22 15:25	1
Coarse Sand (0.5mm to 1mm)	13.56		0.01		%			09/14/22 15:25	1
Fine Sand (0.125 to 0.25mm)	26.85		0.01		%			09/14/22 15:25	1
Gravel (greater than 2 mm)	ND		0.01		%			09/14/22 15:25	1
Medium Sand (0.25 to 0.5 mm)	56.42		0.01		%			09/14/22 15:25	1
Silt (0.00391 to 0.0625mm)	0.33		0.01		%			09/14/22 15:25	1
Total Silt and Clay (0 to 0.0626mm)	0.55		0.01		%			09/14/22 15:25	1
Very Coarse Sand (1 to 2mm)	1.32		0.01		%			09/14/22 15:25	1
Very Fine Sand (0.0625 to 0.125 mm)	1.30		0.01		%			09/14/22 15:25	1

Client Sample ID: 2G14040-03/E3
Date Collected: 07/12/22 14:40
Date Received: 08/31/22 09:50

Lab Sample ID: 570-108193-3
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Clay (less than 0.00391 mm)	0.62		0.01		%			09/14/22 15:35	1
Coarse Sand (0.5mm to 1mm)	3.67		0.01		%			09/14/22 15:35	1
Fine Sand (0.125 to 0.25mm)	44.42		0.01		%			09/14/22 15:35	1
Gravel (greater than 2 mm)	ND		0.01		%			09/14/22 15:35	1
Medium Sand (0.25 to 0.5 mm)	28.76		0.01		%			09/14/22 15:35	1
Silt (0.00391 to 0.0625mm)	4.35		0.01		%			09/14/22 15:35	1
Total Silt and Clay (0 to 0.0626mm)	4.97		0.01		%			09/14/22 15:35	1
Very Coarse Sand (1 to 2mm)	0.01		0.01		%			09/14/22 15:35	1
Very Fine Sand (0.0625 to 0.125 mm)	18.16		0.01		%			09/14/22 15:35	1

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

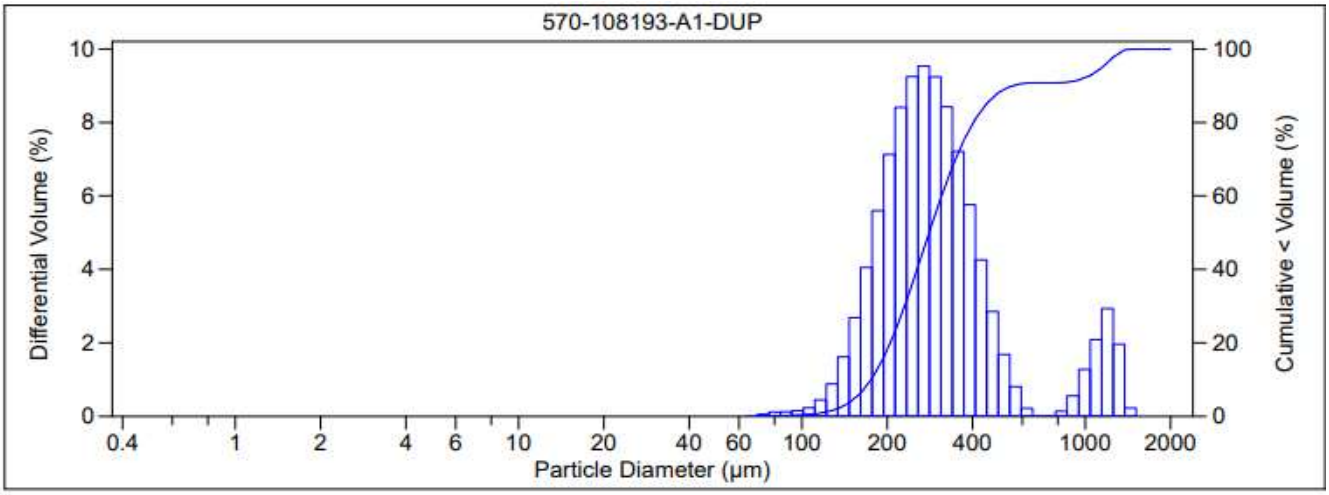
Weck Laboratories, Inc.

Date Sampled:	07/12/22
Date Received:	08/31/22
Work Order No:	570-108193
Date Analyzed:	09/14/22
Method:	ASTM D4464M

Project: Sediment SME Sediment Monitoring

Sample ID	Depth ft	Description	Mean Grain Size mm
2G14040-01/MA1		Medium Sand	0.363

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	7.79	3.93	50.32	36.58	1.38	0.00	0.00	0.00



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

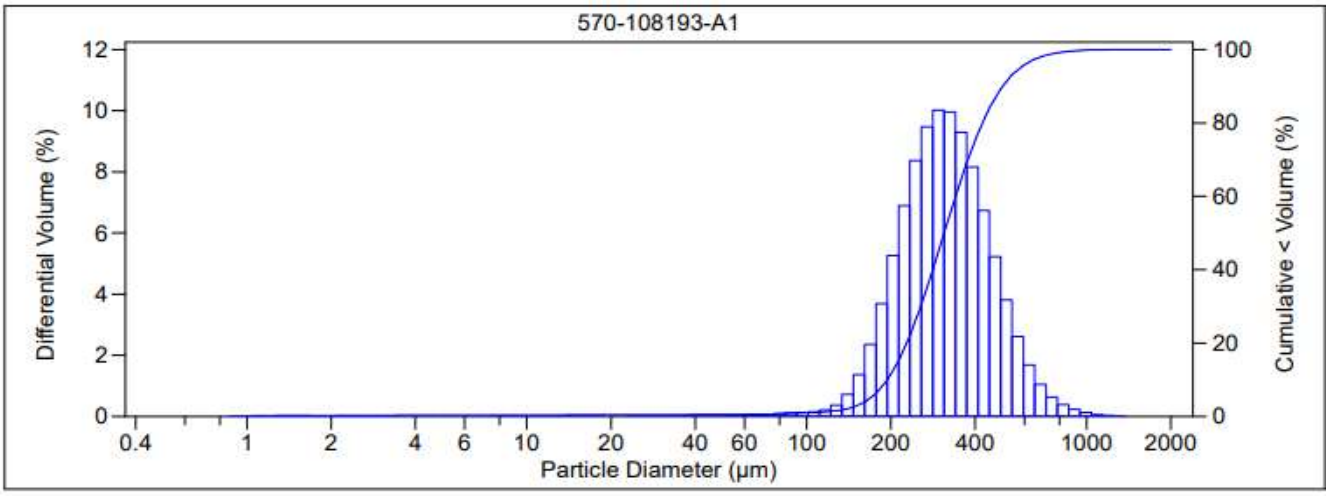
Weck Laboratories, Inc.

Date Sampled:	07/12/22
Date Received:	08/31/22
Work Order No:	570-108193
Date Analyzed:	09/14/22
Method:	ASTM D4464M

Project: Sediment SME Sediment Monitoring

Sample ID	Depth ft	Description	Mean Grain Size mm
2G14040-01/MA1		Medium Sand	0.333

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.18	10.00	61.91	26.41	0.94	0.22	0.34	0.56



PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

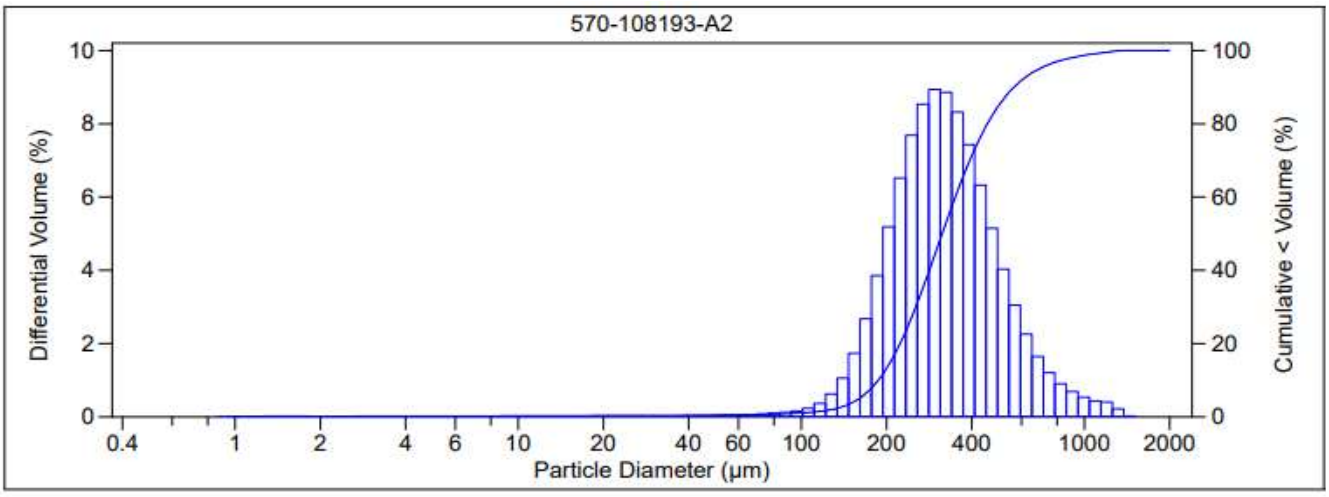
Weck Laboratories, Inc.

Date Sampled:	07/12/22
Date Received:	08/31/22
Work Order No:	570-108193
Date Analyzed:	09/14/22
Method:	ASTM D4464M

Project: Sediment SME Sediment Monitoring

Sample ID	Depth ft	Description	Mean Grain Size mm
2G14040-02/MA2		Medium Sand	0.355

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	1.32	13.56	56.42	26.85	1.30	0.33	0.21	0.55



PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

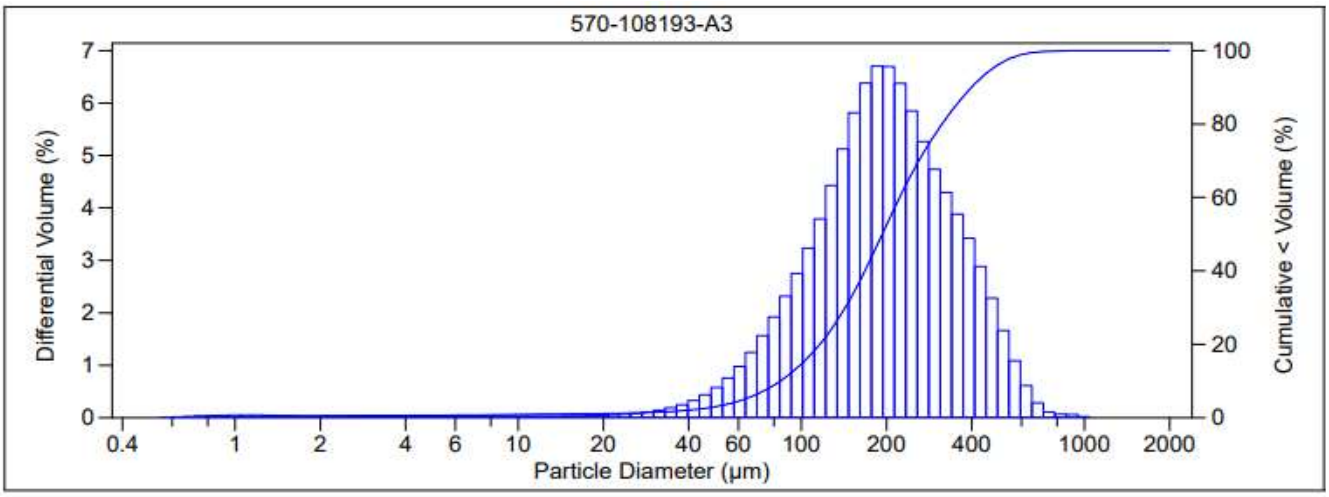
Weck Laboratories, Inc.

