FOURTH FIVE-YEAR REVIEW REPORT FOR SHIAWASSEE RIVER SUPERFUND SITE LIVINGSTON COUNTY, MICHIGAN

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

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X Douglas Ballotti

Douglas Ballotti, Director
Superfund & Emergency Management Division
Signed by: DOUGLAS BALLOTTI

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LIST OF ABBREVIATIONS & ACRONYMS

Adient	US LLC, former Johnson Controls Interiors LLC, a PRP
ARAR	Applicable or Relevant and Appropriate Requirement
BEA	Baseline Environmental Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CD	Consent Decree
CFC	Cast Forge Company
CFR	Code of Federal Regulations
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
cy	cubic yard
DCC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EPA	United States Environmental Protection Agency
ERG	Environmental Research Group, Inc.
FDA	Food and Drug Administration
FS	Feasibility Study
FYR	Five-Year Review
GSIC	Groundwater/Surface Water Interface Criteria
ICs	Institutional Controls
LTM	Long-term Monitoring
LTMP	Long-term Monitoring Plan
MDNR	Michigan Department of Natural Resources
mg/kg	milligrams per kilogram
MNR	Monitored Natural Recovery
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyls
PFOA	Perfluoroctanoic Acid
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
Site	Shiawassee River Superfund Site
SOW	Statement of Work

SWAC	Surface Weighted Average Concentration
TAL	Target Analyte List
TBC	To be considereds
TSCA	Toxic Substances Control Act
UU/UE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Shiawassee River Superfund Site ("Site"). The triggering action for this statutory review is the August 22, 2019, signing date of the previous FYR report (EPA, 2019). The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs), and one OU will be addressed in this FYR. OU1 addresses polychlorinated biphenyls (PCBs) in the Shiawassee River sediment, floodplain soil, and the former Cast Forge Company (CFC) soil. OU2 may address vapor intrusion and groundwater contamination. OU2 is not addressed in this FYR because OU2 is still in the investigation stage and does not have a Record of Decision (ROD).

The Site was bifurcated into two OUs in 2023. As referenced in the last FYR Report, in 2019, the Michigan Department of Environment, Great Lakes, and Energy (EGLE) provided EPA with a Baseline Environmental Assessment (BEA) report that documented the historic presence of volatile organic compounds (VOCs) in soil and groundwater at the former CFC property (AKT Peerless Environmental & Energy Services, 2010). The BEA report prompted a vapor intrusion and groundwater investigation from 2021 to 2023 that confirmed the presence of VOCs above EPA Regional Screening Levels (RSLs) in soil, groundwater, soil gas, sub-slab soil gas, and indoor air samples, as well as perfluoroctanoic acid (PFOA) above EGLE Groundwater/Surface Water Interface Criteria (GSIC) (Tetra Tech, Inc., 2023). The nature and extent of contamination in OU2 will be further investigated in a Remedial Investigation (RI)/Feasibility Study (FS) for OU2. The preliminary investigatory results related to OU2 will not be further discussed in this FYR.

The Shiawassee River Superfund Site FYR was led by Leah Werner, EPA Region 5's Remedial Project Manager (RPM) for the Site. Participants included Charles Rodriguez and Natalie Romain, EPA Region 5's Community Involvement Coordinators for the Site; Mary Schaefer, EGLE Project Manager for the Site; Nicholas Shorkey, EGLE technical support; and Brad Hartwell, EPA Contractor from Tetra Tech. Adient US LLC (Adient), the Site's potentially responsible party (PRP), and EGLE were notified of the initiation of the FYR (EPA, 2023a) and participated in a pre-site inspection meeting (EPA, 2023b), as well as the November 2, 2023, Site inspection. The review began on August 22, 2023.

Site Background

The Shiawassee River Superfund Site includes the former CFC property at 2440 West Highland Road, in Howell, Livingston County, Michigan, and approximately eight miles of the Shiawassee River (i.e., downstream to the Steinacker Road area). The former CFC property is bordered on the north and east by wetlands, on the west by the South Branch of the Shiawassee River, and on the south by Highway M59. The portion of the river affected by PCB contamination begins at Highway M59 and proceeds downstream in a northerly direction to Steinacker Road. Several areas of floodplain soil adjacent to the affected portion of the river were contaminated by PCB-contaminated sediments that were carried over the riverbanks during periods of high flow.

The South Branch of the Shiawassee River is located in a largely rural area and is bordered by forested floodplains, wetlands, and light industrial areas (e.g., the former CFC property). The river ranges from about 20- to 45-feet wide. Residences are located along the river; no PCB contamination was found during the RI at any of the upland soils located on the residences along the river. There are no public beaches along the Shiawassee River, and fishing is limited at the Site due, in part, to the lack of significant game fish. The Shiawassee River is not used as a public water supply. Local residents use private groundwater wells for potable water. Canoes and kayaks at residences along downstream portions of the Site during the Site inspection suggest recreational boating may take place in the South Branch of the Shiawassee River.

The Site was placed on the National Priorities List (NPL) in 1983 (EPA, 1983).

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Shiawassee River		
EPA ID: MID980794473		
Region: 5	**State:** MI	**City/County:** Howell/Livingston

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Leah Werner
Author affiliation: EPA
Review period: 8/22/2023 - 4/16/2024
Date of site inspection: 11/2/2023
Type of review: Statutory
Review number: 4
Triggering action date: 8/22/2019
Due date *(five years after triggering action date)*: 8/22/2024

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

PCBs in soils and sediments are the contaminants of concern for OU1.

The 1992 RI Report identified several areas on the former CFC property that were historically associated with various waste handling and disposal processes. These areas include: an initial unlined lagoon; a former settling tank and discharge pipe; a former lined lagoon, overflow ditch, and overflow lagoon; and a former discharge area (Warzyn Inc., 1992). Some of the areas previously associated with waste disposal (i.e., the former lined lagoon, former overflow ditch, former discharge area, and the flatlands) were at least partially remediated in 1981 due to the State of Michigan filing a Consent Judgement with CFC (Environmental Research Group, Inc., 1982). The 1992 RI Report indicates that PCB-contaminated soil remained in place in portions of the former CFC property that were not addressed in the prior remedial action (Warzyn Inc., 1992).

A risk assessment completed as part of the RI/FS found human health cancer risks exceeding 1×10^{-4}, as well as non-cancer risks exceeding a hazard index of 1 (Pace Incorporated, Warzyn Inc., 1992). Nearby residents are at greatest potential risk. The majority of cancer risk for nearby residents is associated with consumption of contaminated fish from the river. Another pathway of concern is dermal contact with floodplain sediment and inhalation from dust and/or volatilized PCBs. There are also potential risks to ecological receptors (e.g., mink, kingfisher) through dietary consumption of contaminated fish.

Response Actions

Pre-ROD Response Actions

In October 1977, CFC installed a wastewater treatment system at the CFC property and occupants began treating and/or transporting wastewater for off-site disposal (AKT Peerless Environmental & Energy Services, 2010).

On June 19, 1981, the Michigan Attorney General executed a Consent Judgment with CFC that had been under negotiation since 1977 (Frank J. Kelly, et al. v. Cast Forge Incorporated, 1981). The judgment directed that CFC undertake the following actions at the plant and in the river:

- Re-route the existing storm drain north of the plant building;
- Install soil erosion protection (a berm);
- Remove PCB-contaminated muck from the discharge area west of the plant and from the river;

- Remove the lined lagoon, including standing water, sediments, and the plastic liner;
- Remove contaminated soil from the flatlands area;
- Properly transport and dispose of all contaminated material at an off-site facility; and
- Pay to the State of Michigan $700,000 in natural resource damages and $50,000 to reimburse the State for costs incurred in cleanup actions in the river.

The overflow lagoon and spillway were removed prior to issuance of the Consent Judgment.

A-l Disposal of Plainwell, Michigan was contracted to undertake the cleanup of the plant site during July and August of 1981, under MDNR oversight. A second cleanup contract was awarded to A-l Disposal in January 1982 to address the discharge area west of the plant and the river. The goal of this project was to reduce the concentration of PCB contamination in stream sediments for a distance of approximately eight miles downstream of CFC. A backhoe was used to remove PCB-contaminated material from around the discharge area and a dragline was used to remove contaminated sediments from an area in the river near Bowen Road. Vacuum extraction was also used to remove the PCB-contaminated sediments from the river. As most of the PCBs were determined to be tied up in organic material in the river, the vacuum action focused on removing the organic material without taking in the surrounding sand and gravel. This sediment removal took place primarily in the section of the river between the CFC facility and Bowen Road. Solids from the vacuum operation were removed by a filtration system, which included three filters in series. The de-watered solids and spent carbon from the filters were then transported to a licensed landfill permitted to take PCB-contaminated wastes of this type.

The removal effort resulted in the collection of an estimated 2,531 pounds of PCBs in 1,805 cubic yards of river sediment and 500 cubic yards of sand and gravel used as filter media. Pursuant to the federal PCB Spill Cleanup Policy, 40 CFR 761.60, and the Toxic Substances Control Act (TSCA), the contaminated sediments, sand, and gravel were segregated into two fractions based on PCB concentration. Solids with PCB concentrations of 50 mg/kg or greater (approximately 260 cubic yards), were segregated from approximately 2,045 cubic yards of solids having lower PCB concentrations. Materials were transported off-site for disposal. Although the sediment removal project was intended to clean up eight river-miles, because the costs of the removal were higher than anticipated the effort ended at the end of 1982, after extending only 1.5 miles downstream.

Record of Decision

A ROD for the site was signed by EPA in 2001 (EPA, 2001). The remedy selected and described in the ROD required excavation and off-site disposal of PCB-contaminated soil and sediment, monitored natural recovery (MNR) in sediment, and implementation of institutional controls (ICs). The remedial action objective (RAO) identified in the ROD is to protect human health and the environment from imminent and substantial endangerment due to PCBs attributed to the Site.

The remedy described in the 2001 ROD included:

- Excavation of approximately 795 cubic yards (cy) of contaminated soil at the CFC facility to meet a cleanup goal of 10 mg/kg.
- Excavation of approximately 1,755 cy of floodplain soils to meet a cleanup goal of 10 mg/kg.
- Excavation of approximately 1,590 cy of river sediments to meet the post-remediation average concentrations of 5 mg/kg for the first river-mile. (Within the five-mile stretch downstream of Highway M59, this excavation would result in an approximate average sediment PCB concentration of 1 mg/kg immediately following the remedial action.)
- MNR of sediments along with post-remediation monitoring to ensure that MNR is occurring to meet the long-term cleanup goal of a surface weighted average concentration (SWAC) of 0.003 to 0.2 mg/kg over periods of up to 18 and 7 years, respectively. The long-term cleanup goal is based on protection of ecological receptors, i.e., mink through dietary consumption of fish.
- Excavated soil and sediment containing PCBs at concentrations of 50 mg/kg or greater disposed of at an off-site TSCA landfill facility, and soil and sediment containing PCBs at concentrations of less than 50 mg/kg disposed of at an off-site sanitary landfill facility.
- ICs, including ensuring the CFC facility remains zoned industrial and deed restrictions for the CFC property.

Status of Implementation

Remedial action cleanup work (i.e., excavation and removal of soils and sediments) was undertaken on behalf of Johnson Controls, Inc., by ENTACT and Associates, LLC from November 1, 2004 to August 15, 2005, and is summarized in the table below (EPA, 2001; ENTACT Environmental Services, 2005; Stofferahn, 2005).

Table 1. Summary of planned and actual soil and sediment removal.

Site sub-area	2001 ROD removal volume estimate (cy)	Final removal volume (cy)
CFC soils	795	154
Floodplain soils	1,755	160
River sediments	1,590	50
Total	4,140	364

As shown in Table 1, significantly less material was removed during the remedial action than had been estimated in the ROD. This was because sampling conducted during the design phase indicated that smaller volumes of PCB contamination exceeding the concentrations specified in the ROD were present at the excavation areas (ENTACT Environmental Services, 2005).The Preliminary Closeout Report was signed on September 29, 2005 (EPA, 2005).

Sampling and analysis of floodplain soil and river sediment was conducted in 2006, 2007, and 2008. These data and a discussion of them can be found in the 2009 FYR report (EPA, 2009). Sampling and analysis of river sediment and surface water was conducted in 2013 and is discussed in the 2014 FYR report (EPA, 2014). From 2020 to 2021, sampling and analysis of surface water, fish tissue, and river sediment was also conducted to establish baseline measurements of PCBs in post-remediation site data and provide insights relative to historic data (CTI and Associates, Inc.; Arcadis US, Inc., 2024). Additional information is available in the Data Review section of this report. There is no ongoing remedial action at the Site.

Institutional Controls

Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soils and Groundwater	Yes	Yes	Portion of former CFC property, Tax Parcel No. 4706-27-200-010, Livingston County, Michigan	Within portion of former CFC property identified as Restricted Property on Schedule I-A, attached to the May 19, 2010 covenant deed transferring ownership of parcel to Lucy Road Resources, LLC: property use for industrial and light industrial purposes only; no removal of concrete/asphalt surfaces unless promptly replaced with similar coverings; prohibit use of groundwater for any purpose; soils, media and/or debris on property to be managed consistent with Subtitle C of the Resource Conservation and Recovery Act and all other relevant state and federal laws.	Restrictive covenant filed in Livingston County, Michigan, May 19, 2010.
Fish	Yes	Yes	South Branch of the Shiawassee River to beyond the downstream boundary	Prevent ingestion of PCB-contaminated fish.	Michigan Department of Health and Human Services Eat Safe Fish Guide. Current as of latest edition of fish

					consumption advisory, (Michigan Department of Health and Human Services, 2023).

A map showing the area in which the ICs apply is included in Appendix B as Figure 2.

Status of Access Restrictions and ICs:

Former CFC facility:

The description of the selected remedy included in the ROD signed on September 28, 2001, specified that "institutional controls will be placed on the CFC facility property to ensure that it remains industrial" (EPA, 2001). The ROD also states that "institutional controls along with deed restrictions will be required for the CFC facility." The ROD did not articulate any specific and substantive terms of deed restrictions that are required at the former CFC facility to achieve RAOs.

On January 22, 2004, EPA entered into two contemporaneous consent decrees with PRPs. In one, EPA entered into a consent decree (CD) with Johnson Controls, Inc., Hoover Universal, Inc., and Multifastener Corporation, which stipulated that the ROD remedial work would be performed under a separate CD and that Johnson Controls, Hoover Universal, and Multifastener Corporation would reimburse EPA for Response Costs incurred related to the Site (United States of America v. Johnson Controls, Inc., Hoover Universal, Inc., and Multifastener Corporation, 2004). EPA entered into a second CD (i.e., "partial CD") with Johnson Controls to finance and perform the work outlined in the partial CD, the ROD, the statement of work (SOW) and the Remedial Design Work Plan for implementation of the Remedial Action and Operation and Maintenance (O&M) at the Site (United States of America v. Johnson Controls, Inc., et al., 2004). The Partial CD required "an agreement, enforceable by [Johnson Controls] and the United States, to refrain from using the Site, or such other property in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to [the Partial] Consent Decree."

A restrictive covenant (in the form of restrictions on a covenant deed) for the former CFC property was finalized on May 19, 2010, between the former landowner of the former CFC property, Hayes Lemmerz International – Howell, Inc. as a Grantor, and the new property owner of the former CFC facility, Lucy Road Resources, LLC (Spilkin, 2010). The restrictive covenant identified specific land and water use restrictions at the former CFC property. However, the restrictive covenant has subsequently been determined to not be legally enforceable by EPA, as discussed below.

River:

There are current fish consumption advisories in place for the South Branch of the Shiawassee River (Michigan Department of Health and Human Services, 2023). These advisories extend beyond the downstream Site boundary and will be maintained until fish tissue contamination falls to a level acceptable for human consumption.

Current Compliance:

Former CFC Facility:

The former CFC facility is in compliance with the IC requirement that the former CFC facility remain in industrial use. The annual O&M Inspection reports from 2021, 2022, and 2023 required by the O&M Plan for Institutional Controls, prepared by CTI and Associates, Inc. in March 2021, determined that the former CFC property has remained zoned for industrial use and property ownership has not changed (CTI and Associates, Inc., 2021b; CTI and Associates, Inc., 2022; CTI and Associates, Inc., 2023).

The 2010 restrictive covenant is not an IC that EPA can enforce at the Site. The ROD states that "institutional controls along with deed restrictions will be required for the CFC facility (EPA, 2001)." However, the ROD did not articulate any specific land or water use restrictions required in the deed restriction. The 2005 Partial CD documented the requirement for an agreement to refrain from using the site in a manner that would adversely affect the remedy (United States of America v. Johnson Controls, Inc., et al., 2004). The restrictive covenant appears to be that agreement enacted. However, the restrictive covenant is only enforceable by Hayes Lemmerz, a former owner and operator at the former CFC property but is not a PRP for this Site and has no responsibility to enforce the requirements of the Partial CD (Spilkin, 2010). The restrictive covenant also includes more specific land and water use restrictions than the selected remedy documented in the ROD. To date, there are no IC violations.

River:

Fish consumption advisories for the river are in place and appear to be effective. As of the 2023 edition of the Michigan Department of Health and Human Services *Eat Safe Fish Guide*, the South Branch of the Shiawassee River and downstream waters at least as far as the Shiawassee River itself were included in Michigan's fish consumption advisory (Michigan Department of Health and Human Services, 2023). The publication warns anglers not to consume fish of any species, and of any size, if they are taken from the South Branch of the Shiawassee River. EPA does not have any information indicating that fish consumption by humans is occurring.

IC Follow up Actions Needed:

Pursuant to the Partial CD paragraph 24, the PRP will use best efforts to secure a deed restriction for the portion of the former CFC property, Tax Parcel No. 4706-27-200-010 of Livingston County, identified as the Site defined in the Partial CD, with Adient as a grantor and Lucy Road Resources, LLC as a grantee. The deed restriction should be enforceable by the PRP and EPA. The PRP and EPA should assess which land/water use restrictions should be included as deed restrictions to proactively prohibit interference with the integrity or protectiveness of the remedy. Further, additional land/water use restrictions in the form of ICs may be considered in the decision document for OU2.

Long Term Stewardship:

Long-term protectiveness requires compliance with ICs, including fish consumption advisories and the land use requirement of maintaining the former CFC property zoned for industrial use. The PRP prepared an O&M Plan for ICs in March 2021 (CTI and Associates, Inc., 2021a). In accordance with the SOW, the O&M Plan for ICs was required to monitor post-remedial ICs at the former CFC facility. Specifically, the O&M Plan was designed to: "1) ensure that the industrial site zoning and industrial site use restrictions remain in place; and 2) notify potential future site owners/developers/users of residual soil impact."

This O&M Plan for ICs requires annual certifications to be submitted to EPA providing evaluations of ICs for effectiveness and compliance. The PRP submitted Annual O&M Inspection Reports for ICs in 2021, 2022, and 2023 pursuant to this O&M Plan for ICs (CTI and Associates, Inc., 2021b; CTI and Associates, Inc., 2022; CTI and Associates, Inc., 2023). None of the inspection reports identified any changes to the zoning designations or property ownership.

Systems Operations/Operation & Maintenance

The PRP implemented a baseline sampling program between 2020 and 2021 that included sampling and analysis of PCBs in fish tissue, water, and sediments at the Site (CTI and Associates, Inc.; Arcadis US, Inc., 2024). The baseline sampling program was intended to provide recent data for evaluation of recovery of PCB concentrations in media; provide a baseline dataset and methods to assist with the development of a long-term monitoring plan (LTMP); compare to future long-term monitoring (LTM) data to evaluate the ongoing status of MNR at the Site; and evaluate load gain in discrete reaches of the stream adjacent to the former CFC facility to assess residual sources.

The 2005 Partial CD states that, consistent with the SOW, the PRP "shall continue to implement the Remedial Action and O&M until the Performance Standards are achieved and for so long thereafter as is otherwise required under this Partial Consent Decree" (United States of America v. Johnson Controls, Inc., et al., 2004). Per the SOW, this O&M plan is to include a LTMP for river sediments.

This plan is intended to provide for the collection of data necessary to evaluate when portions of the river meet preliminary remediation goals. The PRP has not submitted an O&M plan that includes a LTMP as required by Task 5 of the SOW in the 2005 Partial CD.

However, a draft LTMP was submitted in April 2024, outside the review period for this FYR, and will be discussed in the next FYR. The LTMP will be the foundation of the O&M plan and should include the requirement for natural recovery evaluations and submittal of MNR reports on a five-year basis. Following approval of the LTMP, the O&M Plan will be prepared. Additionally, an updated conceptual site model (CSM) should be developed that assesses potential sources, transport, current exposure concentrations, and changes over time.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2019 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1 and Sitewide	Not Protective	The remedy at the Shiawassee River Superfund Site is not protective of the environment. Additional information is needed to determine whether the remedy is currently protective of human health. The former CFC property is zoned for industrial use, a restrictive covenant has been implemented, and fish consumption advisories are in place, however the Site inspection identified apparent noncompliance with the requirements of the restrictive covenants, and the changes to the Site may have resulted in redistribution of and potentially new or different exposure routes to PCB-contaminated wastes that had been left on-Site. Additionally, there is no O&M plan in place and O&M, including monitoring of the effectiveness of the MNR remedy, has not been occurring for more than 5 years. Ecological receptors may still be exposed to unacceptable risks posed by PCB contamination. The following actions need to be taken to ensure protectiveness: 1. Develop a comprehensive long-term monitoring plan and begin implementing it by June 30, 2020. Include in the plan a requirement for the evaluation

		of MNR progress toward meeting the long-term cleanup goals in the ROD. 2. Develop and implement by August 21, 2020 an O&M plan that includes procedures for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective. 3. By August 22, 2021, evaluate the effectiveness of the 2010 restrictive covenants and determine whether additional ICs are needed. Complete an evaluation of sediment, surface water, floodplain soils, and biota data to determine progress toward meeting the long-term cleanup goals in the ROD and to determine whether additional response actions may be needed to meet cleanup goals and to ensure protectiveness. Submit the first MNR Report by September 30, 2021, with submittal of subsequent reports every five years following submittal of the first report. The MNR Reports will be based upon the results from implementation of the long-term monitoring plan.