Date Sampled:	07/12/22
Date Received:	08/31/22
Work Order No:	570-108193
Date Analyzed:	09/14/22
Method:	ASTM D4464M

Project: Sediment SME Sediment Monitoring

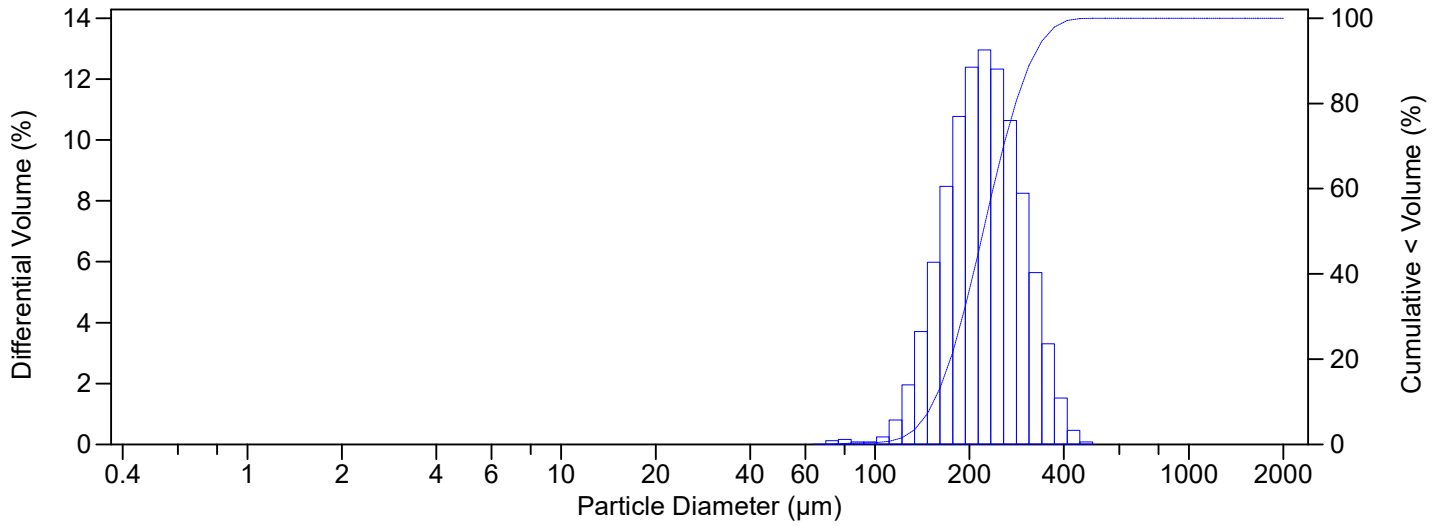
Sample ID	Depth ft	Description	Mean Grain Size mm
2G14040-03/E3		Fine Sand	0.220

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.01	3.67	28.76	44.42	18.16	4.35	0.62	4.97



V 3.0

File name:	C:\LS13320\STD SAND_14 Sep 2022_15.45.21.$ls		
	STD SAND_14 Sep 2022_15.45.21.$ls		
File ID:	STD SAND		
Sample ID:	STD SAND		
Operator:	SP9M		
Run number:	5		
	Control Sample		
Comment 1:	ASTM D4464M, LPSA1		
Comment 2:	1986954		
Optical model:	Fraunhofer.rf780d		
Residual:	2.82%		
LS 13 320	Aqueous Liquid Module		
Start time:	15:44 14 Sep 2022	Run length:	60 seconds
Pump speed:	49		
Obscuration:	11%		
Fluid:	Water		
Software:	6.01	Firmware:	4.00



Volume Statistics (Arithmetic) STD SAND_14 Sep 2022_15.45.21.$ls

Calculations from 0.375 µm to 2000 µm

Volume:	100%		
Mean:	228.6 µm	S.D.:	62.62 µm
Median:	221.6 µm	Variance:	3922 µm^2
Mean/Median ratio:	1.032	Skewness:	0.551 Right skewed
Mode:	223.4 µm	Kurtosis:	0.139 Leptokurtic

d_{10}: 153.6 µm d_{50}: 221.6 µm d_{90}: 315.1 µm

Folk and Ward Statistics (Phi)

Mean:	2.18	Median:	2.17	Deviation:	0.40
Skewness:	0.02	Kurtosis:	0.96		

<5%	<16%	<25%	<40%	<50%	<75%	<84%	<95%
139.2 µm	166.5 µm	182.3 µm	205.9 µm	221.6 µm	268.5 µm	293.0 µm	343.7 µm

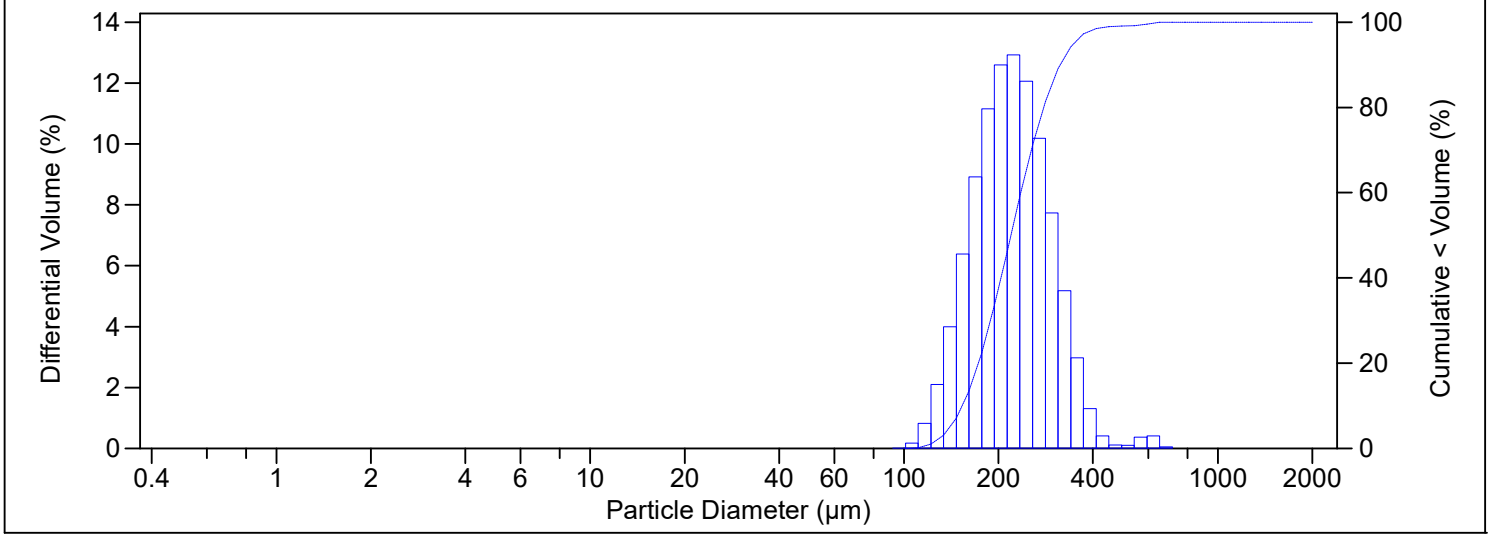
STD SAND_14 Sep 2022_15.45.21.$ls

Particle Diameter µm	Volume %
0.04	0
0.4	0
1.95	0
3.91	0
62.5	2.03
125	64.3
250	33.7
500	0.0035
1000	0
2000	

STD SAND_14 Sep 2022_15.45.21.$ls

Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %
0.375	0	24.95	0	1660	0
0.412	0	27.39	0	1822	0
0.452	0	30.07	0	2000	
0.496	0	33.01	0		
0.545	0	36.24	0		
0.598	0	39.78	0		
0.657	0	43.67	0		
0.721	0	47.94	0		
0.791	0	52.63	0		
0.869	0	57.77	0		
0.954	0	63.42	0.013		
1.047	0	69.62	0.12		
1.149	0	76.43	0.16		
1.261	0	83.90	0.085		
1.385	0	92.10	0.085		
1.520	0	101.1	0.25		
1.669	0	111.0	0.80		
1.832	0	121.8	1.95		
2.011	0	133.7	3.71		
2.208	0	146.8	5.98		
2.423	0	161.2	8.48		
2.660	0	176.9	10.8		
2.920	0	194.2	12.4		
3.206	0	213.2	13.0		
3.519	0	234.1	12.3		
3.863	0	256.9	10.6		
4.241	0	282.1	8.25		
4.656	0	309.6	5.64		
5.111	0	339.9	3.31		
5.611	0	373.1	1.52		
6.159	0	409.6	0.47		
6.761	0	449.7	0.079		
7.422	0	493.6	0.0040		
8.148	0	541.9	0		
8.944	0	594.9	0		
9.819	0	653.0	0		
10.78	0	716.9	0		
11.83	0	786.9	0		
12.99	0	863.9	0		
14.26	0	948.3	0		
15.65	0	1041	0		
17.18	0	1143	0		
18.86	0	1255	0		
20.71	0	1377	0		
22.73	0	1512	0		

File name:	C:\LS13320\STD SAND_14 Sep 2022_16.32.46.$ls		
	STD SAND_14 Sep 2022_16.32.46.$ls		
File ID:	STD SAND		
Sample ID:	STD SAND		
Operator:	SP9M		
Run number:	7		
	Control Sample		
Comment 1:	ASTM D4464M, LPSA1		
Comment 2:	1986954		
Optical model:	Fraunhofer.rf780d		
Residual:	4.42%		
LS 13 320	Aqueous Liquid Module		
Start time:	16:31 14 Sep 2022	Run length:	61 seconds
Pump speed:	49		
Obscuration:	10%		
Fluid:	Water		
Software:	6.01	Firmware:	4.00



Volume Statistics (Arithmetic) STD SAND_14 Sep 2022_16.32.46.$ls

Calculations from 0.375 µm to 2000 µm

Volume:	100%		
Mean:	229.7 µm	S.D.:	70.46 µm
Median:	219.4 µm	Variance:	4965 µm^2
Mean/Median ratio:	1.047	Skewness:	1.644 Right skewed
Mode:	223.4 µm	Kurtosis:	5.884 Leptokurtic

d_{10}: 153.3 µm d_{50}: 219.4 µm d_{90}: 315.0 µm

Folk and Ward Statistics (Phi)

Mean:	2.19	Median:	2.19	Deviation:	0.40
Skewness:	-0.01	Kurtosis:	0.97		

<5%	<16%	<25%	<40%	<50%	<75%	<84%	<95%
139.9 µm	165.6 µm	180.9 µm	203.9 µm	219.4 µm	266.4 µm	291.6 µm	348.2 µm

STD SAND_14 Sep 2022_16.32.46.$ls

Particle Diameter µm	Volume %
0.04	0
0.4	0
1.95	0
3.91	0
62.5	1.56
125	65.9
250	31.6
500	0.92
1000	0
2000	

STD SAND_14 Sep 2022_16.32.46.$ls

Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %
0.375	0	24.95	0	1660	0
0.412	0	27.39	0	1822	0
0.452	0	30.07	0	2000	
0.496	0	33.01	0		
0.545	0	36.24	0		
0.598	0	39.78	0		
0.657	0	43.67	0		
0.721	0	47.94	0		
0.791	0	52.63	0		
0.869	0	57.77	0		
0.954	0	63.42	0		
1.047	0	69.62	0		
1.149	0	76.43	0		
1.261	0	83.90	0		
1.385	0	92.10	0.0088		
1.520	0	101.1	0.17		
1.669	0	111.0	0.83		
1.832	0	121.8	2.10		
2.011	0	133.7	4.00		
2.208	0	146.8	6.38		
2.423	0	161.2	8.92		
2.660	0	176.9	11.2		
2.920	0	194.2	12.6		
3.206	0	213.2	12.9		
3.519	0	234.1	12.1		
3.863	0	256.9	10.2		
4.241	0	282.1	7.74		
4.656	0	309.6	5.18		
5.111	0	339.9	2.98		
5.611	0	373.1	1.31		
6.159	0	409.6	0.41		
6.761	0	449.7	0.11		
7.422	0	493.6	0.10		
8.148	0	541.9	0.37		
8.944	0	594.9	0.41		
9.819	0	653.0	0.053		
10.78	0	716.9	0		
11.83	0	786.9	0		
12.99	0	863.9	0		
14.26	0	948.3	0		
15.65	0	1041	0		
17.18	0	1143	0		
18.86	0	1255	0		
20.71	0	1377	0		
22.73	0	1512	0		

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Lab Sample ID: 570-108193-1 DU
Matrix: Solid
Analysis Batch: 264193

Client Sample ID: 2G14040-01/MA1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Clay (less than 0.00391 mm)	0.34			ND		%				NC	20
Coarse Sand (0.5mm to 1mm)	10.00			3.93	F3	%				87	20
Fine Sand (0.125 to 0.25mm)	26.41			36.58	F3	%				32	20
Gravel (greater than 2 mm)	ND			ND		%				NC	20
Medium Sand (0.25 to 0.5 mm)	61.91			50.32	F3	%				21	20
Silt (0.00391 to 0.0625mm)	0.22			ND		%				NC	20
Total Silt and Clay (0 to 0.0626mm)	0.56			ND		%				NC	20
Very Coarse Sand (1 to 2mm)	0.18			7.79	F3	%				191	20
Very Fine Sand (0.0625 to 0.125 mm)	0.94			1.38	F3	%				38	20

QC Association Summary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Geotechnical

Analysis Batch: 264193

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-108193-1	2G14040-01/MA1	Total/NA	Solid	D4464	
570-108193-2	2G14040-02/MA2	Total/NA	Solid	D4464	
570-108193-3	2G14040-03/E3	Total/NA	Solid	D4464	
LCS 570-264193/5	Lab Control Sample	Total/NA	Solid	D4464	
LCSD 570-264193/7	Lab Control Sample Dup	Total/NA	Solid	D4464	
570-108193-1 DU	2G14040-01/MA1	Total/NA	Solid	D4464	

Lab Chronicle

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Client Sample ID: 2G14040-01/MA1

Lab Sample ID: 570-108193-1

Date Collected: 07/12/22 09:25
Matrix: Solid
Date Received: 08/31/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D4464		1			264193	09/14/22 15:14	SP9M	EET CAL 4
	Instrument ID: NOEQUIP									

Client Sample ID: 2G14040-02/MA2

Lab Sample ID: 570-108193-2

Date Collected: 07/12/22 10:35
Matrix: Solid
Date Received: 08/31/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D4464		1			264193	09/14/22 15:25	SP9M	EET CAL 4
	Instrument ID: NOEQUIP									

Client Sample ID: 2G14040-03/E3

Lab Sample ID: 570-108193-3

Date Collected: 07/12/22 14:40
Matrix: Solid
Date Received: 08/31/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D4464		1			264193	09/14/22 15:35	SP9M	EET CAL 4
	Instrument ID: NOEQUIP									

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

Accreditation/Certification Summary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Laboratory: Eurofins Calscience