Table 4: Status of Recommendations from the 2019 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1 and Sitewide	Lack of long-term monitoring and process to evaluate progress of MNR at the site.	#1: Develop a comprehensive long-term monitoring plan and begin implementing by June 30, 2020. Include in the plan a requirement for the evaluation of MNR progress toward meeting the long-term cleanup goals in the ROD.	Addressed in Next FYR	The PRP should finalize and begin implementing a LTMP. Include in the plan a requirement for the evaluation of MNR progress toward meeting the long-term cleanup goals in the ROD.	N/A
1 and Sitewide	There is no O&M plan for the Site, and O&M	#2: PRP should submit an O&M plan consistent	Completed	The PRP prepared an O&M Plan for ICs in March 2021 that monitors post remedial ICs at the	3/1/2021

	procedures are needed to ensure that effective ICs are monitored, maintained and enforced.	with Task 5 of the SOW (as attached to the 2002 Administrative Order and included by reference in the 2004 Consent Decree). The O&M plan should include procedures to monitor and track compliance with existing ICs, communicate with EPA, and provide an annual certification to EPA that the ICs remain in place and are effective.		former CFC facility. Specifically, the O&M Plan was designed to: 1. Ensure that the industrial site zoning and industrial site use restrictions remain in place; and 2. Notify potential future site owners/developers/users of residual soil impact. The PRP has submitted Annual O&M Inspection Reports in 2021, 2022, and 2023 pursuant to this O&M Plan.	
1 and Sitewide	Existing 2010 restrictive covenants are not being complied with and, given recent activities at the former CFC property, may no longer address all areas with remaining contamination.	#3: Evaluate the effectiveness of the 2010 restrictive covenants and determine whether additional ICs are needed.	Completed	The 2010 restrictive covenant is not legally enforceable by EPA. The PRP will use best efforts to a secure a deed restriction for a portion of the former CFC property. Additional ICs may also be evaluated as a remedy for the OU2 decision document. Please see additional information below.	2/29/2024
1 and Sitewide	A current evaluation of the natural recovery processes at the Site, including evaluating if and where ongoing sources of PCB contamination exist and whether MNR is occurring, is needed. This	#4: Complete an evaluation of sediment, surface water, floodplain soils, and biota data to determine progress toward meeting the long-term cleanup goals in the ROD and to determine whether	Addressed in Next FYR	The PRP conducted baseline sampling and analysis of sediment, surface water, and fish tissue data between 2020 and 2021. The PRP should finalize the first MNR Report, which should evaluate the baseline data in the context of historic data to evaluate whether natural recovery of PCBs is occurring in site media. Subsequent MNR reports will be based upon the	N/A

	and subsequent evaluations will assist EPA with evaluating the MNR component of the remedy, determining whether additional response actions are necessary to meet the long-term cleanup goals specified in the ROD, and determining protectiveness for human health and the environment in subsequent FYRs.	additional response actions may be needed to meet cleanup goals and to ensure protectiveness. Submit the first MNR Report by September 30, 2021, with submittal of subsequent reports every five years following submittal of the first report. The MNR Reports will be based upon the results from implementation of the long-term monitoring plan.		results from implementation of the LTMP and should be submitted every five years. The MNR Reports should also evaluate additional source input into the system to determine if ongoing source(s) are preventing natural recovery of sediment from meeting the long-term cleanup goals, and whether additional response actions may be needed to meet cleanup goals.	

Recommendation #3

The 2010 restrictive covenant is not legally enforceable by EPA, as discussed in the Institutional Controls section of this FYR Report above (Spilkin, 2010). Before this determination was made, the 2019 FYR documented apparent noncompliance with the requirements of the restrictive covenant to maintain the existing asphalt cap (which is not a requirement in the ROD or Partial CD) (EPA, 2019). Between August 20 and December 21, 2021, EPA contractor START implemented investigation activities to assess whether modifications to the Site since the 2010 transfer of the Site to Lucy Road Resources, LLC have impacted historically clean portions of the site, created new routes of exposure to PCBs, or created new conduits for releasing PCBs into the Shiawassee River (Tetra Tech, Inc., 2023). The investigation results are discussed in more detail in the Data Review section below, and an excerpt of the Final Assessment Report (including relevant discussion, figures, and data tables) is available in Appendix C.

The findings of the investigation activities indicated that all soil samples were below the PCB cleanup goal of 10 mg/kg. The data results indicate that the previous land clearing and regrading activities documented in the 2019 FYR Report have not resulted in a direct contact risk for PCBs or metals in shallow site soils or landscaping materials. Therefore, while the restrictive covenant is not legally enforceable by EPA or Adient, the land disturbance activities documented in the 2019 FYR do not appear to have interfered with or adversely affected the implementation, integrity or protectiveness of the remedial measures pursuant to the Partial CD. Additionally, a title search on the former CFC property includes the 2010 restrictive covenant and potential prospective purchasers would be informed of historic implementation of deed restrictions on the property. Since the former CFC property is currently in compliance with the IC documented in the ROD to retain industrial zoning of the Site, and data evaluation of upland soil does not show PCB exceedances above the cleanup goal, there is no present need for additional ICs to be included in a ROD Amendment or an Explanation of Significant Differences.

Pursuant to the Partial CD paragraph 24, the PRP will use best efforts to secure a deed restriction for the portion of the former CFC property, Tax Parcel No. 4706-27-200-010 of Livingston County, defined as the Site in the Partial CD, with Adient as a grantor and Lucy Road Resources, LLC as a grantee. The deed restriction would be enforceable by the PRP and EPA. The PRP and EPA should assess which land use restrictions should be included as deed restrictions to proactively prohibit interference for the integrity or protectiveness of the remedy. Land/water use restrictions in the form of ICs for the former CFC property may be considered in the decision document for OU2.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by in the Livingston Daily titled “EPA Begins Review of Shiawassee River Site”, on September 3, 2023, stating that there was a FYR and inviting the public to submit any comments to EPA. The address was not listed correctly in the September 3, 2023, public notice, and the public notice was re-posted with the corrected address in the Livingston Daily on April 14, 2024. The public notices are available in Appendix D. No comments have been received and no inquiries have been made regarding the FYR.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy, as implemented. On November 2, 2023, a representative of Lucy Road Resources, LLC. stated that he is unaware of any changes to the former CFC property that may have adversely impacted the remedy.

Representatives of EGLE expressed concern related to the lack of an updated CSM; the possibility that PCB-contaminated material that remains in place in floodplain soil being a source of PCBs to the South Branch of the Shiawassee River; comparability of the baseline sampling data to future LTM data; and the ineffectiveness of the MNR remedy to achieve the long-term cleanup goals of the 2001 ROD. Additional concerns and issues expressed by EGLE regarding the current status and progress of the Site remedy are included in a letter to EPA dated August 22, 2023, and May 15, 2024 (EGLE, 2023; EGLE, 2024).

Data Review

PCB BASELINE SAMPLING FOR LONG-TERM MONITORING

As noted in the "Response Actions" section of this FYR, the long-term goal of the sediment remediation is to achieve SWACs between 0.003 and 0.2 mg/kg over a period of up to 18 years, or by 2023. This target was believed to be sufficient to be protective of mink through dietary consumption of fish or other ecological receptors. In addition, the ROD indicated that attaining these levels that were believed to be protective of ecological receptors would eliminate the need for fish consumption advisories for recreational fishing. The excavation of PCB-contaminated soil at the former CFC facility and on the river floodplain, as well as contaminated sediment in the Shiawassee River was meant to reduce the potential risk caused by exposure of PCBs via direct contact with, ingestion of, or inhalation of contaminated soil and sediment, as well as reduce the risk to wildlife of exposure to PCBs by removing a large mass of PCBs from the environment.

Between September 2020 and August 2021, a baseline monitoring program of PCB concentrations in surface sediment, fish tissue, and surface water was conducted by the PRP at the Site between Michigan State Highway (M-59) and Steinacker Road and upstream of M-59 (i.e., the upstream area). Sampling was conducted in accordance with the 2020 LTMP Baseline Sampling Event Field Sampling Plan, prepared by CTI Associates, Inc. and Arcadis on October 1, 2020 (CTI and Associates, Inc., and Arcadis, 2020). The objective of the baseline monitoring program was to evaluate post-remediation data in the context of the historical data. These data also assist in the development of a LTMP, support evaluation of MNR at the Site, and will be used to determine if the long-term cleanup goals established in the ROD are being met. The baseline data sampling effort and analysis is reported in the draft 2020-2021 Baseline Sampling Data Report dated February 2024 (CTI and Associates, Inc.; Arcadis US, Inc., 2024). A final copy of this report is anticipated in 2024. For more detailed information on the baseline data collection effort (including discussion, figures, and data tables), see the excerpt from the draft report in Appendix E. Data interpretation by media is discussed the next few subsections.

Results from the 2020 to 2021 baseline sampling effort are compared to historic sampling programs. An overview of the historic sampling programs is provided in **Table 5.** Interpretation of historical data prior to 2020 is limited to overview comments and general trend observations. A more robust interpretation of data is required in the MNR Report.

Table 5: Summary of Historical and Baseline Datasets

Sampled Media	Historical		Baseline	
	Sampling Period	Sample Count	Sampling Year	Sample Count
1980	1980 to 2013	553	2021	486
1981	1982 to 2013	50	2020	24
1982	1981 to 2014	108	2021	55

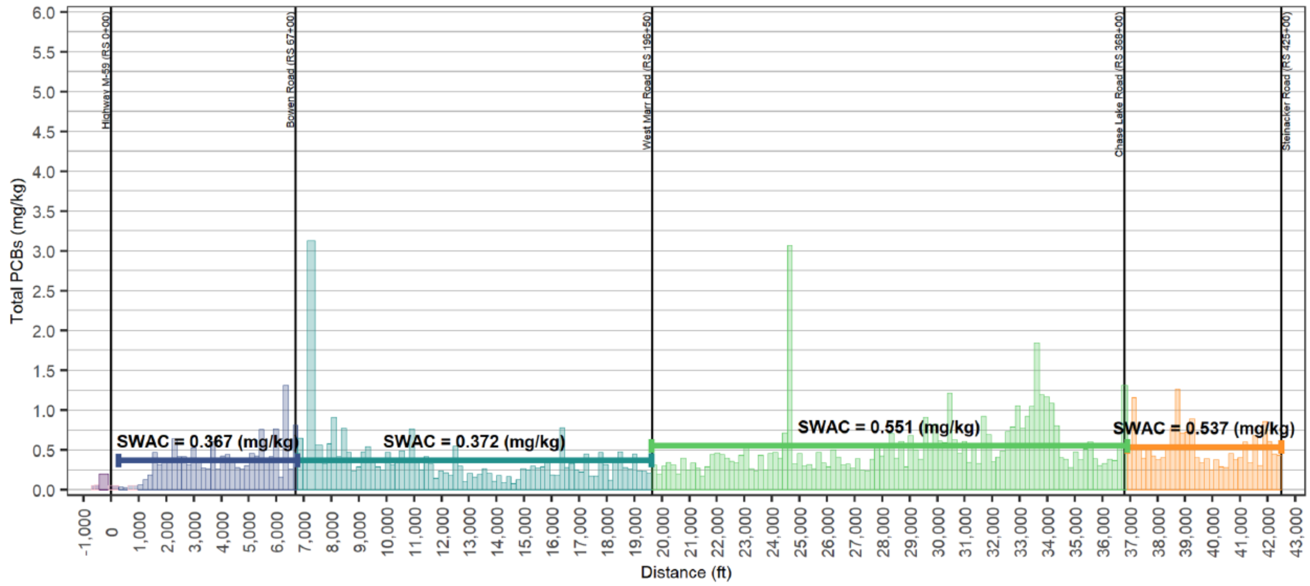
Referenced: (CTI and Associates, Inc., 2014; CTI and Associates, Inc., 2015; CTI and Associates, Inc. and Aracdis US, Inc., 2024; ENTACT Environmental Services, 2003; ENTACT Environmental Services, 2006; ENTACT Environmental Services, 2010; Gannett Fleming of Michigan, Inc., 2008; Malcolm Pirnie Engineers, 1995; Malcolm Pirnie Engineers, 1997; Rice, White, Simmons, & Rossmann, 1984; Tetra Tech EM Inc., 2001; Warzyn Inc., 1992)

Surface Sediment Sampling

Baseline sediment sample collection was performed between July 12 and August 27, 2021. Sediment cores were collected from approximately 30 evenly spaced transects per mile (240 transects total), resulting in approximately 486 composite sediment samples. Each sediment transect sample was composed of five subsamples spaced evenly across the stream channel, combined into one composite sample each for the 0- to 2-inch and 2- to 6-inch intervals. The 0- to 2-inch interval was selected to determine the PCB concentrations in the surface sediment interval tied most closely to fish tissue concentrations, and the 2- to 6-inch interval was selected to support comparison to prior samples collected at the Site via 0- to 6-inch length-weighted comparisons. The results of the SWAC concentrations for the 0- to 2-inch interval and the 0- to 6-inch interval are shown below in **Figure 1** and **Figure 2**, respectively. Reference Appendix E for supporting figures of the baseline sampling effort.

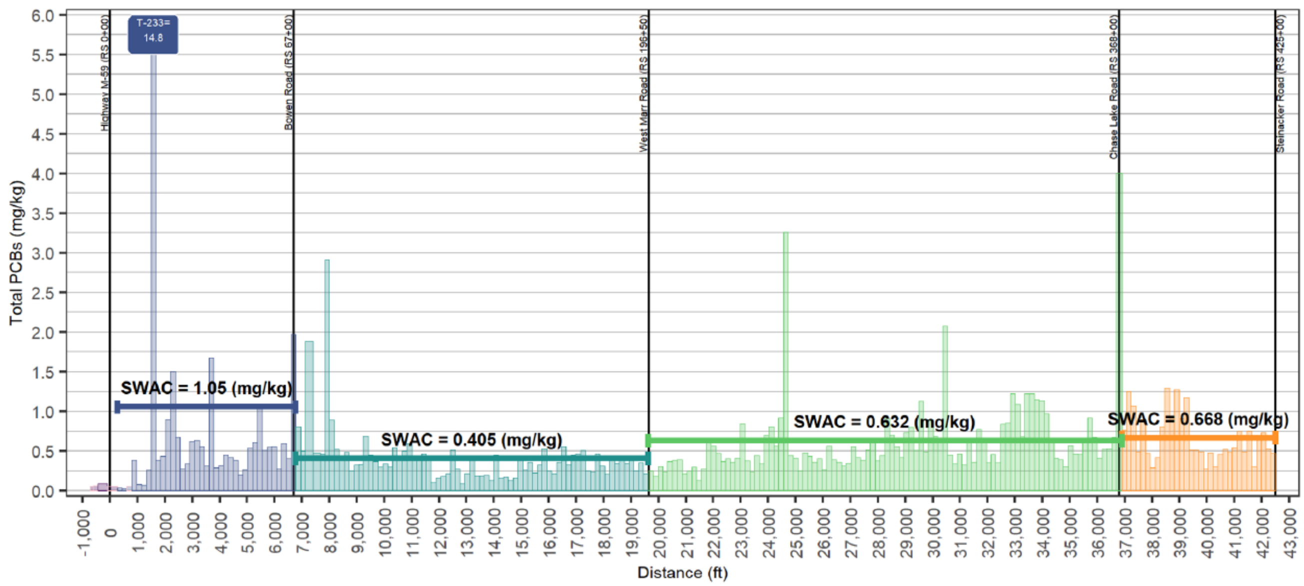
Average baseline surface sediment (0- to 2-inch) total PCB Aroclor concentrations were less than 1 milligram per kilogram (mg/kg), with 13 of 239 (5 percent [%]) of surface samples greater than 1 mg/kg (see **Figure 1** below). Total PCB Aroclor SWACs in surface sediment were below 1 mg/kg across the entire baseline sampling area, ranging from 0.37 to 0.55 mg/kg in individual reaches (excluding the upstream area). The surface and subsurface sampling intervals were length-weighted to provide a singular representative result for comparison to the historical 0- to 6-inch subsurface sampling interval (see **Figure 2**). In the length-weighted 0- to 6-inch interval, the total PCB SWAC is notably higher between the M-59 bridge and Bowen Road bridge (1.05 mg/kg), which may be attributed to a maximum total PCB concentration (22 mg/kg) measured in the 2- to 6-inch subsurface interval within this area. The total PCB SWAC concentrations in the 0- to 6-inch interval were lower downstream from the former CFC facility.

Figure 1: Surface Sediment (0-2 in) SWAC Concentration Total PCBs



Referenced: (CTI and Associates, Inc.; Arcadis US, Inc., 2024)

Figure 2: Surface Sediment (0-6 in) SWAC Concentration Total PCBs



Referenced: (CTI and Associates, Inc.; Arcadis US, Inc., 2024)

In the fall of 2013, sediment samples were collected for the purpose of improving the CSM. The results are further discussed in the 2014 and 2019 FYR Reports (EPA, 2014; EPA, 2019). The total PCB SWAC concentrations for the 2021 baseline 0- to 6-inch samples are compared to the total PCB SWAC concentrations for the 2013 historical 0- to 6-inch samples collected using the incremental sampling methodology during the 2013 Conceptual Site Model Sample Event (CTI and Associates, Inc., 2015).

The total PCB SWAC concentrations for the 2013 historical 0- to 6-inch samples ranged from 0.490 to 3.96 mg/kg, and the total PCB SWAC concentrations for the 2021 baseline 0- to 6-inch samples ranged from 0.280 to 1.06 mg/kg. When the 2021 baseline sediment data were examined on a length-weighted basis for comparison to the historical 0- to 6-inch sampling interval, SWAC values in River Mile 1 (i.e., the first mile of the Site) were of similar magnitude to the composite sample concentrations measured in 2013 (2015; 1.05 mg/kg and 1.02 mg/kg, respectively). In comparison to the sampling conducted in 2013, SWAC concentrations in River Mile 1 (i.e., the first mile of the Site) declined by 73% over this 8-year period (**Table 6** and **Figure 3**). In each of River Miles 2 through 8, the 2021 SWAC concentrations are also lower than those calculated for the 2013 data, with declines between 24% to 48% over this 8-year period (**Table 6**).

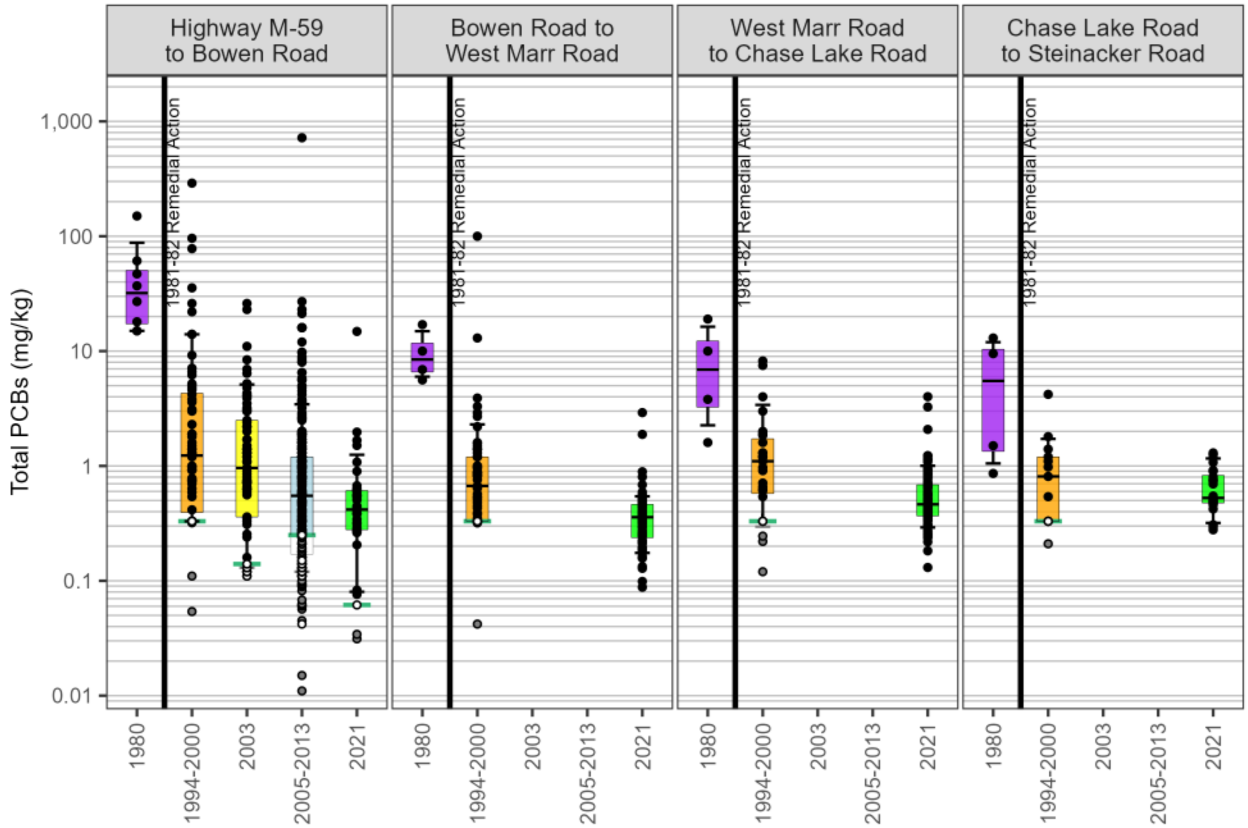
Table 6: Total PCB SWAC Concentrations in Sediment Samples

River Mile	2013	2021		Percent Change in 0-6 inch
	0- to 6-inch (mg/kg)	0- to 2-inch (mg/kg)	0- to 6-inch (mg/kg)	
1	3.96	0.295	1.06	73%
2	0.910	0.638	0.696	24%
3	0.490	0.249	0.280	43%
4	0.600	0.303	0.336	44%
5	0.800	0.459	0.528	34%
6	1.01	0.542	0.606	40%
7	1.32	0.701	0.811	39%
8	1.30	0.542	0.675	48%

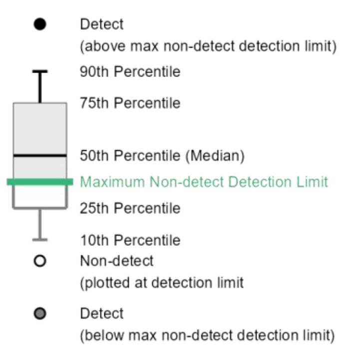
Note: For the 2021 samples, the 0- to 2-inch and 2- to 6-inch sampling interval results were length-weighted to calculate the 0- to 6-inch interval concentration.
Referenced: (CTI and Associates, Inc., 2014; CTI and Associates, Inc.; Arcadis US, Inc., 2024)

Total PCB concentrations in sediment have also been compared to historic sediment data collected at the Site dating back to the 1980s. The historical data comparison is available in **Figure 3**. For the 0- to 6-inch depth interval, total PCB concentrations in 2021 sediment samples exhibit a continued trend of long-term declines in comparison to historical samples collected periodically since the 1980s, including multiple rounds of samples collected between State Highway M-59 (M-59) and Bowen Road after the remedial action implemented in 1981 and 1982. Examining the data trends for all historical sampling events within reaches of the Site bounded by bridges illustrates the declines over time in surface sediment PCB concentrations at the Site (**Figure 3**).

Figure 3: Total PCB Concentrations in Sediment Samples (0 to 6 inches) Over Time (in Downstream Direction)



Boxplot Legend



Notes:

1. For the 2021 samples, the 0- to 2-inch and 2- to 6-inch sampling interval results were length-weighted to calculate the 0- to 6-inch interval concentration.
2. For 1980 to 2013 dataset, sample results with a bottom depth less than or equal to 6 inches are included.
3. Three samples collected in 2003 between Bowen Road to West Marr Road are excluded from this figure. All three results are below 0.4 mg/kg.
4. Non-detects included at the detection limit in percentile estimation.
5. Non-detects plotted at the detection limit.
6. Detected parent and duplicate sample results were averaged to represent a single result for that sample. Detected result was selected if either parent of duplicate sample result was a non-detect. Maximum detection limit was selected if both parent and duplicate sample results were non-detects.

Referenced: (CTI and Associates, Inc., 2014; CTI and Associates, Inc.; Arcadis US, Inc., 2024; ENTACT Environmental Services, 2003; ENTACT Environmental Services, 2006; ENTACT Environmental Services, 2010; Malcolm Pirnie Engineers, 1995; Tetra Tech EM. Inc., 2001)

The 2021 baseline data shows that the long-term cleanup goal of the sediment remediation to achieve a SWAC between 0.003 and 0.2 mg/kg PCBs has not been met at any of the river miles. However, when comparing the 2021 0- to 6-inch SWAC concentrations to historic 0- to 6-inch baseline SWAC concentrations, total PCB SWAC concentrations have decreased over time suggesting natural recovery may be occurring. However, due to age of the data, differences in sampling or analysis methods, or other factors, data comparability for long-term trend analysis are limited. The first MNR Report, submitted in April 2024 outside the review period for this FYR, will provide a more detailed data comparability analysis and will further discuss the data limitations. Future datasets collected for the LTMP should be directly comparable to the 2021 baseline data to ensure a more robust analysis of natural recovery. It is also recommended that future LTMP sampling assess whether new or continuing source(s) are re-supplying PCBs to surface sediment and preventing achievement of the long-term cleanup goal.