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	02-02-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
D4464		Solid	Clay (less than 0.00391 mm)
D4464		Solid	Coarse Sand (0.5mm to 1mm)
D4464		Solid	Fine Sand (0.125 to 0.25mm)
D4464		Solid	Gravel (greater than 2 mm)
D4464		Solid	Medium Sand (0.25 to 0.5 mm)
D4464		Solid	Silt (0.00391 to 0.0625mm)
D4464		Solid	Total Silt and Clay (0 to 0.0626mm)
D4464		Solid	Very Coarse Sand (1 to 2mm)
D4464		Solid	Very Fine Sand (0.0625 to 0.125 mm)

Method Summary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Method	Method Description	Protocol	Laboratory
D4464	Particle Size Distribution of Catalytic Material (Laser light scattering)	ASTM	EET CAL 4

Protocol References:

ASTM = ASTM International

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

Sample Summary

Client: Weck Laboratories, Inc.
Project/Site: 2G14040

Job ID: 570-108193-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
570-108193-1	2G14040-01/MA1	Solid	07/12/22 09:25	08/31/22 09:50
570-108193-2	2G14040-02/MA2	Solid	07/12/22 10:35	08/31/22 09:50
570-108193-3	2G14040-03/E3	Solid	07/12/22 14:40	08/31/22 09:50

108193

Subcontract Order

Subcontracted Laboratory:

Eurofins Calscience, Inc
2841 Dow Avenue, Suite 100
Tustin, CA 92780
Phone (714) 895-5494
Fax (714) 894-7501

Turn Around Time: Normal unless noted in comments
Project Manager: Chris Samatmanakit
Project Name: Sediment
Project Number: SME Sediment Monitoring
Sampler Employed by:
Drinking Water: Yes / (No)
Need Transfer File (xls): (Yes) / No
Tracking Number:

Work Order: 2G14040

Analysis	Expires	Comments
Sample ID: 2G14040-01/MA1		**Sampled:** 07/12/2022 09:25
Sample comment:		**Matrix:**Solid **Sampled By:** Nicholas Hayman
Particle size distribution - Laser ASTM D4464	07/12/2023 09 25	Report on Dry Weight Basis
Containers Supplied.		
Sample ID: 2G14040-02/MA2		**Sampled:** 07/12/2022 10:35
Sample comment:		**Matrix:**Solid **Sampled By:** Nicholas Hayman
Particle size distribution - Laser ASTM D4464	07/12/2023 10 35	Report on Dry Weight Basis
Containers Supplied		
Sample ID: 2G14040-03/E3		**Sampled:** 07/12/2022 14:40
Sample comment:		**Matrix:**Solid **Sampled By:** Nicholas Hayman
Particle size distribution - Laser ASTM D4464	07/12/2023 14 40	Report on Dry Weight Basis
Containers Supplied		

570-108193 Chain of Custody

Remarks / Special Comments:

Sample Condition

Temperature:
Preserved: Yes / No
Evidence Seal Intact: Yes / No
Container Attacked: Yes / No
Preserved at Lab: Yes / No

Relinquished By	Date / Time	Received By	Date / Time
Huang Lin - 8/31/22 13:32		Fedex	
Fedex		OR	8/31/22 0945

Page 1 of 1

Login Sample Receipt Checklist

Client: Weck Laboratories, Inc.

Job Number: 570-108193-1

Login Number: 108193
List Number: 1
Creator: Patel, Jayesh

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/18/2022	7/19/2022	EPA 160.3M	_NONE (METALS)	% Solids	NA	FALSE	72.5		0.100	% by Weight	Wet	1					chc	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Cadmium, Total	7440-43-9	FALSE	ND	0.083	0.28	mg/kg dry	Dry	1					ALN	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Copper, Total	7440-50-8	FALSE	3.1	0.40	0.69	mg/kg dry	Dry	1					ALN	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Lead, Total	7439-92-1	FALSE	1.2	0.29	0.69	mg/kg dry	Dry	1					ALN	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Zinc, Total	7440-66-6	FALSE	9.7	3.1	6.9	mg/kg dry	Dry	1					ALN	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/20/2022	EPA 7471A	EPA 7471A	Mercury, Total	7439-97-6	FALSE	ND	0.0079	0.014	mg/kg dry	Dry	1					KVM	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDD	53-19-0	FALSE	ND	11	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDE	3424-82-6	FALSE	ND	10	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDT	789-02-6	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDD	72-54-8	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDE	72-55-9	FALSE	ND	14	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDT	50-29-3	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Aldrin	309-00-2	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-BHC	319-84-6	FALSE	ND	11	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-Chlordane	5103-71-9	FALSE	ND	15	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	beta-BHC	319-85-7	FALSE	ND	17	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Chlordane (tech)	57-74-9	FALSE	ND	270	1200	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Decachlorobiphenyl	2051-24-3	TRUE	72.6			ug/kg dry	Dry	5	97.1	75	125	21	RJG	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-33	38444-86-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-37	38444-90-5	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-44	41464-39-5	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-49	41464-40-8	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-52	35693-99-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-56/60	41464-40-8/33025-41-1	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-66	32598-10-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-70	32598-11-1	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-74	32690-93-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-77	32598-13-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-8	34883-43-7	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-81	70362-50-4	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-87	38380-02-8	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-95	38379-99-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-97	41464-51-1	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-99	38380-01-7	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	Triphenyl phosphate	115-86-6	TRUE	392			ug/kg dry	Dry	1	263	149	179	15	EFC	72.5		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/18/2022	7/19/2022	EPA 160.3M	_NONE (METALS)	% Solids	NA	FALSE	68.7		0.100	% by Weight	Wet	1					chc	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Cadmium, Total	7440-43-9	FALSE	ND	0.087	0.29	mg/kg dry	Dry	1					ALN	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Copper, Total	7440-50-8	FALSE	3.5	0.42	0.73	mg/kg dry	Dry	1					ALN	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Lead, Total	7439-92-1	FALSE	0.87	0.31	0.73	mg/kg dry	Dry	1					ALN	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Zinc, Total	7440-66-6	FALSE	12	3.3	7.3	mg/kg dry	Dry	1					ALN	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/20/2022	EPA 7471A	EPA 7471A	Mercury, Total	7439-97-6	FALSE	ND	0.0084	0.015	mg/kg dry	Dry	1					KVM	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDD	53-19-0	FALSE	ND	14	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDE	3424-82-6	FALSE	ND	13	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDT	789-02-6	FALSE	ND	16	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	delta-BHC	319-86-8	FALSE	ND	19	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Dieldrin	60-57-1	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan I	959-98-8	FALSE	ND	9.7	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan II	33213-65-9	FALSE	ND	12	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan sulfate	1031-07-8	FALSE	ND	15	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin	72-20-8	FALSE	ND	27	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin aldehyde	7421-93-4	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-BHC (Lindane)	58-89-9	FALSE	ND	12	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-Chlordane	5566-34-7	FALSE	ND	14	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor	76-44-8	FALSE	ND	24	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor epoxide	1024-57-3	FALSE	ND	13	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Methoxychlor	72-43-5	FALSE	ND	14	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Tetrachloro-meta-xylene	877-09-8	TRUE	53.5			ug/kg dry	Dry	5	97.1	55	138	23	RJG	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Toxaphene	8001-35-2	FALSE	ND	510	1800	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	trans-Nonachlor	39765-80-5	FALSE	ND	7.3	61	ug/kg dry	Dry	5					RJG	72.5		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylnaphthalene	90-12-0	FALSE	ND	6.1	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylphenanthrene	832-69-9	FALSE	ND	12	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2,6-Dimethylnaphthalene	581-42-0	FALSE	ND	9.3	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Fluorobiphenyl	321-60-8	TRUE	3420			ug/kg dry	Dry	1	4850	70	109	0.1	rmr	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Methylnaphthalene	91-57-6	FALSE	ND	6.6	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthene	83-32-9	FALSE	ND	5.3	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthylene	208-96-8	FALSE	ND	11	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Anthracene	120-12-7	FALSE	ND	9.0	97	ug/kg dry	Dry	1					rmr	72.5		M-02

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) anthracene	56-55-3	FALSE	ND	35	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) pyrene	50-32-8	FALSE	ND	49	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (b) fluoranthene	205-99-2	FALSE	ND	50	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (g,h,i) perylene	191-24-2	FALSE	ND	38	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (k) fluoranthene	207-08-9	FALSE	ND	42	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Chrysene	218-01-9	FALSE	ND	6.2	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Dibenzo (a,h) anthracene	53-70-3	FALSE	ND	45	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluoranthene	206-44-0	FALSE	ND	39	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluorene	86-73-7	FALSE	ND	6.1	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Indeno (1,2,3-cd) pyrene	193-39-5	FALSE	ND	54	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Naphthalene	91-20-3	FALSE	ND	7.3	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Nitrobenzene-d5	4165-60-0	TRUE	3350			ug/kg dry	Dry	1	4850	69	107	0.1	rmr	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Phenanthrene	85-01-8	FALSE	ND	6.5	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Pyrene	129-00-0	FALSE	ND	39	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Terphenyl-d14	1718-51-0	TRUE	4020			ug/kg dry	Dry	1	4850	83	128	28	rmr	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (e) pyrene	192-97-2	FALSE	ND	14	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Biphenyl	92-52-4	FALSE	ND	7.8	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Perylene	198-55-0	FALSE	ND	12	97	ug/kg dry	Dry	1					rmr	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	8/3/2022	8/3/2022	EPA 9060A	EPA 9060M	Total Organic Carbon (TOC)	NA	FALSE	845	42.0	200	mg/kg	Wet	1					ajc	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	1,3-Dimethyl-2-nitrobenzene	81-20-9	TRUE	158			ug/kg dry	Dry	1	263	60	141	0.1	EFC	72.5		
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-101	37680-73-2	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-105	32598-14-4	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-110	38380-03-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-114	74472-37-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-118	31508-00-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-119	56558-17-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-123	65510-44-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-126	57465-28-8	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-128	38380-07-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-151	52663-63-5	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-156	38380-08-4	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-157	69782-90-7	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-158	74472-42-7	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-174	38411-25-5	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-177	52663-70-4	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-18	37680-65-2	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-180	35065-29-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-195	52663-78-2	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-199	52663-75-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-201	40186-71-8	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-203	52663-76-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDD	72-54-8	FALSE	ND	16	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDE	72-55-9	FALSE	ND	17	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDT	50-29-3	FALSE	ND	17	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Aldrin	309-00-2	FALSE	ND	16	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-BHC	319-84-6	FALSE	ND	14	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-Chlordane	5103-71-9	FALSE	ND	19	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	beta-BHC	319-85-7	FALSE	ND	22	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Chlordane (tech)	57-74-9	FALSE	ND	1500	1500	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Decachlorobiphenyl	2051-24-3	TRUE	85.9			ug/kg dry	Dry	5	122	70	125	21	RJG	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	delta-BHC	319-86-8	FALSE	ND	24	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Dieldrin	60-57-1	FALSE	ND	16	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan I	959-98-8	FALSE	ND	12	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan II	33213-65-9	FALSE	ND	15	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan sulfate	1031-07-8	FALSE	ND	19	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin	72-20-8	FALSE	ND	34	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin aldehyde	7421-93-4	FALSE	ND	17	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-BHC (Lindane)	58-89-9	FALSE	ND	15	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-132/153	38380-05-1/35065-27-1	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-138	35065-28-2	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-141	52712-04-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-149	38380-04-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-167	52663-72-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-168	59291-65-5	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-169	32774-16-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-170	35065-30-6	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-183	52663-69-1	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-187	52663-68-0	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-189	39635-31-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-194	35694-08-7	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-206	40186-72-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-209	2051-24-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-28/31	7012-37-5/16606-02-3	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	MA1	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-3	2051-62-9	FALSE	ND	32	32	ug/kg dry	Dry	1					EFC	72.5		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-Chlordane	5566-34-7	FALSE	ND	18	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor	76-44-8	FALSE	ND	32	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor epoxide	1024-57-3	FALSE	ND	18	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Tetrachloro-meta-xylene	877-09-8	TRUE	80.8			ug/kg dry	Dry	5	128	63	138	23	RJG	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Toxaphene	8001-35-2	FALSE	ND	670	2400	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	trans-Nonachlor	39765-80-5	FALSE	ND	9.6	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylnaphthalene	90-12-0	FALSE	ND	6.7	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthene	83-32-9	FALSE	ND	5.8	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthylene	208-96-8	FALSE	ND	12	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Anthracene	120-12-7	FALSE	ND	10	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) anthracene	56-55-3	FALSE	ND	39	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Chrysene	218-01-9	FALSE	ND	6.9	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Dibenzo (a,h) anthracene	53-70-3	FALSE	ND	49	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluoranthene	206-44-0	FALSE	ND	43	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluorene	86-73-7	FALSE	ND	6.8	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-Chlordane	5566-34-7	FALSE	ND	17	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor	76-44-8	FALSE	ND	31	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Heptachlor epoxide	1024-57-3	FALSE	ND	17	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Methoxychlor	72-43-5	FALSE	ND	18	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Tetrachloro-meta-xylene	877-09-8	TRUE	64.8			ug/kg dry	Dry	5	122	53	138	23	RJG	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Toxaphene	8001-35-2	FALSE	ND	2300	2300	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	trans-Nonachlor	39765-80-5	FALSE	ND	9.2	76	ug/kg dry	Dry	5					RJG	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylnaphthalene	90-12-0	FALSE	ND	7.5	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylphenanthrene	832-69-9	FALSE	ND	15	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2,6-Dimethylnaphthalene	581-42-0	FALSE	ND	11	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Fluorobiphenyl	321-60-8	TRUE	4110			ug/kg dry	Dry	1	5970	69	109	0.1	rmr	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Methylnaphthalene	91-57-6	FALSE	ND	8.1	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthene	83-32-9	FALSE	ND	6.5	120	ug/kg dry	Dry	1					rmr	68.7		M-02