<u>Fish Tissue Sampling</u>

In order to address unacceptable risks at the Site, EPA calculated a sediment cleanup goal to be protective of mink through dietary consumption of fish or other ecological receptors. The ROD also states that attaining the long-term cleanup goal to protect ecological receptors would eliminate the need for fish consumption advisories for recreational fishing. The ROD did not identify any clean-up goals for PCBs in fish tissue.

Fish tissue sampling was conducted in May 2021 in areas where historical fish tissue samples exist to support development of trend analysis to evaluate the MNR, and to provide baseline data for future monitoring. A total of 55 white sucker and panfish (rock bass, pumpkinseed, bluegill) were submitted for analysis of PCB congeners and lipid concentrations in fillets.

Comparison of the historical PCB dataset to the current PCB dataset are affected by the difference in the PCB analysis methods; historical data were primarily analyzed for PCB Aroclors (i.e., commercial mixtures of PCB compounds) and the baseline fish data were analyzed for individual PCB congeners. While the difference in the PCB analysis methods preclude a more rigorous statistical comparison and in recognition of the uncertainty, the 2021 PCB congener concentrations were lower than those observed historically (pre-2017) for similar species and sampling locations.

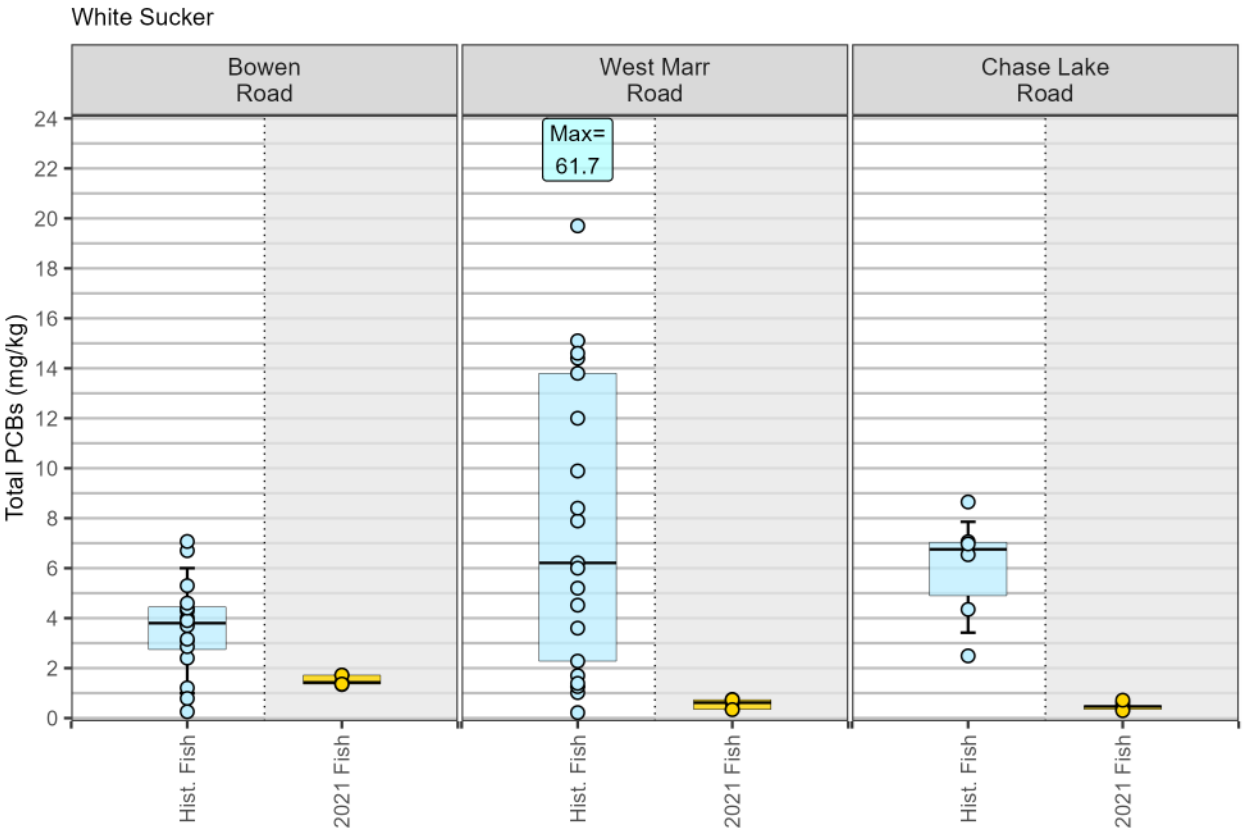
Based on comparison of the mean wet-weight total PCB congener concentrations in 2021 to the mean wet-weight total Aroclor PCB concentrations from the period 1984 to 1994, white sucker and panfish PCB concentrations in 2021 fish tissue samples are 88% lower than historical results for respective fish tissue samples (**Table 7**). Maximum PCB concentrations in these species exhibit declines of 97% in 2021 white sucker samples and 94% in 2021 panfish samples (**Table 7**). The fish sampling results compiled for four sampling areas within the Site from Bowen Road to Chase Lake Road illustrate significant recovery of PCB levels in the most recent fish tissue samples from 2020 (**Figures 4 and 5**).

Table 7: Summary of Wet-Weight PCB Concentrations in Fish Tissue Samples

Dataset	Analyte	Frequency of Detection	Minimum	Maximum	Mean
White Sucker					
1984-1994	Total Aroclor PCBs (mg/kg)	49/49 (100%)	0.220	61.7	6.83
2021	Total PCB Congeners (mg/kg)	15/15 (100%)	0.298	1.72	0.846
--	**Percent Change 1984-1994 to 2021**	--	--	**97%**	**88%**
Panfish (Black Crappie, Bluegill, Pumpkinseed, and Rock Bass)					
1984-1994	Total Aroclor PCBs (mg/kg)	28/28 (100%)	0.200	14.6	4.40
2021	Total PCB Congeners (mg/kg)	18/18 (100%)	0.341	0.851	0.528
--	**Percent Change 1984-1994 to 2021**	--	--	**94%**	**88%**

Note: Table summarizes PCB concentrations data for skin-on fillet fish tissue samples collected downstream of former CFC facility between Bowen Road and Chase Lake Road.
Referenced: (CTI and Associates, Inc., 2015; CTI and Associates, Inc.; Arcadis US, Inc., 2024; Malcolm Pirnie Engineers, 1997; Warzyn Inc., 1992)

Figure 4: Total PCB Concentrations in White Sucker Samples – Historical vs 2021 (in Downstream Direction)



Legend:

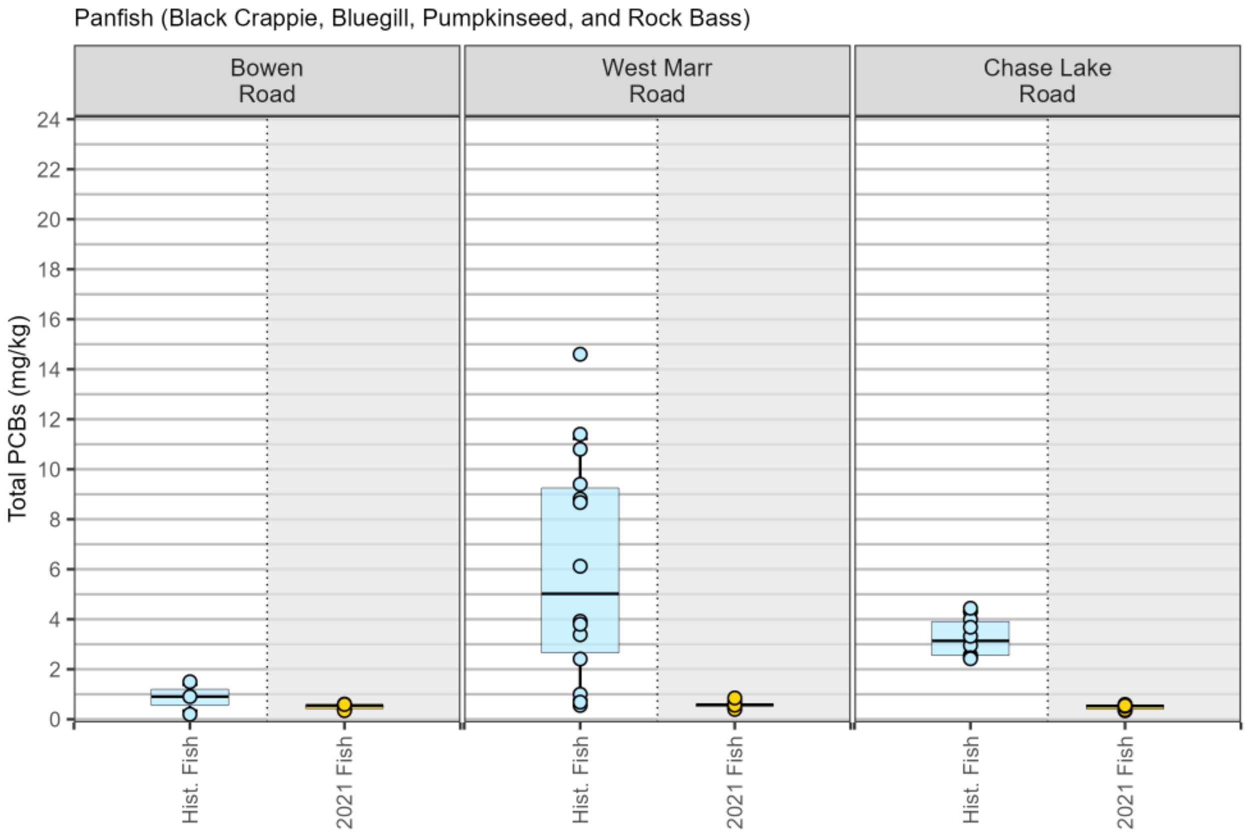
- ● Detected Result
- 90th Percentile
- 75th Percentile
- 50th Percentile (Median)
- 25th Percentile
- 10th Percentile
- Total PCB Congeners in 2021 Fish Tissue Samples
- Total Aroclor PCBs in Historical Samples (see Note 2)

Notes:

1. Figure shows the wet-weight PCB concentrations for skin-on fillet samples of each species of fish.
2. Historical data includes fish tissue sampling events completed between 1984 and 1994.

Referenced: (CTI and Associates, Inc., 2015; CTI and Associates, Inc.; Arcadis US, Inc., 2024; Malcolm Pirnie Engineers, 1997; Warzyn Inc., 1992)

Figure 5: Total PCB Concentrations in Panfish Samples – Historical vs 2021 (in Downstream Direction)



Legend:

- Detected Result
- 90th Percentile
- 75th Percentile
- 50th Percentile (Median)
- 25th Percentile
- 10th Percentile
- Total PCB Congeners in 2021 Fish Tissue Samples
- Total Aroclor PCBs in Historical Samples (see Note 2)

Notes:

1. Figure shows the wet-weight PCB concentrations for skin-on fillet samples of each species of fish.
2. Historical data includes fish tissue sampling events completed between 1984 and 1994.

Referenced: (CTI and Associates, Inc., 2015; CTI and Associates, Inc.; Arcadis US, Inc., 2024; Malcolm Pirnie Engineers, 1997; Warzyn Inc., 1992)

<u>Surface Water Sampling</u>

The ROD does not include a long-term cleanup goal for surface water. However, surface water sampling and analysis is key to evaluating changes in PCB concentrations to support natural recovery assessment; assess changes in PCB concentrations over time; evaluate changes in PCB transport over time; and to update the CSM.

Between September and November 2020, PCB concentrations in river surface water were measured in both time-averaged samples, using SP3™ samplers, and discrete samplers. The time-averaged surface water data collected were PCB congener concentrations in surface water at a series of locations from upstream of the former CFC facility and to downstream locations. Paired with estimates of flow at each monitoring station, these data also made possible estimates of PCB load gain between surface water monitoring stations (e.g., the amount of PCBs entering the river between each monitoring station). The measurements also provide baseline data for possible future monitoring. The discrete surface water sample data were collected to provide baseline data for future monitoring and were also compared to historical data to assess changes over time in surface water PCB concentrations.

Surface water dissolved total PCB congener concentrations measured in 2020 are compared to historical dissolved total Aroclor PCBs in 1983. Data comparison for long-term trend analysis is limited due to differences in collection methods (grab or passive sampling), processing approaches (filtered versus non-filtered accounting for dissolved versus total PCBs, respectively), and chemical analysis techniques (Aroclor-based or congener-based methods). The 1983 data are also reflective of conditions prior to the 2001 ROD. Additional data is needed to assess natural recovery in surface water following the 2005 to 2006 removal action.

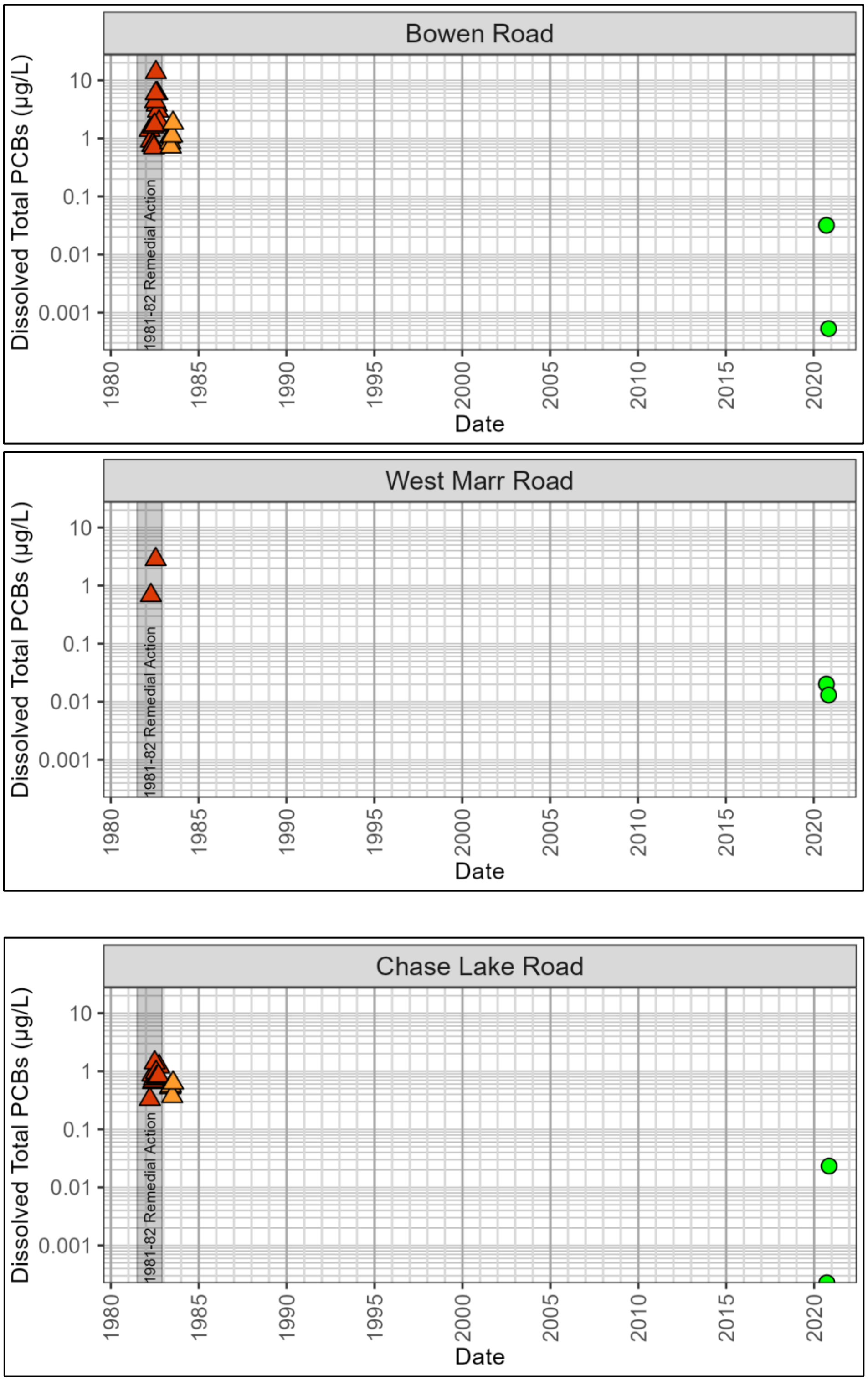
The maximum concentration detected in 2020 shows a decline of 98% compared to the maximum concentration detected in 1983 (**Table 8**). Mean concentration values over this period have also declined by 98% (**Table 8**). The long-term trends are shown in time series charts of the data at the Bowen Road, West Marr Road, and Chase Lake Road sampling stations (**Figure 6**).

Table 8 – Summary of PCB Concentrations in Surface Water Samples

Dataset	Analyte	Frequency of Detection	Minimum	Maximum	Mean
1983	Dissolved Total Aroclor PCBs (µg/L)	15/15 (100%)	0.0190	1.83	0.558
2020	Dissolved Total PCB Congeners (µg/L)	20/20 (100%)	3.79E-06	0.033	0.00995
	Percent Change 1983 to 2020	--	--	**98%**	**98%**

Note: Table summarizes PCB concentrations data for discrete surface water samples collected between M-59 and Bowen Road.
Referenced: (Rice, White, Simmons, & Rossmann, 1984; CTI and Associates, Inc.; Arcadis US, Inc., 2024)

Figure 6: Dissolved Total PCB Concentrations in Discrete Surface Water Samples collected Downstream of Former CFC Facility



Legend:

- 1982 Dissolved Total Aroclor PCBs
- 1983 Dissolved Total Aroclor PCBs
- 2013 Dissolved Total PCB Congeners

Notes:

1. Open symbol indicates non-detect result plotted at detection limit.
2. Parent and duplicate sample results were averaged to represent a single result for that sample.

Referenced: (Rice, White, Simmons, & Rossmann, 1984; CTI and Associates, Inc.; Arcadis US, Inc., 2024)

EGLE also reported that a State-led surface water sampling and analysis effort was conducted in 2023 in the Shiawassee River. EPA has not been provided a comprehensive report of the PCB sampling, analysis, and data evaluation effort. The surface water data will be reviewed in the next FYR if complete documentation of the sampling effort is provided.

PCB SAMPLING IN UPLAND SOILS

The 2019 FYR documented apparent noncompliance with the requirements of the restrictive covenant to maintain the existing asphalt cap (which is not a requirement in the ROD or Partial CD) (EPA, 2019). Between August 20 and December 21, 2021, EPA contractor START implemented investigation activities to assess whether modifications to the Site since the 2010 transfer of the Site to Lucy Road Resources, LLC have impacted historically clean portions of the Site, created new routes of exposure to PCBs, or created new conduits for releasing PCBs into the Shiawassee River (Tetra Tech, Inc., 2023). The investigation also evaluated whether the modifications to the Site have resulted in new routes of exposure to metals. Metal-impacted soil (aluminum, antimony, chromium, nickel, silver, and zinc) was identified in the southwestern portion of the former CFC facility beneath and adjacent to the site building, but was not identified as a contaminant of concern (COC) in the 2001 ROD (AKT Peerless Environmental & Energy Services, 2010). For more detailed information on the PCB investigation effort in former CFC property soils (including relevant discussion, figures, and data tables), see the excerpt from the report in Appendix C. Investigation activities included:

- Collecting and analyzing soil samples for PCBs and metals from various areas of the Site including land clearing areas, former lagoons and northern wetland, and former lagoon ditches;
- Sampling landscaping materials along the eastern boundary of the former CFC facility for PCBs and/or metals;
- Collecting sediment samples in the retention pond at the northern end of the former CFC building and in Shiawassee River outfalls for PCBs analysis;
- Collecting wipe samples at Shiawassee River outfalls for PCB analysis; and
- Collecting perimeter ambient air samples for PCB analysis.

The findings of the investigation activities indicated that all soil samples were below the PCB cleanup goal of 10 mg/kg. The data results indicate that the previous land clearing and regrading activities documented in the 2019 FYR Report have not resulted in a direct contact risk for PCBs or metals in shallow site soils or landscaping materials. Additionally, PCBs were not detected in perimeter ambient air, and therefore no off-site inhalation risk associated with PCBs was identified. The following subsections discuss the results by media in greater detail.

<u>Soil Sampling</u>

From August 23 to 31, 2021, soil was sampled from 250 soil borings using a combination of composite and direct sampling. On September 15, 2021, seven composite soil samples were also collected from landscaping material. Soil samples were analyzed for PCB Aroclors, and 25 percent of samples were also analyzed for target analyte list (TAL) metals, and hexavalent chromium (chromium [VI]). PCB results were compared to the clean-up goal of 10 mg/kg PCBs. Metal results were compared to both the EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC), and the EPA Construction Worker RSL based off a hazard quotient of 1, and a target cancer risk of $1x10^{-5}$. Since landscaping material is being distributed to residences, soil results from landscaping materials were compared to both EGLE Part 201 Generic Residential DCC and EPA Residential RSLs.

There were no PCBs Aroclors detected in soil samples above the cleanup goal of 10 mg/kg. Soil sample results ranged from non-detect to 3.6 mg/kg PCBs. There were also no metal exceedances in soil samples above the EGLE Generic Nonresidential DCC and the EPA Composite Worker RSL, with the exception of one soil sample from landscaping material that had a manganese detection of 2,500 mg/kg, above the EPA Composite Worker RSL; however, the detection fell within the EPA Common Concentration Range between 20 to 3,000 mg/kg.

Outfall Sampling

On September 16, 2022, 11 soil samples were collected immediately downstream of outfall pipes and were analyzed for PCB Aroclors. Further, on September 28, 2021, one to three wipe samples were collected from each of the eight outfall pipes identified at the former CFC property.

No PCB Aroclors were detected in any of the outfall soil samples or in any of the outfall wipe samples.

Sediment Sampling

On August 25, 2021, five discrete sediment samples were collected from the retention pond on the northern portion of the Site from 0- to 6-inches below ground surface. Sediment samples were submitted for laboratory analysis of PCB Aroclors.

No PCB Aroclors were detected in any of the retention pond sediment samples.

Perimeter Ambient Air Sampling

From December 20 to 21, 2021, four 34-hour perimeter ambient air samples were collected along the eastern boundary of the Site to assess risk associated with fugitive dust for adjacent residential properties. One background 34-hour ambient air sample was also collected along the western boundary of the Site. Perimeter air samples were analyzed for PCB Aroclors.

No PCB Aroclors were detected in any of the perimeter ambient air samples.

Site Inspection

The inspection of the Site was conducted on November 2, 2023. In attendance were Leah Werner, EPA Region 5; Mary Schafer of EGLE; Brad Hartwell of Tetra Tech; John Allen of Lucy Road Resources, LLC; James D. VandeWyngearde and Lisa Tomlinson of Adient (the PRP); Matt Handyside and Brian Finley of CTI; and Lisa Tomlinson of Arcadis. The purpose of the inspection was to assess the protectiveness of the remedy and determine whether there exists a current pathway for human health or ecological exposure from the former CFC facility to the floodplain soils or Shiawassee River. The inspection also included some areas along the Shiawassee River that are accessible by road; however, the inspection did not address the entire eight-mile stretch of the Shiawassee River.

The Site inspection did not visually identify any issues that may call into question the protectiveness and implementation of the remedy. The State of Michigan and/or applicable federal agencies have been informed of the abovementioned observations, as necessary. Please refer to photographs from the site inspection in Appendix F, and the Site Inspection Report in Appendix G.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

No. The remedy is not functioning as intended by the 2001 ROD. It appears that natural recovery may be occurring at all river miles based on a preliminary comparison of baseline data collected from 2020 to 2021 with historic data. However, the historic data have limitations in terms of their comparability due to the age of the data and differences in sampling or analysis methods.