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SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Acenaphthylene	208-96-8	FALSE	ND	13	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Anthracene	120-12-7	FALSE	ND	11	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) anthracene	56-55-3	FALSE	ND	43	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) pyrene	50-32-8	FALSE	ND	60	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (b) fluoranthene	205-99-2	FALSE	ND	62	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (g,h,i) perylene	191-24-2	FALSE	ND	46	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (k) fluoranthene	207-08-9	FALSE	ND	52	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Chrysene	218-01-9	FALSE	ND	7.6	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Dibenzo (a,h) anthracene	53-70-3	FALSE	ND	55	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluoranthene	206-44-0	FALSE	ND	48	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (e) pyrene	192-97-2	FALSE	ND	17	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Biphenyl	92-52-4	FALSE	ND	9.5	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Fluorene	86-73-7	FALSE	ND	7.5	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Indeno (1,2,3-cd) pyrene	193-39-5	FALSE	ND	66	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Naphthalene	91-20-3	FALSE	ND	8.9	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Nitrobenzene-d5	4165-60-0	TRUE	3980			ug/kg dry	Dry	1	5970	67	107	0.1	rmr	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Phenanthrene	85-01-8	FALSE	ND	8.0	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Pyrene	129-00-0	FALSE	ND	48	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Terphenyl-d14	1718-51-0	TRUE	4830			ug/kg dry	Dry	1	5970	81	128	28	rmr	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Perylene	198-55-0	FALSE	ND	15	120	ug/kg dry	Dry	1					rmr	68.7		M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	8/3/2022	8/3/2022	EPA 9060A	EPA 9060M	Total Organic Carbon (TOC)	NA	FALSE	4660	42.0	200	mg/kg	Wet	1					ajc	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	1,3-Dimethyl-2-nitrobenzene	81-20-9	TRUE	188			ug/kg dry	Dry	2	337	56	141	0.1	EFC	68.7		
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-101	37680-73-2	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-105	32598-14-4	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-110	38380-03-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-114	74472-37-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-118	31508-00-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-119	56558-17-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-123	65510-44-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-126	57465-28-8	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-128	38380-07-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-132/153	38380-05-1/35065-27-1	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-138	35065-28-2	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-141	52712-04-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-149	38380-04-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-151	52663-63-5	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-156	38380-08-4	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-157	69782-90-7	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-158	74472-42-7	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-167	52663-72-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-168	59291-65-5	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-169	32774-16-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-170	35065-30-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-174	38411-25-5	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-177	52663-70-4	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-18	37680-65-2	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-180	35065-29-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-183	52663-69-1	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-187	52663-68-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-189	39635-31-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-194	35694-08-7	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-195	52663-78-2	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-199	52663-75-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-201	40186-71-8	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-203	52663-76-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-206	40186-72-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-209	2051-24-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-28/31	7012-37-5/16606-02-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-3	2051-62-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-33	38444-86-9	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-37	38444-90-5	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-44	41464-39-5	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-49	41464-40-8	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-04, M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-52	35693-99-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-56/60	41464-40-8/33025-41-1	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-66	32598-10-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-70	32598-11-1	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-74	32690-93-0	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-77	32598-13-3	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-8	34883-43-7	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-81	70362-50-4	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-04, M-02
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-87	38380-02-8	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-95	38379-99-6	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-97	41464-51-1	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-99	38380-01-7	FALSE	ND	81	81	ug/kg dry	Dry	2					EFC	68.7		M-02, M-04
SME Sediment Monitoring	MA2	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	Triphenyl phosphate	115-86-6	TRUE	365			ug/kg dry	Dry	2	337	108	179	15	EFC	68.7		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/18/2022	7/19/2022	EPA 160.3M	_NONE (METALS)	% Solids	NA	FALSE	64.6		0.100	% by Weight	Wet	1					chc	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Cadmium, Total	7440-43-9	FALSE	ND	0.093	0.31	mg/kg dry	Dry	1					ALN	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Copper, Total	7440-50-8	FALSE	15	0.45	0.77	mg/kg dry	Dry	1					ALN	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/15/2022	7/19/2022	EPA 6020	EPA 3050B	Lead, Total	7439-92-1	FALSE	4.0	0.32	0.77	mg/kg dry	Dry	1					ALN	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/15/2022	7/22/2022	EPA 6020	EPA 3050B	Zinc, Total	7440-66-6	FALSE	49	3.5	7.7	mg/kg dry	Dry	1					ALN	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/20/2022	EPA 7471A	EPA 7471A	Mercury, Total	7439-97-6	FALSE	ND	0.0089	0.015	mg/kg dry	Dry	1					KVM	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDD	53-19-0	FALSE	ND	15	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDE	3424-82-6	FALSE	ND	13	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	2,4'-DDT	789-02-6	FALSE	ND	17	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDD	72-54-8	FALSE	ND	17	80	ug/kg dry	Dry	5					RJG	64.6		M-04, M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDE	72-55-9	FALSE	ND	18	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	4,4´-DDT	50-29-3	FALSE	ND	18	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Aldrin	309-00-2	FALSE	ND	17	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-BHC	319-84-6	FALSE	ND	15	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	alpha-Chlordane	5103-71-9	FALSE	ND	20	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	beta-BHC	319-85-7	FALSE	ND	23	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Chlordane (tech)	57-74-9	FALSE	ND	350	1600	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Decachlorobiphenyl	2051-24-3	TRUE	88.6			ug/kg dry	Dry	5	128	69	125	21	RJG	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	delta-BHC	319-86-8	FALSE	ND	25	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Dieldrin	60-57-1	FALSE	ND	17	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan I	959-98-8	FALSE	ND	13	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan II	33213-65-9	FALSE	ND	16	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endosulfan sulfate	1031-07-8	FALSE	ND	20	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin	72-20-8	FALSE	ND	35	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Endrin aldehyde	7421-93-4	FALSE	ND	18	80	ug/kg dry	Dry	5					RJG	64.6		M-04, M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	gamma-BHC (Lindane)	58-89-9	FALSE	ND	15	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	E3	Solid	7/12/2022	7/19/2022	7/29/2022	EPA 8081A	EPA 3546/Microwave	Methoxychlor	72-43-5	FALSE	ND	19	80	ug/kg dry	Dry	5					RJG	64.6		M-02, M-04
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	1-Methylphenanthrene	832-69-9	FALSE	ND	14	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2,6-Dimethylnaphthalene	581-42-0	FALSE	ND	10	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Fluorobiphenyl	321-60-8	TRUE	3380			ug/kg dry	Dry	1	5370	63	109	0.1	rmr	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	2-Methylnaphthalene	91-57-6	FALSE	ND	7.3	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (a) pyrene	50-32-8	FALSE	ND	54	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (b) fluoranthene	205-99-2	FALSE	ND	56	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (g,h,i) perylene	191-24-2	FALSE	ND	42	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (k) fluoranthene	207-08-9	FALSE	ND	47	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Indeno (1,2,3-cd) pyrene	193-39-5	FALSE	ND	59	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Naphthalene	91-20-3	FALSE	ND	8.0	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Benzo (e) pyrene	192-97-2	FALSE	ND	15	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Biphenyl	92-52-4	FALSE	ND	8.6	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Perylene	198-55-0	FALSE	ND	14	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	8/3/2022	8/3/2022	EPA 9060A	EPA 9060M	Total Organic Carbon (TOC)	NA	FALSE	893	42.0	200	mg/kg	Wet	1					ajc	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	1,3-Dimethyl-2-nitrobenzene	81-20-9	TRUE	211			ug/kg dry	Dry	1	345	61	141	0.1	EFC	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-101	37680-73-2	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-119	56558-17-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-123	65510-44-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-126	57465-28-8	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-128	38380-07-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-151	52663-63-5	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-156	38380-08-4	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-157	69782-90-7	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-158	74472-42-7	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-174	38411-25-5	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-177	52663-70-4	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-18	37680-65-2	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-180	35065-29-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Nitrobenzene-d5	4165-60-0	TRUE	3300			ug/kg dry	Dry	1	5370	61	107	0.1	rmr	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Phenanthrene	85-01-8	FALSE	ND	7.2	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Pyrene	129-00-0	FALSE	ND	43	110	ug/kg dry	Dry	1					rmr	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	7/28/2022	EPA 8270C SIM	EPA 3546/Microwave	Terphenyl-d14	1718-51-0	TRUE	3970			ug/kg dry	Dry	1	5370	74	128	28	rmr	64.6		
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-105	32598-14-4	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02

PROJECTNUM	SAMPLE NAME	MATRIX	SAMP DATE	PREP DATE	ANA DATE	METHOD NAME	PREP NAME	ANALYTE	CAS NUMBER	SURROGATE	Result	DL	RL	UNITS	BASIS	DILUTION	SPIKE LEVEL	RECOVERY	UPPER CL	LOWER CL	ANALYST	PSOLIDS	LNOTE	ANOTE
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-110	38380-03-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-114	74472-37-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-118	31508-00-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-132/153	38380-05-1/35065-27-1	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-138	35065-28-2	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-141	52712-04-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-149	38380-04-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-167	52663-72-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-168	59291-65-5	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-169	32774-16-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-170	35065-30-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-183	52663-69-1	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-187	52663-68-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-189	39635-31-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-194	35694-08-7	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-206	40186-72-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-209	2051-24-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-28/31	7012-37-5/16606-02-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-3	2051-62-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-52	35693-99-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-56/60	41464-40-8/33025-41-1	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-66	32598-10-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-70	32598-11-1	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-87	38380-02-8	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-95	38379-99-6	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-97	41464-51-1	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-99	38380-01-7	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-195	52663-78-2	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-199	52663-75-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-201	40186-71-8	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-203	52663-76-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-33	38444-86-9	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-37	38444-90-5	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-44	41464-39-5	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-49	41464-40-8	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-74	32690-93-0	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-77	32598-13-3	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-8	34883-43-7	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	PCB-81	70362-50-4	FALSE	ND	41	41	ug/kg dry	Dry	1					EFC	64.6		M-02
SME Sediment Monitoring	E3	Solid	7/12/2022	7/21/2022	8/3/2022	GC/MS/MS	EPA 3546/Microwave	Triphenyl phosphate	115-86-6	TRUE	410			ug/kg dry	Dry	1	345	119	179	15	EFC	64.6		

APPENDIX C – SEDIMENT TOXICITY TEST DATA AND STATISTICAL SUMMARIES

Marine Amphipod

Eohaustorius estuarius

Marine Sediment Bioassay

Organism Survival

Project: Camp Pendleton - Santa Margarita Estuary

Test Species: *E. estuarius*

Sample ID: Site Sediments

Start Date/Time: 7/15/2022 1220

Test No.: NIWC-2022-150 -- 153

End Date/Time: 7/25/2022 1020

Sample ID	~~Replicate~~ Random # ME	Initial No.	No. Recovered	Technician Initials
Yaquina Bay Sediment	A 1	20	20	ME
	B 2	20	20	ME
	C 3	20	20	ME
	D 4	20	20	ME
	E 5	20	20	ME
MA1 "Outlet"	A 6	20	20	ME
	B 7	20	20	ME
	C 8	20	20	ME
	D 9	20	20	ME
	E 10	20	20	ME
MA2 "Midpoint"	A 11	20	20	ME
	B 12	20	18	ME
	C 13	20	20	ME
	D 14	20	20	ME
	E 15	20	20	ME
E3 "Inlet"	A 16	20	20	ME
	B 17	20	20	ME
	C 18	20	20	ME
	D 19	20	20	ME
	E ~~20~~	20	20	ME

QC Check: [illegible]

Final Review: LLL 8/15/22

Camp Pendleton - Santa Margarita Estuary
Amphipod Sediment Tests
Test Initiation Date: 7/15/2022

Sample ID	Replicate	Random #
Yaquina Bay Sediment	A	19
	B	13
	C	2
	D	5
	E	16
MA1 "Outlet"	A	1
	B	6
	C	14
	D	17
	E	11
MA2 "Midpoint"	A	7
	B	10
	C	3
	D	12
	E	4
E3 "Inlet"	A	15
	B	18
	C	20
	D	8
	E	9

10-Day Marine Sediment Bioassay
Static Conditions

Water Quality Measurements

Project ID: Camp Pendleton - Santa Margarita Estuary
Test Species: *E. estuarius*
Sample ID: YB Control
Start Date/Time: 7/15/2022 1220
Test No.: NIWC-2022-150
End Date/Time: 7/25/2022 1020

Test Day	Salinity (ppt)	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (units)	Technician Initials	Comments
0	33.0	14.8	10.2 mg/L 102.1%	7.98	RL	
1	33.1	14.9	10.1 101.3%	8.01	NH	
2	33.2	14.5	9.9 101.8	8.05	MC	
3	33.2	14.7	9.8 101.3	7.98	NH	
4	33.2	14.6	9.8 101.4	7.99	MC	
5	33.2	14.5	9.7 101.1	7.98	MC	
6	33.1	14.6	9.7 101.2	7.95	NH	
7	33.2	14.6	9.7 101.6	7.96	NH	
8	33.1	14.6	9.8 101.8	8.01	NH	
9	33.6	14.7	9.7 100.6	8.04	NH	
10	33.4	14.5	9.8 101.2	8.06	MC	