The PRP submitted a draft of the first MNR Report in April 2024, however, the report was submitted outside of the review period for this FYR Report and will be assessed in the next FYR. The MNR Report will evaluate comparison between the historic data and the 2021 baseline data to evaluate whether natural recovery has been occurring in a manner consistent with the natural recovery described in the ROD (EPA, 2001). The PRP also submitted a draft LTMP in April 2024, outside the review period for this FYR, which will be discussed in the next FYR. The LTMP must include an approach to evaluate natural recovery, including a sampling plan and schedule to continue routine monitoring of PCB concentrations in sediment, surface water, and fish tissue for a robust analysis of natural recovery. The future LTM datasets will be directly comparable to the 2021 baseline data. Following collection of LTM data every five years, the PRP will need to submit an MNR report that evaluates the comparison between the 2021 baseline data and LTM data and assesses whether natural recovery is occurring, surface sediment SWAC PCB concentration changes and rates of decline, and trend analysis with comparison to the long-term cleanup goal. The PRP should implement the first LTM data collection effort in 2025. The second MNR Report should be submitted in 2027, two years in advance of subsequent FYR Report deadline.

The ROD required post-remediation monitoring to ensure that natural recovery is occurring to meet the long-term cleanup goal of SWACs between 0.2 to 0.003 over a period of 18 years (i.e., by 2023). Evaluation of the baseline dataset indicates that none of the SWACs have met the long-term cleanup goal. A total PCB load gain analysis discussed in the draft 2020-2021 Baseline Sampling Data Report suggests a source of residual dissolved PCB contributions to the water column is located adjacent to the former CFC facility, within the area previously targeted by dredging (CTI and Associates, Inc.; Arcadis US, Inc., 2024). A Principal Component Analysis of the baseline sampling surface water data similarly demonstrated a shift in PCB composition moving downstream from the former CFC property, which could reflect a greater portion of weathered versus un-weathered PCBs entering the water column, or potentially a different PCB source material (CTI and Associates, Inc.; Arcadis US, Inc., 2024). A revised CSM should be developed in advance of the LTMP to understand potential ongoing sources of PCBs to the river, transport, current exposure concentrations, and changes over time. Further, the LTMP will evaluate additional source input into the Shiawassee River system. If additional source input is determined to prevent achievement of the long-term cleanup goal, EPA will require the PRP to take action to address the ongoing source(s).

Fish consumption advisories are in place and appear to be effective. Human exposures to contaminated fish tissue at the Site are addressed through fish consumption advisories, but ecological receptors could be impacted by elevated PCB concentrations.

The 2010 restrictive covenant is not legally enforceable by EPA. However, the property appears to have been consistently zoned for industrial use and the IC currently in place and required in the ROD appears to be effective. The investigation activities performed in 2021 determined that the land clearing and regrading activities documented in the 2019 FYR report did not result in direct contact risk for PCBs or metals above the site-specific long-term cleanup goal of 10 mg/kg in shallow site soils or landscaping materials. The PRP will use best efforts to secure a deed restriction for the portion of the former CFC property, Tax Parcel No. 4706-27-200-010 of Livingston County, identified as the Site defined in the Partial CD, with Lucy Road Resources, LLC as both grantor and grantee. The deed restriction would be enforceable by the PRP and EPA. The PRP and EPA will assess which land/water use restrictions should be included as deed restrictions to proactively prohibit interference for the integrity or protectiveness of the remedy. Land/water use restrictions in the form of ICs for the former CFC property may be considered in the decision document for OU2.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

Yes, the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid and appropriate. However, impacts of climate change, including increased precipitation and flooding, could result in the resuspension of contaminated floodplain soils and sediments to residential properties adjacent to the river. This may make the exposure assumptions made at the time of the ROD no longer valid. If contaminated floodplain soils, sediments, or surface water are moving to areas where a 10 mg/kg PCBs cleanup goal is not appropriate, EPA would need to evaluate whether exposure in those areas present unacceptable risk. A detailed CSM should evaluate whether the floodplain soils act as a pathway for recontamination of sediment and/or adjacent residential properties.

The 2021 sampling conducted at the former CFC property found that the land disturbance activities documented in the 2019 FYR do not appear to have created new routes of exposure to PCBs. Land use at the Site has not changed and the O&M Plan for ICs requires annual monitoring of the post-remedial ICs at the former CFC property to ensure that the industrial site zoning remains in place and to monitor property ownership.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

Yes. The 2019 FYR Report documented that during the site inspection, there were signs of floodplain soil erosion on the western shore of the river, west of the CFC facility (EPA, 2019). It further noted that because floodplain soils were remediated to a PCB concentration of 10 mg/kg and the protective concentration of PCBs in river sediment is 0.003 to 0.2 mg/kg, eroding floodplain soils or significant flood events may represent a source of PCBs to the river. While significant floodplain erosion was not observed along the western shore of the river near the former CFC property during the FYR site inspection, impacts of climate change (e.g., increased precipitation or flooding) could be a path for recontamination of river sediments by adjacent floodplain soils that may contain concentrations up to 10 mg/kg PCBs. Potential increased flooding may raise concern over human health exposures adjacent to the river from resuspended sediment (e.g., vegetable gardens, livestock areas, playsets, basements). A detailed CSM should evaluate whether floodplain soils act as a pathway for recontamination of sediment and/or adjacent residential properties. The CSM should also evaluate the geomorphology of the river and its potential correlation to contamination distribution.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category:** Monitoring			
	Issue: Lack of long-term monitoring and process to evaluate progress of MNR at the site.			
	Recommendation: Finalize the draft LTMP and implement the first round of LTM data collection. Include in the plan a requirement for continued monitoring to evaluate the progress of natural recovery toward meeting the long-term cleanup goals in the ROD. The LTMP will require LTM data collection every five years, which should be collected four years in advance of the subsequent FYR deadline.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	PRP	EPA/State	6/30/2025

OU(s): 1	**Issue Category:** Remedy Performance			
	Issue: SWAC concentrations of PCBs in sediment from all river miles exceed the 2001 ROD long-term cleanup goals. A current evaluation of the natural recovery processes at the Site, including evaluating whether natural recovery is occurring and if and where ongoing source(s) of PCB contamination exist, is needed.			
	Recommendation: Finalize the first MNR Report, which should evaluate the baseline data in the context of historic data to evaluate the progress of natural recovery of PCBs in site media. The MNR Reports should also evaluate additional source input into the system to determine if ongoing source(s) are preventing natural recovery of sediment from meeting the long-term cleanup goal, and whether additional response actions may be needed. Future MNR reports will be based upon the results from implementation of the LTMP and should be submitted two years before the subsequent FYR deadline.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	PRP	EPA/State	9/30/2024

<table>
<tr><td>OU(s): 1</td><td colspan="4">Issue Category: Other</td></tr>
<tr><td></td><td colspan="4">Issue: A CSM has not been revised for the Site since before the remedy implementation.</td></tr>
<tr><td></td><td colspan="4">Recommendation: An updated CSM should be developed that assesses potential sources, transport, current exposure concentrations, and changes over time. A detailed CSM should evaluate whether floodplain soils act as a pathway for recontamination of sediment and/or adjacent residential properties.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>PRP</td><td>EPA/State</td><td>9/30/2024</td></tr>
</table>

<table>
<tr><td>OU(s): 1</td><td colspan="4">Issue Category: Operations and Maintenance</td></tr>
<tr><td></td><td colspan="4">Issue: An O&M plan that includes a LTMP has not been developed as required by the 2005 Partial CD.</td></tr>
<tr><td></td><td colspan="4">Recommendation: Pursuant to Task 5 of the SOW included in the Partial CD, the PRP will develop an O&M Plan following approval of the LTMP.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>PRP</td><td>EPA/State</td><td>11/30/2025</td></tr>
</table>

<table>
<tr><td>OU(s): 1</td><td colspan="4">Issue Category: Institutional Controls</td></tr>
<tr><td></td><td colspan="4">Issue: The 2010 restrictive covenant is not legally enforceable by EPA.</td></tr>
<tr><td></td><td colspan="4">Recommendation: Pursuant to the Partial CD paragraph 24, the PRP will use best efforts to secure a deed restriction for the portion of the former CFC property, Tax Parcel No. 4706-27-200-010 of Livingston County, identified as the Site defined in the Partial CD, Lucy Road Resources, LLC as both grantor and grantee. The deed restriction should be enforceable by the PRP and EPA. The PRP and EPA should assess which land/water use restrictions should be included as deed restrictions to proactively prohibit interference with the integrity or protectiveness of the remedy.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>PRP</td><td>EPA/State</td><td>6/30/2025</td></tr>
</table>

VII. PROTECTIVENESS STATEMENT

OU1 and Sitewide Protectiveness Statement
Protectiveness Determination: Not Protective

Protectiveness Statement:

The remedy at the Shiawassee River Superfund Site is not protective of the environment. SWAC concentrations of PCBs in sediment from all river miles exceed the 2001 ROD long-term cleanup goals. A current evaluation of the natural recovery processes at the Site, including evaluating whether natural recovery is occurring, the rate at which it may be occurring, and if and where ongoing source(s) of PCB contamination exist, is needed.

Additional information is needed to determine whether the remedy is currently protective of human health. The former CFC facility is currently zoned for industrial use and fish advisories are in place. However, additional information is required to determine if impacts of climate change (i.e., increased precipitation and flooding) are causing the resuspension of contaminated floodplain soils and sediments to residential properties adjacent to the river, resulting in the redistribution of and potential new or different exposure routes to PCB contamination.

The following actions need to be taken to ensure protectiveness:

1. Finalize the draft LTMP and implement the first round of LTM data collection. Include in the plan a requirement for continued monitoring to evaluate the progress of natural recovery toward meeting the long-term cleanup goals in the ROD. The LTMP will require LTM data collection every five years, which should be collected four years in advance of the subsequent FYR deadline.
2. Finalize the first MNR Report, which should evaluate the baseline data in the context of historic data to evaluate the progress of natural recovery of PCBs in site media. The MNR Reports should also evaluate additional source input into the system to determine if ongoing source(s) are preventing natural recovery of sediment from meeting the long-term cleanup goal, and whether additional response actions may be needed. Future MNR reports will be based upon the results from implementation of the LTMP and should be submitted two years before the subsequent FYR deadline.
3. An updated CSM should be developed that assesses potential sources, transport, current exposure concentrations, and changes over time. A detailed CSM should evaluate whether floodplain soils act as a pathway for recontamination of sediment and/or adjacent residential properties.
4. Pursuant to Task 5 of the SOW included in the Partial CD, the PRP will develop an O&M Plan following approval of the LTMP.
5. Pursuant to the Partial CD paragraph 24, the PRP will use best efforts to secure a deed restriction for the portion of the former CFC property, Tax Parcel No. 4706-27-200-010 of Livingston County, identified as the Site defined in the Partial CD, Lucy Road Resources, LLC as both grantor and grantee. The deed restriction should be enforceable by the PRP and EPA. The PRP and EPA should assess which land/water use restrictions should be included as deed restrictions to proactively prohibit interference with the integrity or protectiveness of the remedy.

VIII. NEXT REVIEW

The next FYR report for the Shiawassee River Superfund Site is required five years from the completion date of this review.

APPENDIX A

REFERENCE LIST

APPENDIX A – REFERENCES

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APPENDIX B

GENERAL SITE FIGURES

APPENDIX B – SITE MAP

Figure 1. Map of the Shiawassee River Superfund Site, which begins at approximately the former Cast Forge facility and continues north (downstream) to approximately Steinacker Road.