QC Check: NH
Final Review: MC 8/15/22

10-Day Marine Sediment Bioassay
Static Conditions

Water Quality Measurements

Project ID: Camp Pendleton - Santa Margarita Estuary

Test Species: *E. estuarius*

Sample ID: MA1 - "Outlet"

Start Date/Time: 7/15/2022 1220

Test No.: NIWC-2022-151

End Date/Time: 7/25/2022 1020

Test Day	Salinity (ppt)	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (units)	Technician Initials	Comments
0	33.2	14.5	10.3 mg/L 102.2%	8.02	RL	
1	33.1	14.9	10.1 102.1	8.00	NH	
2	33.4	14.6	10.2 102.2	8.14	MC	
3	33.3	14.3	10.3 102.5	8.11	NH	
4	33.2	14.2	10.4 102.7	8.13	MC	
5	33.3	14.5	10.1 100.6	8.08	MC	
6	33.2	14.4	10.1 100.1	8.10	NH	
7	33.2	14.4	9.9 100.0	8.11	NH	
8	33.1	14.1	9.9 100.0	8.11	NH	
9	33.4	14.5	10.0 102.6	8.23	NH	
10	33.2	14.4	9.8 101.1	8.13	MC	

QC Check: NH

Final Review: MC 8/15/22

10-Day Marine Sediment Bioassay
Static Conditions

Water Quality Measurements

Project ID: Camp Pendleton - Santa Margarita Estuary
Test Species: *E. estuarius*

Sample ID: MA2 - "Midpoint"
Start Date/Time: 7/15/2022 1220

Test No.: NIWC-2022-152
End Date/Time: 7/25/2022 1020

Test Day	Salinity (ppt)	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (units)	Technician Initials	Comments
0	33.2	14.7	10.1 mg/L 101.1 %	8.03	RL	
1	33.2	14.9	10.0 101.0	8.01	NH	
2	33.3	14.3	10.1 102.0	8.09	MC	
3	33.1	14.5	10.0 101.8	8.06	NH	
4	33.2	14.4	10.1 101.9	8.08	MC	
5	33.2	14.5	9.8 100.2	8.01	MC	
6	33.1	14.5	9.7 101.1	8.00	NH	
7	33.2	14.5	9.8 100.9	8.01	NH	
8	33.1	14.5	9.9 101.3	8.06	NH	
9	33.3	14.6	9.9 101.8	8.26	NH	
10	33.2	14.5	9.8 100.7	8.14	MC	

QC Check: NH

Final Review: ML 8/15/22

10-Day Marine Sediment Bioassay
Static Conditions

Water Quality Measurements

Project ID: Camp Pendleton - Santa Margarita Estuary

Test Species: *E. estuarius*

Sample ID: E3 - "Inlet"

Start Date/Time: 7/15/2022 1220

Test No.: NIWC-2022-153

End Date/Time: 7/25/2022 1020

Test Day	Salinity (ppt)	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (units)	Technician Initials	Comments
0	33.0	14.7	10.2 mg/L 101.7 %	8.05	RL	
1	33.1	14.8	10.1 101.8	8.06	NH	
2	33.0	14.3	10.1 102.3	8.12	MC	
3	33.0	14.4	10.2 102.5	8.10	NH	
4	33.1	14.4	10.1 102.1	8.08	MC	
5	33.3	14.6	10.0 101.8	8.06	MC	
6	33.1	14.5	10.0 101.9	8.04	NH	
7	33.0	14.4	9.9 101.3	8.04	NH	
8	33.1	14.5	9.8 100.4	8.10	NA	
9	33.1	14.5	10.0 102.0	8.26	NH	
10	33.2	14.6	9.8 100.6	8.17	MC	

QC Check: NH

Final Review: MC 8/15/22

Mediterranean Mussel

Mytilus galloprovincialis

Embryo Larval Bioassay

48-Hour Development

Project: Camp Pendleton - Santa Margarita Estuary

Test Species: *M. galloprovincialis*

Sample ID: Sediment Samples

Start Date: 7/15/2022

Test No.: NIWC-2022-146 -- 149

End Date: 7/17/2022

Random #	Number Normal	Number Abnormal	Technician Initials
1	96	5	MC
2	99	4	MC
3	108	5	MC
4	96	3	MC
5	112	6	MC
6	97	7	MC
7	108	3	MC
8	103	6	MC
9	89	3	MC
10	95	3	MC
11	88	4	MC
12	89	3	MC
13	108	2	MC
14	91	2	MC
15	83	4	MC
16	97	4	MC
17	102	3	MC
18	96	6	MC
19	97	3	MC
20	92	3	MC

QC Check: KH

Final Review: LL 8/15/2022

Camp Pendleton - Santa Margarita Estuary
Bivalve Development Test
Test Initiation Date: 7/15/2022

Sample ID	Replicate	Random #
Screen Tube Control	A	19
	B	13
	C	2
	D	5
	E	16
MA1 "Outlet"	A	1
	B	6
	C	14
	D	17
	E	11
MA2 "Midpoint"	A	7
	B	10
	C	3
	D	12
	E	4
E3 "Inlet"	A	15
	B	18
	C	20
	D	8
	E	9

Marine Chronic Bioassay

Water Quality Measurements

Project: Camp Pendleton - Santa Margarita Estuary
Sample ID: Site Sediments
Test No.: NIWC-2022-146 -- 149

Test Species: *M.galloprovincialis*
Start Date/Time: 7/15/2022 1245
End Date/Time: 7/17/2022 1130

Sample ID	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L / % sat.)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Water Only Control	31.8	31.9	33.4	15.2	15.0	14.4	8.9 97.2	9.1 98.1	10.3 102.9	7.70	8.01	8.05
MA1	32.8	33.1	33.2	15.2	15.0	14.5	9.9 102.0	9.8 101.8	10.4 103.2	8.06	8.01	8.10
MA2	33.2	33.1	33.4	15.0	15.0	14.5	10.1 102.1	10.1 102.3	10.4 103.3	8.06	8.01	8.13
E3	32.1	33.1	33.0	14.9	15.0	14.5	10.1 101.9	10.1 102.1	10.4 103.3	8.11	8.01	8.15

Technician Initials:	0	24	48
WQ Readings:	BL	NH	MC
Dilutions made by:	NH		
Meter # (DO, pH):	4,3	1,3	1,3

Animal Source/Date Received: field collected 5/16/2022

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: NH

Final Review: LL 8/15/22

Embryo-Larval Development Test – SPAWNING CHECKLIST & CALCULATIONS

Batch ID: 05162211Mg
Analyst: GR
Spawn/Test Date: 7/15/2022

Test Species: M. galloprovincialis
Animal Source: field collected
Date Received: 5/16/22

Task	Time
Spawning Inducement Initiated	0930 ↑ Temp from 15°C to 24°C *
Spawning Begins	1030 3♂ 1♀
Females/Males Isolated in Incubator	1100
Fertilization Initiated	1110
Fertilzation Terminated/eggs rinsed	1120
Embryo Counts	1220
Embryo addition to vials	1245

Embryo Counts:
Embryo Stock #1: 17, 17, 17 Mean = 17 / 20 uL * 1000 uL/mL = 850 cells/mL
Embryo Stock #2: 23, 17, 19 Mean = 19.7 / 20 uL * 1000 uL/mL = 983 cells/mL
Embryo Stock #3: 25, 32, 24 Mean = 27 / 20 uL * 1000 uL/mL = 1,350 cells/mL

Adjust selected embryo stock to 2000 embryos/ml. Confirm density:

Selected Stock : _____, _____, _____ Mean = _____/_____ uL * 1000 uL/mL = _____ cells/mL

Add 100 µl of 2000 embryo/ml stock to obtain 20 embryos/ml in test vials.

Time Zero Counts (if applicable):
Rep A 114, Rep B 120, Rep C 113, Rep D 104, Rep E 101; Mean = 111.6

Notes:
*back down to 15°C @ 1030.
Made 3 batches of the 1 ♀ eggs combined w/ solution of all 3 ♂
1240 ~ All batches @ 2-cell stage
Add 200 µl of #1 for 170 cell/ml

QC Check: AAT

Final Review: ME 8/15/2022

Ammonia Analysis Results

Total Ammonia Analysis

Project ID: Camp Pendleton / Santa Margarita Estuary
Test Type: Mg. SWI / Eoh Whole Sed

DI Blank: 0.0 / 0.0
Seawater Blank: 0.5

Analyst name: Rebecca L.
Analysis Date: 07/15/22 1000

N x 1.22

Sample ID	Sample Date	Test Day	pH (units)	Salinity (ppt)	Nitrogen (mg/L)	Ammonia (mg/L)
Mg. Dev						
Blank Spike (10 mg/L NH_3)	NA	NA	NA		9.5	11.59
MA1	7/15/2022	0			0.4	0.488
MA2	"	0			0.3	0.366
E3	"	0			0.0	0.00
control tube	7/15/2022	0			0.0	0.00
Mg-dev	7/17/2022	2				
WC	"	"			0.5	0.61
MA1	"	"			1.0	1.22
MA2	"	"			0.6	~~1.098~~ 0.732
E3	"	"			0.9	1.098
spike	"	"			9.1	11.10
Eoh						
YB	7/15/2022	0			0.1	0.122
MA1	"	0			0.2	0.244
MA2	"	0			0.1	0.122
E3	"	0			0.1	0.122
Spike	"	0			9.1	11.10
					~~9.1 WC MP~~	~~11.10~~
YB	7/25/22	10			0.4	0.488 WC
MA1	"	"			0.8	~~0.732~~ 0.976
MA2	"	"			0.6	0.732
E3	"	"			0.8	0976
Spike	"	"			9.2	11.224

QC Check: NTH

Final Review: LL 8/15/22

Reference Toxicant Test Data and Statistical Summaries

Marine Amphipod

Eohaustorius estuarius

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test **NIWC Pacific Bioassay Laboratory**

Batch ID:	14-7167-8100	**Test Type:**	Survival (96h)	**Analyst:**	Molly Colvin		
Start Date:	15 Jul-22 12:30	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater		
Ending Date:	19 Jul-22 10:30	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable		
Test Length:	94h	**Taxon:**	Malacostraca	**Source:**	Northwest Amphipod	**Age:**	

Sample ID:	00-1327-5570	**Code:**	CA91B2	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Cadmium chloride	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
07-9653-1602	96h Survival Rate	Steel Many-One Rank Sum Test		5	10	7.071	12.6%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	S
18-3669-1320	96h Survival Rate	Trimmed Spearman-Kärber		LC50	11.34	9.72	13.24	1

96h Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
1.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
2.5		4	0.9500	0.8581	1.0420	0.9000	1.0000	0.0289	0.0577	6.08%	5.00%
5		4	0.9000	0.7701	1.0300	0.8000	1.0000	0.0408	0.0817	9.07%	10.00%
10		4	0.6250	0.3532	0.8968	0.4000	0.8000	0.0854	0.1708	27.33%	37.50%
20		4	0.1250	-0.0752	0.3252	0.0000	0.3000	0.0629	0.1258	100.66%	87.50%

96h Survival Rate Detail MD5: 7D5D1416DC4679606CBC187E4E07CDEC

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	1.0000	1.0000
1.25		1.0000	1.0000	1.0000	1.0000
2.5		1.0000	0.9000	0.9000	1.0000
5		0.9000	1.0000	0.9000	0.8000
10		0.8000	0.7000	0.6000	0.4000
20		0.3000	0.1000	0.1000	0.0000

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	10/10	10/10	10/10	10/10
1.25		10/10	10/10	10/10	10/10
2.5		10/10	9/10	9/10	10/10
5		9/10	10/10	9/10	8/10
10		8/10	7/10	6/10	4/10
20		3/10	1/10	1/10	0/10

Eohaustorius 10-d Survival and Reburial Sediment Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	07-9653-1602	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:06	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Jan-23 8:06	**MD5 Hash:**	7D5D1416DC4679606CBC187E4E07CDEC	**Editor ID:**	008-623-435-5
Batch ID:	14-7167-8100	**Test Type:**	Survival (96h)	**Analyst:**	Molly Colvin
Start Date:	15 Jul-22 12:30	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	19 Jul-22 10:30	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	94h	**Taxon:**	Malacostraca	**Source:**	Northwest Amphipod **Age:**
Sample ID:	00-1327-5570	**Code:**	CA91B2	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Cadmium chloride	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	5	10	7.071	---	0.1264	12.64%

Steel Many-One Rank Sum Test

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		1.25	18	10	1	6	CDF	0.8333	Non-Significant Effect
		2.5	14	10	1	6	CDF	0.3451	Non-Significant Effect
		5	12	10	1	6	CDF	0.1424	Non-Significant Effect
		10*	10	10	0	6	CDF	0.0417	Significant Effect
		20*	10	10	0	6	CDF	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.49399	0.698799	5	48.28	<1.0E-05	Significant Effect
Error	0.260522	0.0144735	18			
Total	3.75452		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.9244	0.884	0.0730	Normal Distribution

96h Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
1.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
2.5		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	5.00%
5		4	0.9000	0.7701	1.0000	0.9000	0.8000	1.0000	0.0408	9.07%	10.00%
10		4	0.6250	0.3532	0.8968	0.6500	0.4000	0.8000	0.0854	27.33%	37.50%
20		4	0.1250	0.0000	0.3252	0.1000	0.0000	0.3000	0.0629	100.66%	87.50%

Angular (Corrected) Transformed Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	0.00%
1.25		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	0.00%
2.5		4	1.3310	1.1810	1.4800	1.3310	1.2490	1.4120	0.0471	7.07%	5.77%
5		4	1.2540	1.0560	1.4530	1.2490	1.1070	1.4120	0.0623	9.93%	11.17%
10		4	0.9173	0.6318	1.2030	0.9386	0.6847	1.1070	0.0897	19.56%	35.04%
20		4	0.3455	0.0686	0.6223	0.3218	0.1588	0.5796	0.0870	50.36%	75.53%

Eohaustorius 10-d Survival and Reburial Sediment Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	07-9653-1602	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:06	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Jan-23 8:06	**MD5 Hash:**	7D5D1416DC4679606CBC187E4E07CDEC	**Editor ID:**	008-623-435-5

96h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	1.0000	1.0000
1.25		1.0000	1.0000	1.0000	1.0000
2.5		1.0000	0.9000	0.9000	1.0000
5		0.9000	1.0000	0.9000	0.8000
10		0.8000	0.7000	0.6000	0.4000
20		0.3000	0.1000	0.1000	0.0000

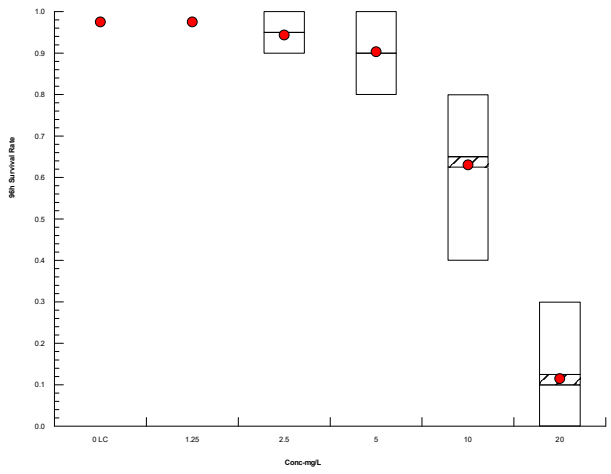
Angular (Corrected) Transformed Detail

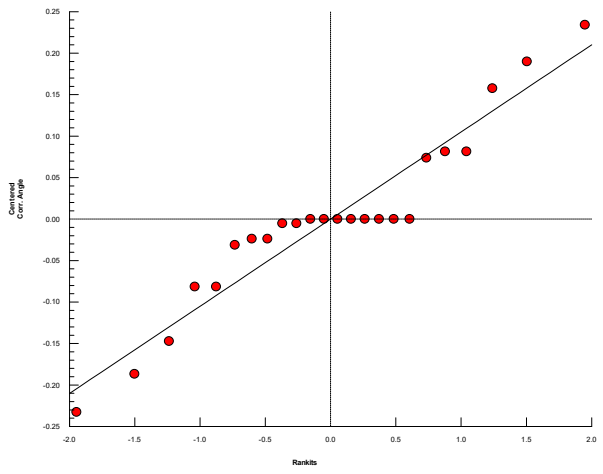
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.4120	1.4120	1.4120	1.4120
1.25		1.4120	1.4120	1.4120	1.4120
2.5		1.4120	1.2490	1.2490	1.4120
5		1.2490	1.4120	1.2490	1.1070
10		1.1070	0.9912	0.8861	0.6847
20		0.5796	0.3218	0.3218	0.1588

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	10/10	10/10	10/10	10/10
1.25		10/10	10/10	10/10	10/10
2.5		10/10	9/10	9/10	10/10
5		9/10	10/10	9/10	8/10
10		8/10	7/10	6/10	4/10
20		3/10	1/10	1/10	0/10

Graphics





Eohaustorius 10-d Survival and Reburial Sediment Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	18-3669-1320	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:07	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	05 Jan-23 8:06	**MD5 Hash:**	7D5D1416DC4679606CBC187E4E07CDEC	**Editor ID:**	008-623-435-5
Batch ID:	14-7167-8100	**Test Type:**	Survival (96h)	**Analyst:**	Molly Colvin
Start Date:	15 Jul-22 12:30	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	19 Jul-22 10:30	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	94h	**Taxon:**	Malacostraca	**Source:**	Northwest Amphipod **Age:**
Sample ID:	00-1327-5570	**Code:**	CA91B2	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Cadmium chloride	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	12.50%	1.054733	0.0335229	11.34	9.72	13.24

96h Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	**Code**	**Count**	**Mean**	**Median**	**Min**	**Max**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	LC	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
1.25		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
2.5		4	0.9500	0.9500	0.9000	1.0000	6.08%	5.00%	38/40	0.9500	5.00%
5		4	0.9000	0.9000	0.8000	1.0000	9.07%	10.00%	36/40	0.9000	10.00%
10		4	0.6250	0.6500	0.4000	0.8000	27.33%	37.50%	25/40	0.6250	37.50%
20		4	0.1250	0.1000	0.0000	0.3000	100.66%	87.50%	5/40	0.1250	87.50%

96h Survival Rate Detail

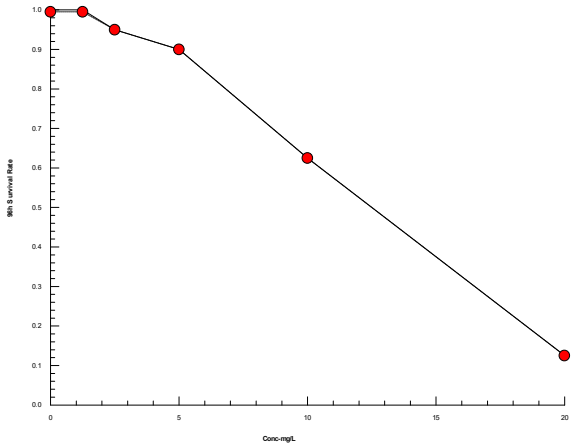
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	1.0000	1.0000
1.25		1.0000	1.0000	1.0000	1.0000
2.5		1.0000	0.9000	0.9000	1.0000
5		0.9000	1.0000	0.9000	0.8000
10		0.8000	0.7000	0.6000	0.4000
20		0.3000	0.1000	0.1000	0.0000

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	10/10	10/10	10/10	10/10
1.25		10/10	10/10	10/10	10/10
2.5		10/10	9/10	9/10	10/10
5		9/10	10/10	9/10	8/10
10		8/10	7/10	6/10	4/10
20		3/10	1/10	1/10	0/10

Eohaustorius 10-d Survival and Reburial Sediment Test					**NIWC Pacific Bioassay Laboratory**
Analysis ID:	18-3669-1320	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:07	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	05 Jan-23 8:06	**MD5 Hash:**	7D5D1416DC4679606CBC187E4E07CDEC	**Editor ID:**	008-623-435-5

Graphics



Marine Acute Bioassay
Static Conditions

Water Quality Measurements
& Test Organism Survival

Project: Camp Pendleton - Santa Margarita Estuary
Sample ID: $CdCl_2$ Reference Toxicant
Test No.: NIWC_2022-145

Test Species: *E. estuarius*
Start Date/Time: 7/15/2022 1230
End Date/Time: 7/19/2022 1030

	Tech Initials				
	0	24	48	72	96
Counts:	NH/RL	NH	MC	NH	MC
Readings:	RL	NH	MC	NH	MC
Dilutions made by:	NH				

meter: 1,3 1,3 1,3

Concentration $CdCl_2$ (mg/L)	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L / % sat.)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	10	10	10	10	10	33.1	33.0	33.5	33.4	33.3	15.0	14.8	14.3	14.5	14.6	10.2	10.1	9.8	9.9	9.8	7.9	8.01	8.02	8.01	8.02
	B	10	10	10	10	10											105.7	101.6	98.4	98.4	98.7					
	C	10	10	10	10	10																				
	D	10	10	10	10	10																				
1.25	A	10	10	10	10	10	33.4	33.1	33.6	33.3	33.3	15.0	14.8	14.2	14.7	14.7	10.1	10.1	9.8	9.8	9.7	8.01	8.01	8.02	8.02	8.03
	B	10	10	10	10	10											106	101.6	98.3	98.1	98.4					
	C	10	10	10	10	10																				
	D	10	10	10	10	10																				
2.5	A	10	10	10	10	10	33.3	33.1	33.6	33.4	33.4	15.0	14.8	14.2	14.7	14.7	10.1	10.0	9.6	9.7	9.7	8.03	8.01	8.01	8.02	8.03
	B	10	10	10	9	9											106	101.8	96.7	98.2	98.4					
	C	10	10	10	9	9																				
	D	10	10	10	10	10																				
5	A	10	10	10	10	9	33.1	33.1	33.5	33.3	33.3	15.0	14.8	14.3	14.4	14.5	10.1	10.1	9.8	9.7	9.8	8.04	8.01	8.01	8.02	8.03
	B	10	10	10	10	10											106	101.6	98.2	98.2	98.3					
	C	10	10	10	10	9																				
	D	10	10	10	10	8																				
10	A	10	10	10	9	8	33.0	33.0	33.2	33.4	33.5	15.0	14.8	14.4	14.5	14.6	10.1	10.2	9.7	9.7	9.7	8.05	8.01	7.99	8.00	8.03
	B	10	10	10	9	7											105	102.3	98.1	98.3	98.3					
	C	10	10	10	8	6																				
	D	10	10	10	8	4																				
20	A	10	10	10	6	3	32.6	32.6	33.0	33.1	33.0	15.0	14.8	14.2	14.5	14.6	10.0	10.1	9.7	9.7	9.8	8.05	8.01	8.00	8.01	8.03
	B	10	10	6	2	1											105	101.6	97.5	98.1	98.3					
	C	10	10	10	4	1																				
	D	10	10	8	5	ø																				

Initial Counts QC'd by: NH/RL

Animal Source/Date Received: Northwest Amphipod 7/12/2022 Size at Initiation: 3-5mm

	Feeding Times				
	0	24	48	72	96
AM:					
PM:					

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one (y / (n))

Tests aerated? Circle one (y / (n)) if yes, sample ID(s): Duration:

Aeration source:

QC Check: NH

Final Review: ME 8/15/22

Cadmium Reference Toxicant Test for *Eohaustorius estuarius*

Date of Test Initiations: 7/15/22

Date of Cu Stock: 17 June 2013

Dilutions Prepared By: MO

Amphipod Survival

Substock concentration (mg/L):	C_1	1040	
Target test volume (mL):	V_2	2000	$V_1 = C_2V_2/C1$
Target test concentrations (mg/L): C_2	Volume of parent stock to add (mL): V_1	Volume of FSW to add (mL):	
0	0.00	2000.00	
1.25	~~2.40~~ 1.2	1997.60	
2.5	4.81 2.4	1995.19	1000
5	9.62 4.8	1990.38	
10	19.23 9.6	1980.77	
20	38.46 19.2	1961.54	

QC Check: _____ Final Review: ME 8/15/22

Mediterranean Mussel

Mytilus galloprovincialis

CETIS Summary Report

Bivalve Larval Survival and Development Test — **NIWC Pacific Bioassay Laboratory**

Batch ID:	18-3353-6267	**Test Type:**	Development-Survival	**Analyst:**	Molly Colvin		
Start Date:	15 Jul-22 12:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	17 Jul-22 11:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable		
Test Length:	47h	**Taxon:**	Bivalvia	**Source:**	Field Collected	**Age:**	NA

Sample ID:	00-4506-8598	**Code:**	2AFB136	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Copper sulfate	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
02-9244-0978	Combined Proportion Normal	Steel Many-One Rank Sum Test	✓	4.1	5.8	4.876	11.7%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
02-3886-8571	Combined Proportion Normal	Trimmed Spearman-Kärber	✓	EC50	6.12	6.028	6.214	1

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9720	0.9571	0.9868	0.9540	0.9825	0.0053	0.0119	1.23%	0.00%
2.9		5	0.9656	0.9530	0.9783	0.9551	0.9806	0.0046	0.0102	1.05%	0.65%
4.1		5	0.9446	0.9119	0.9773	0.9068	0.9759	0.0118	0.0263	2.79%	2.81%
5.8		5	0.5612	0.1917	0.9306	0.2301	0.8235	0.1331	0.2976	53.02%	42.27%
8.4		5	0.0484	0.0118	0.0850	0.0000	0.0750	0.0132	0.0295	60.95%	95.02%
12		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
17.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Combined Proportion Normal Detail MD5: 5C40FE900B69A19D498CA8D3B09CD103

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9825	0.9817	0.9540	0.9663	0.9753
2.9		0.9625	0.9806	0.9551	0.9591	0.9708
4.1		0.9759	0.9379	0.9620	0.9068	0.9404
5.8		0.8235	0.7908	0.2301	0.7152	0.2462
8.4		0.0750	0.0584	0.0657	0.0000	0.0429
12		0.0000	0.0000	0.0000	0.0000	0.0000
17.2		0.0000	0.0000	0.0000	0.0000	0.0000

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	168/171	161/164	166/174	172/178	158/162
2.9		154/160	152/155	149/156	164/171	166/171
4.1		162/166	151/161	152/158	146/161	142/151
5.8		126/153	121/153	26/113	118/165	32/130
8.4		12/160	8/137	9/137	0/127	6/140
12		0/112	0/112	0/112	0/112	0/112
17.2		0/112	0/131	0/112	0/112	0/112

Bivalve Larval Survival and Development Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	02-9244-0978	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:19	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Jan-23 8:15	**MD5 Hash:**	5C40FE900B69A19D498CA8D3B09CD103	**Editor ID:**	008-623-435-5
Batch ID:	18-3353-6267	**Test Type:**	Development-Survival	**Analyst:**	Molly Colvin
Start Date:	15 Jul-22 12:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	17 Jul-22 11:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Test Length:	47h	**Taxon:**	Bivalvia	**Source:**	Field Collected **Age:** NA
Sample ID:	00-4506-8598	**Code:**	2AFB136	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Copper sulfate	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	4.1	5.8	4.876	---	0.1136	11.68%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.9	23	17	0	8	CDF	0.3998	Non-Significant Effect
		4.1	19	17	0	8	CDF	0.1130	Non-Significant Effect
		5.8*	15	17	0	8	CDF	0.0158	Significant Effect
		8.4*	15	17	0	8	CDF	0.0158	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.36076	1.34019	4	58.61	<1.0E-05	Significant Effect
Error	0.457331	0.0228666	20			
Total	5.81809		24			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	27.44	13.28	1.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8762	0.8877	0.0058	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9720	0.9571	0.9868	0.9753	0.9540	0.9825	0.0053	1.23%	0.00%
2.9		5	0.9656	0.9530	0.9783	0.9625	0.9551	0.9806	0.0046	1.05%	0.65%
4.1		5	0.9446	0.9119	0.9773	0.9404	0.9068	0.9759	0.0118	2.79%	2.81%
5.8		5	0.5612	0.1917	0.9306	0.7152	0.2301	0.8235	0.1331	53.02%	42.27%
8.4		5	0.0484	0.0118	0.0850	0.0584	0.0000	0.0750	0.0132	60.95%	95.02%
12		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
17.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.4050	1.3620	1.4490	1.4130	1.3550	1.4380	0.0157	2.50%	0.00%
2.9		5	1.3860	1.3490	1.4230	1.3760	1.3570	1.4310	0.0132	2.13%	1.37%
4.1		5	1.3390	1.2660	1.4120	1.3240	1.2610	1.4150	0.0263	4.39%	4.75%
5.8		5	0.8521	0.4596	1.2450	1.0080	0.5003	1.1370	0.1413	37.09%	39.37%
8.4		5	0.2067	0.0897	0.3237	0.2441	0.0444	0.2774	0.0421	45.57%	85.29%
12		5	0.0473	0.0473	0.0473	0.0473	0.0473	0.0473	0.0000	0.00%	96.64%
17.2		5	0.0466	0.0446	0.0485	0.0473	0.0437	0.0473	0.0007	3.42%	96.69%

Bivalve Larval Survival and Development Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	02-9244-0978	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:19	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Jan-23 8:15	**MD5 Hash:**	5C40FE900B69A19D498CA8D3B09CD103	**Editor ID:**	008-623-435-5

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9825	0.9817	0.9540	0.9663	0.9753
2.9		0.9625	0.9806	0.9551	0.9591	0.9708
4.1		0.9759	0.9379	0.9620	0.9068	0.9404
5.8		0.8235	0.7908	0.2301	0.7152	0.2462
8.4		0.0750	0.0584	0.0657	0.0000	0.0429
12		0.0000	0.0000	0.0000	0.0000	0.0000
17.2		0.0000	0.0000	0.0000	0.0000	0.0000

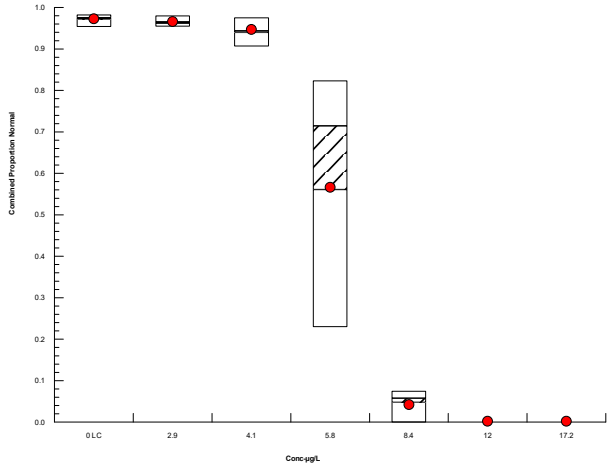
Angular (Corrected) Transformed Detail

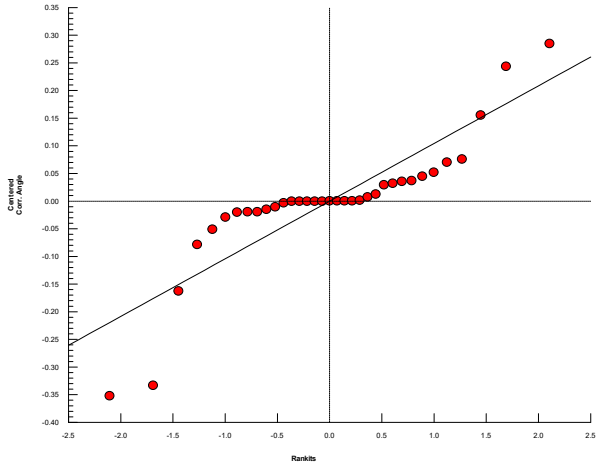
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.4380	1.4350	1.3550	1.3860	1.4130
2.9		1.3760	1.4310	1.3570	1.3670	1.3990
4.1		1.4150	1.3190	1.3750	1.2610	1.3240
5.8		1.1370	1.0960	0.5003	1.0080	0.5191
8.4		0.2774	0.2441	0.2592	0.0444	0.2085
12		0.0473	0.0473	0.0473	0.0473	0.0473
17.2		0.0473	0.0437	0.0473	0.0473	0.0473

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	168/171	161/164	166/174	172/178	158/162
2.9		154/160	152/155	149/156	164/171	166/171
4.1		162/166	151/161	152/158	146/161	142/151
5.8		126/153	121/153	26/113	118/165	32/130
8.4		12/160	8/137	9/137	0/127	6/140
12		0/112	0/112	0/112	0/112	0/112
17.2		0/112	0/131	0/112	0/112	0/112

Graphics





Bivalve Larval Survival and Development Test — **NIWC Pacific Bioassay Laboratory**

Analysis ID:	02-3886-8571	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:19	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	05 Jan-23 8:15	**MD5 Hash:**	5C40FE900B69A19D498CA8D3B09CD103	**Editor ID:**	008-623-435-5
Batch ID:	18-3353-6267	**Test Type:**	Development-Survival	**Analyst:**	Molly Colvin
Start Date:	15 Jul-22 12:45	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	17 Jul-22 11:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Test Length:	47h	**Taxon:**	Bivalvia	**Source:**	Field Collected **Age:** NA
Sample ID:	00-4506-8598	**Code:**	2AFB136	**Project:**	Santa Margarita River Estuary
Sample Date:	15 Jul-22	**Material:**	Copper sulfate	**Source:**	Reference Toxicant
Receipt Date:	15 Jul-22	**CAS (PC):**		**Station:**	Reference Toxicant
Sample Age:	13h	**Client:**	NRSW		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02827	0.64%	0.7867866	0.003298	6.12	6.028	6.214

Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Median**	**Min**	**Max**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	LC	5	0.9720	0.9753	0.9540	0.9825	1.23%	0.00%	825/849	0.9720	0.00%
2.9		5	0.9656	0.9625	0.9551	0.9806	1.05%	0.65%	785/813	0.9656	0.65%
4.1		5	0.9446	0.9404	0.9068	0.9759	2.79%	2.81%	753/797	0.9446	2.81%
5.8		5	0.5612	0.7152	0.2301	0.8235	53.02%	42.27%	423/714	0.5612	42.27%
8.4		5	0.0484	0.0584	0.0000	0.0750	60.95%	95.02%	35/701	0.0484	95.02%
12		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/560	0.0000	100.00%
17.2		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/579	0.0000	100.00%

Combined Proportion Normal Detail

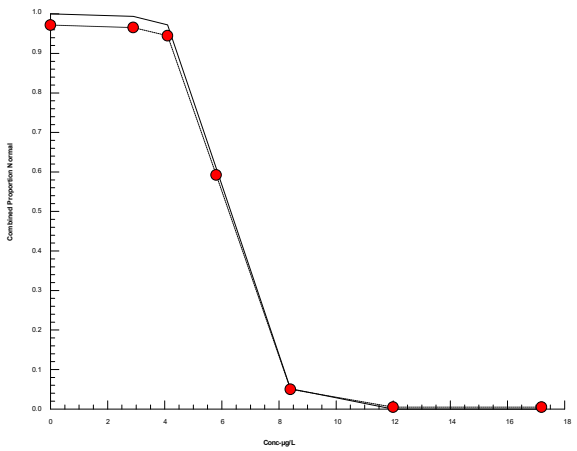
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9825	0.9817	0.9540	0.9663	0.9753
2.9		0.9625	0.9806	0.9551	0.9591	0.9708
4.1		0.9759	0.9379	0.9620	0.9068	0.9404
5.8		0.8235	0.7908	0.2301	0.7152	0.2462
8.4		0.0750	0.0584	0.0657	0.0000	0.0429
12		0.0000	0.0000	0.0000	0.0000	0.0000
17.2		0.0000	0.0000	0.0000	0.0000	0.0000

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	168/171	161/164	166/174	172/178	158/162
2.9		154/160	152/155	149/156	164/171	166/171
4.1		162/166	151/161	152/158	146/161	142/151
5.8		126/153	121/153	26/113	118/165	32/130
8.4		12/160	8/137	9/137	0/127	6/140
12		0/112	0/112	0/112	0/112	0/112
17.2		0/112	0/131	0/112	0/112	0/112

Bivalve Larval Survival and Development Test					**NIWC Pacific Bioassay Laboratory**
Analysis ID:	02-3886-8571	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Jan-23 8:19	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1
Edit Date:	05 Jan-23 8:15	**MD5 Hash:**	5C40FE900B69A19D498CA8D3B09CD103	**Editor ID:**	008-623-435-5

Graphics



Embryo Larval Bioassay

48-Hour Development

Project: Camp Pendleton - Santa Margarita Estuary

Test Species: *M. galloprovincialis*

Sample ID: Reference Toxicant CuSO4

Start Date: 7/15/2022

Test No.: NIWC-2022-144

End Date: 7/17/2022

Random #	Number Normal	Number Abnormal	Technician Initials
21	32	98	MC
22	∅	127	MC
23	∅	131	MC
24	166	8	MC
25	154	6	MC
26	MC ~~HOT~~ 26	MC ~~3~~ 87	MC
27	161	3	MC
28	146	15	MC
29	162	4	MC
30	∅	–	MC
31	8	129	MC
32	12	~~HS~~	MC
33	126	27	MC
34	∅	–	MC
35	172	6	MC
36	∅	–	MC
37	168	3	MC
38	∅	–	MC
39	9	128	MC
40	∅	–	MC
41	151	10	MC
42	∅	–	MC
43	6	134	MC
44	∅	–	MC
45	149	7	MC
46	152	3	MC
47	164	7	MC
48	158	4	MC
49	∅	–	MC
50	152	6	MC
51	166	5	MC
52	121	32	MC
53	142	9	MC
54	∅	–	MC
55	118	47	MC

QC Check: ~~AH~~

Final Review: MC 8/15/2022

NIWC Pacific Bioassay Lab, 53475 Strothe Rd, Bldg 111 Rm 116, San Diego, CA 92152

Camp Pendleton - Santa Margarita Estuary
Bivalve Development Test
Test Initiation Date: 7/15/2022
Copper Reference Toxicant

Copper Concentration (µg/L)	Replicate	Random #
0	A	37
	B	27
	C	24
	D	35
	E	48
2.9	A	25
	B	46
	C	45
	D	47
	E	51
4.1	A	29
	B	41
	C	50
	D	28
	E	53
5.8	A	33
	B	52
	C	26
	D	55
	E	21
8.4	A	32
	B	31
	C	39
	D	22
	E	43
12	A	42
	B	36
	C	49
	D	30
	E	44
17.2	A	40
	B	23
	C	38
	D	34
	E	54

QC Check - Bivalve: ME

Marine Chronic Bioassay

Water Quality Measurements

Project: Camp Pendleton - Santa Margarita Estuary
Sample ID: Copper Sulfate Reference Toxicant
Test No.: NIWC-2022-144

Test Species: *M.galloprovincialis*
Start Date/Time: 7/15/2022 1245
End Date/Time: 7/17/2022 1130

Concentration $CuSO_4$ (µg/L)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L / % sat.)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	32.8	33.1	33.5	15.6	15.1	14.3	10.11 103.8	10.1 102.6	10.1 101.5	8.01	8.01	8.06
2.9	33.4	33.4	33.5	15.0	15.1	14.3	10.26 106.5	10.3 102.6	10.2 101.8	8.04	8.01	8.06
4.1	33.3	33.0	33.6	15.0	15.1	14.4	10.11 105.3	10.1 102.6	10.3 102.2	8.04	8.01	8.06
5.8	33.3	33.1	33.8	15.0	15.1	14.3	10.13 105.5	10.1 102.4	10.3 102.2	8.04	8.01	8.06
8.4	33.3	33.1	33.7	15.0	15.1	14.4	10.18 106.0	10.1 102.5	10.3 102.0	8.04	8.06	8.06
12	33.4	33.1	33.6	15.0	15.1	14.4	10.14 105.7	102.6 10.14	10.3 102.0	8.04	8.01	8.06
17.2	33.3	33.1	33.9	15.0	15.1	14.2	10.23 106.1	10.1 10.5	10.4 102.2	8.05	8.04	8.08

Technician Initials:	0	24	48
WQ Readings:	RL	NH	MC
Dilutions made by:	NH		
Meter # (DO, pH):	1/3	1,3	1,3

Animal Source/Date Received: field collected 5/16/2022

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: [signature]

Final Review: [signature] 8/15/22

$CuSO_4$ Reference Toxicant Concentration Calculations

Date of Test Initiations: 7/15/22

Date of Cu Stock: 3/15/22

Dilutions Prepared By: ME

1 ppm Substock Preparation: $C_1V_1 = C_2V_2$

Parent stock concentration (µg/L):	C_1	1000000	
Target substock volume (mL):	V_2	100	
Target substock concentration (µg/L):	C_2	1000	
Volume of parent stock to add (mL):	V_1	0.1	$V_1 = C_2V_2/C1$

Add 0.1mL (100µL) of parent stock to 100mL of FSW

Bivalve Embryo-Development:
Test Concentrations Preparation:

Substock concentration (µg/L):	C_1	1000
Target test volume (mL):	V_2	250
Target test concentrations (µg/L):	Volume of parent stock to add (mL):	
C_2	V_1	
2.9	**0.73**	
4.1	**1.03**	
5.8	**1.45**	
8.4	**2.10**	
12	**3.00**	
17.2	**4.30**	

QC Check: [signature]

Final Review: ME 8/15/22

Sample Information

al Information
arfare Center

PACIFIC

Project: CPEN - Santa Margarita Estuary
Sample ID: Yaquina Bay Sed.
Test ID No(s): NIWC - 2022-150

Sample Check-In Information

Check-in No.:	2022-042
Collection Date & Time:	7/7/22 NR
Collection Temperature (°C):	NR
Receipt Date & Time:	7/12/22
# of Containers & Container Type:	2 bags
Approximate Volume Received (L):	2
Check-in Temperature (°C):	14.8
Temperature OK?[1]:	(Y) N
DO (mg/L) | (% Sat.)	- | -
Meter #	-
pH (units) | Meter #:	- | -
Conductivity (µS/cm) | Meter #:	- | -
Salinity (ppt) | Meter #:	- | -

Sample Description (circle): SED - SANDY
Color: no color yellow (brown) green ~~orange~~ other _____ N/A
Turbidity: none light moderate heavy N/A
Odor: (none) other _____ N/A
Debris: none light moderate heavy other _____ (N/A)

Test Performed: Eoh Whole Sed
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: (Lab FSW) Art SW

Test Performed: Mg-dev SW1
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: (Lab FSW) Art SW

Test Performed: _____
Salinity Adjustment? Y / N Target ppt: _____
Source: Crystal Sea Brine
Control/Dilution Water: Lab FSW Art SW

COC Complete? (Y) N

Filtration? Y (N)
Pore size: _____ Organisms or Debris

pH Adjustment? Y (N)
Initial pH: _____ Final pH: _____ Amount HCl: _____

Sample Aeration? Y (N)
Initial DO: _____ Final DO: _____ Duration/Rate: _____

Subsamples for Additional Chemistry Required? N/A NR

Additional Comments: [1] - Temperature of sample should be 0-6°C if received >24hrs past collection time.
NR - Not recorded

QC Check: MH
Final Review: [illegible] 7/15/2022

Naval Information Warfare Center PACIFIC

Project: CPEN | SME
Sample ID: MA1 - "outlet"
Test ID No(s): NIWC-2022-1466 ; -150

Sample Check-In Information

Check-in No.:	2022-043
Collection Date & Time:	7/12/2022 0925
Collection Temperature (°C):	22.5
Receipt Date & Time:	7/13/2022 1000
No. of Containers & Container Type:	1 bag
Approximate Volume Received (L):	~8 L
Check-in Temperature (°C):	4.6
Temperature OK?[1]:	(Y) N
DO (mg/L) | (% Sat.)	
Meter #	
pH (units) | Meter #:	
Conductivity (µS/cm) | Meter #:	
Salinity (ppt) | Meter #:	

Sample Description (circle): SEDIMENT — Sandy

Color: no color yellow (brown) green orange other_____

Turbidity: none light moderate heavy

Odor: (none) other_____

Debris: none light moderate heavy other_____

Test Performed: Eoh Whole Sed

Salinity Adjustment? Y / (N) Target ppt: 34

Source: Crystal Sea Brine

Control/Dilution Water: (Lab FSW) Art SW

Test Performed: Mg-dev SW1

Salinity Adjustment? Y / (N) Target ppt: 34

Source: Crystal Sea Brine

Control/Dilution Water: (Lab FSW) Art SW

Test Performed: _____

Salinity Adjustment? Y / N Target ppt: _____

Source: Crystal Sea Brine

Control/Dilution Water: Lab FSW Art SW

COC Complete? (Y) N

Filtration? (Y) N

Pore size: 1mm (Organisms or Debris)

pH Adjustment? Y (N)

Initial pH: _____ Final pH: _____ Amount HCl: _____

Sample Aeration? Y (N)

Initial DO: _____ Final DO: _____ Duration/Rate: _____

Subsamples for Additional Chemistry Required? ~~Yes~~ ~~per~~ MC 3 x 4oz glass jar; 1 x 8oz glass jar

Additional Comments: [1] - Temperature of sample should be 0-6°C if received >24hrs past collection time.

QC Check: NH

Final Review: LL 8/15/2022

Naval Information Warfare Center PACIFIC

Project: CPEN / SME
Sample ID: MA2 - "Midpoint"
Test ID No(s): NIWC-2022-147; -151

Sample Check-In Information

Check-in No.:	2022-044
Collection Date & Time:	7/12/2022 1035
Collection Temperature (°C):	22.7
Receipt Date & Time:	7/13/2022 1000
No. of Containers & Container Type:	1 bag
Approximate Volume Received (L):	~8L
Check-in Temperature (°C):	4.6
Temperature OK?[1]:	(Y) N
DO (mg/L) | (% Sat.)	
Meter #	
pH (units) | Meter #:	
Conductivity (µS/cm) | Meter #:	
Salinity (ppt) | Meter #:	

NE

Sample Description (circle): SEDIMENT – Silty
Color: no color yellow (brown) green orange other_____
~~Turbidity:~~ none light moderate heavy
Odor: none other sulfides
~~Debris~~: none light moderate heavy other_____

Test Performed: Eoh whole Sed
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: (Lab FSW) Art SW

Test Performed: Mg-dev SW
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: (Lab FSW) Art SW

Test Performed: _____
Salinity Adjustment? Y / N Target ppt: _____
Source: Crystal Sea Brine
Control/Dilution Water: Lab FSW Art SW

COC Complete? (Y) N

Filtration? (Y) N
Pore size: 1mm (Organisms or Debris)

pH Adjustment? Y (N)
Initial pH: _____ Final pH: _____ Amount HCl: _____

Sample Aeration? Y (N)
Initial DO: _____ Final DO: _____ Duration/Rate: _____

Subsamples for Additional Chemistry Required? Y, 3x 4oz; 1x 8oz. glass jars

Additional Comments: [1] - Temperature of sample should be 0-6°C if received >24hrs past collection time.

QC Check: KTA
Final Review: 8/15/2022

Naval Information Warfare Center PACIFIC

Project: CPEN | SME
Sample ID: B3 - "Inlet"
Test ID No(s): NIWC-2022-148, -152

Sample Check-In Information

Check-in No.:	2022-045
Collection Date & Time:	7/12/2022 1344
Collection Temperature (°C):	28.9
Receipt Date & Time:	7/13/2022 1000
No. of Containers & Container Type:	1 bag
Approximate Volume Received (L):	~8L
Check-in Temperature (°C):	4.6
Temperature OK?[1]:	(Y) N
DO (mg/L) | (% Sat.)	|
Meter #	
pH (units) | Meter #:	
Conductivity (µS/cm) | Meter #:	
Salinity (ppt) | Meter #:	

ME

Sample Description (circle): SEDIMENT - SANDY
Color: no color yellow ~~brown~~ green orange other_____
~~Turbidity~~: none light moderate heavy
Odor: (none) other_____
~~Debris~~: none light moderate heavy other_____

Test Performed: Eoh Whole Sed
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: (Lab FSW) Art SW

Test Performed: Mg-dev SW
Salinity Adjustment? Y / (N) Target ppt: 34
Source: Crystal Sea Brine
Control/Dilution Water: ~~Lab FSW~~ Art SW

Test Performed: _____
Salinity Adjustment? Y / N Target ppt: _____
Source: Crystal Sea Brine
Control/Dilution Water: Lab FSW Art SW

COC Complete? (Y) N

Filtration? (Y) N
Pore size: 1mm (Organisms) or Debris

pH Adjustment? Y (N)
Initial pH: _____ Final pH: _____ Amount HCl: _____

Sample Aeration? Y (N)
Initial DO: _____ Final DO: _____ Duration/Rate: _____

Subsamples for Additional Chemistry Required? Y; 3 x 4oz, 1 x 8oz. glass jars

Additional Comments: [1] - Temperature of sample should be 0-6°C if received >24hrs past collection time.

QC Check: MH
Final Review: ME 8/15/2022

Naval Information Warfare Center PACIFIC

ENERGY AND ENVIRONMENTAL SUSTAINABILITY, Code 71760
53475 Strothe Road, Building 111
San Diego, CA 92152-5000

Chain of Custody Record

Date 7/13/22

Page 1 of 1

Project Title/Project Number: ~~ENVVEST AMB 32~~ SME sed testing

Project Leader: ~~John Frew~~ Kara Sorenson

Sampler(s): Nick Haymen, Kara, Ignacio

Contact Tel: 206 861 8252

Tel:

Fax:

Email: ~~John.Frew@spawar.navy.mil~~

Special Instructions/Comments:

Sample Identification	Collection Date	Collection Time	Matrix	Sample Type	Container Type	Collection Temp (°C)	Requested Analyses: Amph	Requested Analyses: Mg-dev. sed.	Temperature upon arrival at Lab (°C)
~~QE018~~ MA1	7/12/22	0925	Sed	grab	LDPE bag	22.5	X	X	4.6
~~QE019~~ MA2	"	1035	"	"	"	22.7	X	X	4.6
~~PS01~~ E3	"	1411	"	"	"	28.9	X	X	4.6
~~PS03~~									
~~PS06~~									
~~PS08~~									
~~PS09~~									
~~PS15~~									
~~M3~~									
~~M4~~									
~~BIGST~~									
~~Dup~~ MA1									

Relinquished by: (Signature/Agency)	Received by: (Signature/Agency)	Date:	Time:
		7/13/2022	1000
Relinquished by: (Signature/Agency)	**Received by: (Signature/Agency)**	**Date:**	**Time:**

Glossary of Qualifier Codes

Glossary of Qualifier Codes:

Q1 – pH out of recommended range; refer to CAR

Q2 – Temperatures out of recommended range; corrective action taken and recorded in Test Temperature Correction Log

Q3 – Temperatures out of recommended range; no action taken, test terminated same day

Q4 – Sample aerated prior to initiation or renewal

Q5 – Salinity out of recommended range; refer to QA section of report

Q6 – Spilled test chamber/ Lost test animal

Q7– Instrumentation Error/Failure; refer to CAR

Q8 – Inadequate sample volume, 50% renewal performed

Q9 – Inadequate sample volume, no renewal performed

Q10 – Sample out of holding time; refer to QA section of report

Q11 – Refer to QA section of report for explanation

Q12 – Supplemental information is footnoted

Q13 – Test initiated with an incorrect number of test organisms

Q14 – Replicate(s) not initiated

Q15 – Survival counts not recorded due to poor visibility or heavy debris

Q16 – Test aerated due to dissolved oxygen levels dropping below 4.0 mg/L

Q17 – Test initiated with aeration due to an anticipated drop in dissolved oxygen

Q18 – Airline obstructed or fell out of replicate and replaced, drop in dissolved oxygen occurred

Q19 – Animals out of appropriate age range at test initiation

Q20 – Readings not taken, tech error

Q21 – Organisms in replicate not counted, tech error

Q22 – Dissolved oxygen above recommended range, but remained within the 100% ±10% saturation requirement

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1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
September 2023	Final	

4. TITLE AND SUBTITLE

Santa Margarita Estuary 2022 Sediment Monitoring Report (Project PEMEC2743)-FINAL (MAY 2023)

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

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8. PERFORMING ORGANIZATION REPORT NUMBER

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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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BLDG 23171 2ND Deck, Unnamed Road Oceanside, CA 92058

10. SPONSOR/MONITOR'S ACRONYM(S)

MCBCP

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

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13. SUPPLEMENTARY NOTES

14. ABSTRACT

This report describes results of sediment monitoring conducted in the Santa Margarita River Estuary (SMRE) located on Marine Corps Base Camp Pendleton (MCBCP) in 2022, performed on behalf of MCBCP Environmental Security (ES) Staff, in support of their Municipal Watershed Monitoring Program (MCBCP, 2020). Sediment monitoring was conducted at three (3) locations on 12 July 2022, during the summer index period, following the analytical techniques and quality controls/assurances as required under the Sediment Quality Assessment Technical Support Manual and as specified under the SMRE IO Workplan and Quality Assurance Project Plan. Samples were analyzed for standard sediment quality characteristics and benthic community composition, and were tested for toxicity with marine amphipods (*Eohaustorius estuarius*) and Mediterranean mussel (*Mytilus galloprovincialis*) embryos using standardized protocols. This report describes the methods, results and data evaluation used to meet the monitoring goals following the California Sediment Quality Objectives line of evidence framework to assess sediment quality using these various metrics.

15. SUBJECT TERMS

California Sediment Quality Objectives (CASQO), Sediment Monitoring, Marine Corps Base Camp Pendleton (MCBCP)

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Molly Colvin
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