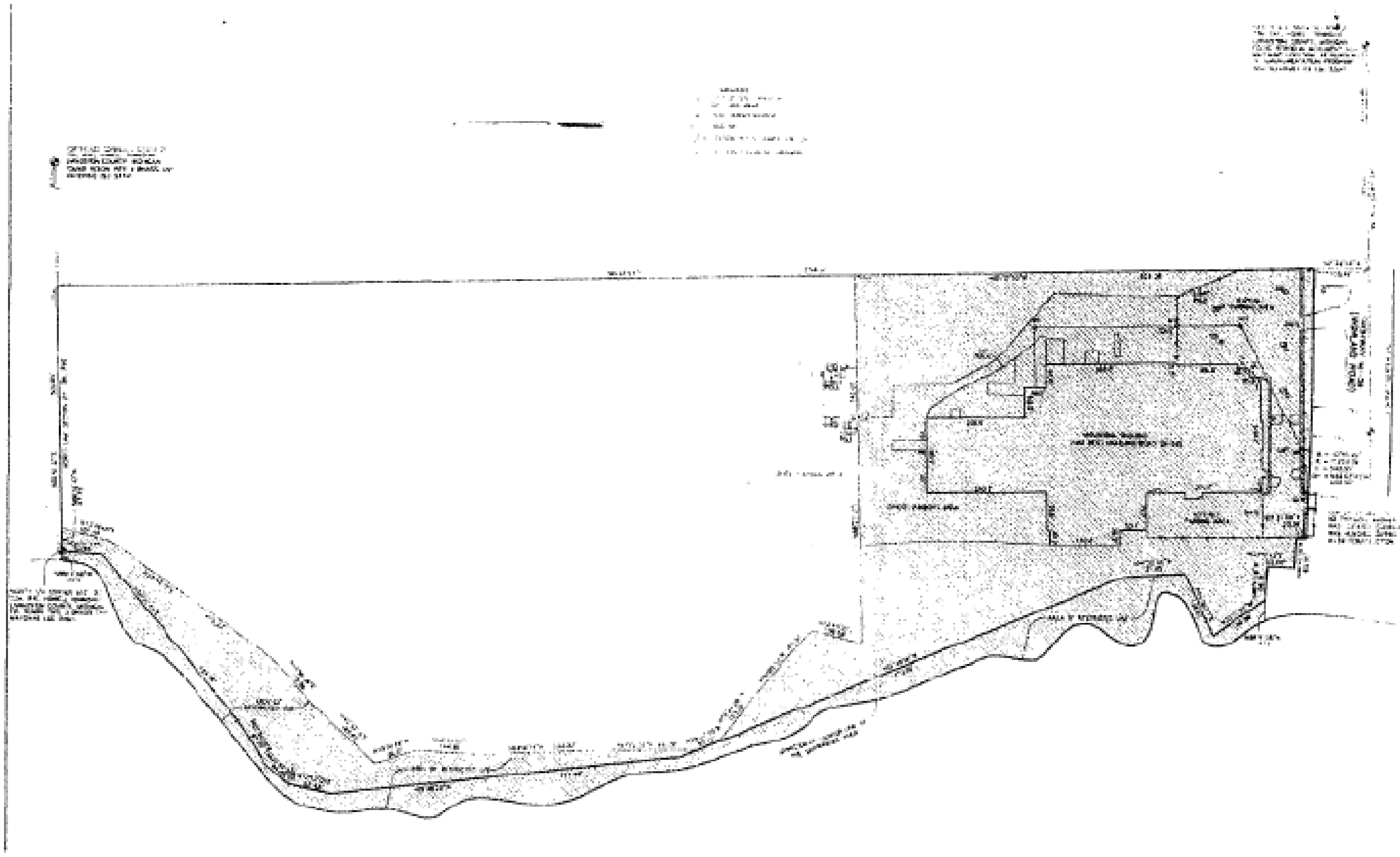

Figure 2. Schedule I-A from May 19, 2020 covenant deed conveying the former CFC property to Lucy Road Resources, LLC. The covenant deed depicted the shaded area as the area in which the institutional controls described in the ROD apply.

APPENDIX C

EXCERPT, *FINAL ASSESSMENT REPORT*
PREPARED BY TETRA TECH, INC. SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
DATED SEPTEMBER 23, 2023

FINAL ASSESSMENT REPORT
SHIAWASSEE RIVER SUPERFUND SITE
HOWELL, LIVINGSTON COUNTY, MICHIGAN

Final

September 28, 2023

Prepared for:

U.S. Environmental Protection Agency (EPA) Region 5
25213 Dequindre Road
Madison Heights, Michigan 48071

Submitted by:

Tetra Tech, Inc. Superfund Technical Assessment and Response Team
1 South Wacker Drive, Suite 3700
Chicago, IL 60606

EPA Contract Number: 68HE0519D0005
Task Order – Task Order (TO): 68HE0520F0065
Document Tracking Number: 0376b

CONTENTS

TABLES

APPENDICES

ATTACHMENTS

LIST OF ACRONYMS

AA	Ambient air
ASB	Analytical Services Branch
BEA	Baseline Environmental Assessment
CFC	Caste Forge Company
CLP	Contracts Laboratory Program
COC	Chain of custody
DCC	Direct Contact Criteria
DCE	Dichloroethene
DOT	U.S. Department of Transportation
DWC	Drinking Water Criteria
DWPC	Drinking Water Protection Criteria
ECD	Electron capture detector
EGLE	Michigan Department of Environment, Great Lakes, & Energy
EPA	U.S. Environmental Protection Agency
FID	Flame ionization detector
FL	Former lagoon
FSP	Field Sampling Plan
GSIC	Groundwater/Surface Water Interface Criteria
HDPE	High density polyethylene
HQ	Hazard quotient
IA	Indoor air
IDW	Investigation-derived waste
LC	Land clearing
LD	Former lagoon ditch
LM	Landscape material
LTCG	Long-Term Cleanup Goal
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MIP	Membrane interface probe
MS/MSD	Matrix spike/matrix spike duplicate
NP	Northern portion
NPL	National Priority List
NRCS	Natural Resource Conservation Service
NW	Northern wetland
OF	Outfall
PA	Perimeter ambient air
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene

PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PID	Photoionization detector
PPE	Personal protective equipment
ppm	Parts per million
PVC	Polyvinyl chloride
QA	Quality assurance
QC	Quality control
RD	Restricted area ditch
RIASL	Recommended Interim Action Screening Level
ROD	Record of Decision
RP	Retention pond
RSL	Regional Screening Level
SG	Soil gas
SMO	Sample Management Office
SOP	Standard operating procedure
SS	Sub-slab soil gas
START	Superfund Technical Assessment and Response Team
TAL	Target analyte list
TCA	Trichloroethane
TCE	Trichloroethene
TR	Target cancer risk
TW	Temporary monitoring well
USDA	U.S. Department of Agriculture
VC	Vinyl Chloride
VIAPSL	Volatilization to Indoor Air Pathway Screening Level
VISL	Vapor Intrusion Screening Level
VOC	Volatile organic compound
XSD	Halogen specific detector

1. INTRODUCTION

Under Superfund Technical Assessment and Response Team (START) Contract No. 68-HE-0519-D0005, Task Order No. (TO) 68HE0520F0065, U.S. Environmental Protection Agency (EPA) tasked Tetra Tech, Inc. (Tetra Tech) to perform a site assessment at the Shiawassee River Superfund site (the site) in Howell, Livingston County, Michigan. Historically, polychlorinated biphenyls (PCB) have been the primary contaminants of concern.

The primary objectives of this site assessment were to: (1) determine whether recent activities at the former Cast Forge Company (CFC) facility have resulted in a release of PCBs or metals at the site, (2) perform a vapor intrusion assessment at the site, and (3) assess the presence of emerging contaminants (1,4-dioxane and per- and polyfluoroalkyl substances [PFAS]) in site groundwater.

Assessment activities was completed by the following personnel:

Table 1 — Project Personnel

Name	Organization	Title
Brad Hartwell	Tetra Tech, Inc.	Project Manager, Field Team Leader
Leah Werner	U.S. Environmental Protection Agency	Remedial Project Manager (Current)
Greg Gehrig	U.S. Environmental Protection Agency	Remedial Project Manager (Previous)
Emily Dunbar	Tetra Tech, Inc.	Field Environmental Scientist
Todd Grossmann	Tetra Tech, Inc.	Field Environmental Scientist
Halie Kish	Tetra Tech, Inc.	Field Environmental Scientist
Chad Whelton	ALS Environmental (Holland, MI)	Project Manager
Sue Anderson	ALS Environmental (Simi Valley, CA)	Project Manager
Elizabeth Nye	Eurofins Burlington	Project Manager
Various	Mateco Drilling Company	Driller
Cody Stoddard	Michigan Department of Environment, Great Lakes, & Energy (EGLE)	Geological Technician
Various	Terra Probe Environmental, Inc.	Driller

Michigan Department of Environment, Great Lakes, & Energy (EGLE) conducted direct-push drilling associated with the PCB and metals assessment at the site. Mateco Drilling Company conducted the direct-push membrane interface probe (MIP) profiling, the temporary soil gas probe installations, and the on-site temporary monitoring well installations. Terra Probe Environmental, Inc. conducted direct-push drilling for resampling of soil samples for volatile organic compounds (VOCs) around the perimeter of the source building, and installed the monitoring wells at the west adjoining property, Chestnut Woods Condominiums.

Most analytical services for the project were provided by either the EPA Analytical Services Branch (ASB) or an EPA Contracts Laboratory Program (CLP) laboratory. ALS Environmental provided VOCs analysis for indoor air and sub-slab soil gas, as well as PFAS analysis for groundwater samples; and Eurofins TestAmerica provided PCBs analysis for outdoor perimeter air.

This report summarizes the assessment activities; specifically, in addition to this introduction, it contains the following:

- The assessment methodology (Section 2)
- The site's environmental setting (Section 3)
- Results of the assessment (Section 4)
- Summary and recommendations of the assessment (Section 5)
- A list of references cited herein (Section 6)

For reference, this report includes additional information contained in appendices and attachments:

- Site figures (Appendix A)
- Summary tables of analytical results (Appendix B)
- EPA calculator inputs for screening levels (Appendix C)
- A photographic documentation log (Appendix D)
- Monitoring well logs (Appendix E)
- Soil gas probe logs (Appendix F)
- MIP profiling logs (Appendix G)
- Groundwater sampling field forms (Appendix H)
- Air sampling field forms (Appendix I)
- Data validation reports (Appendix J)
- Laboratory analytical reports (Attachment 1)

1.1. SITE BACKGROUND

The Shiawassee River Superfund site is at 2440 West Highland Road (M-59) in Howell, Livingston County, Michigan. The site includes the former CFC facility (now owned by Lucy Road Resources) and approximately 8 miles of the Shiawassee River extending from the site downstream to the Steinacker Road area; however, this investigation only focuses on the former CFC facility and immediate surrounding area (see Figures 1 and 2, Appendix A). The former CFC property covers approximately 51 acres and is bordered by wetlands to north and east, Highway M-59 to the south, and the South Branch of the Shiawassee River to the west. The South Branch of the Shiawassee River is surrounded by forested areas, flood plains, rural areas, wetlands, and residences along the river. Based on the Five-Year Review Report for Shiawassee River Superfund Site, August 2019, PCB contamination has not been reported at any of the residential properties along the river. The Shiawassee River is not used as a drinking water supply; however, groundwater is used by local residents for drinking water and other uses (EPA 2019a).

The former CFC facility manufactured aluminum wheels for the automotive industry, which used PCBs as a heat retardant in oils from 1969 through 1972. Improper waste handling practices at the property from 1969 through 1976 resulted in disposal of PCB-laden wastewater and sludges on the CFC property, as well as the release of PCB-laden oils to an adjoining wetland and to the South Branch of the Shiawassee River. Areas impacted by these disposal practices include the initial unlined lagoon; former lined lagoon, overflow ditch, and overflow lagoon; flat area behind the building; and the former discharge pipe area on the riverbank (EPA 2019a). During an investigation performed by Michigan Department of Natural Resources (MDNR) in 1978 and 1979, high levels of PCBs were detected in soils around the site and in on-site monitoring wells. PCB concentrations above 1 part per million (ppm) were found in sediment samples collected from the Shiawassee River 14 miles downstream from the former CFC facility (EPA 2019a).

Following several rounds of sediment, soil, groundwater, and fish sampling completed by MDNR, the site was added to the National Priorities List (NPL) in September 1983. In 2001, after subsequent investigations and evaluations conducted by the responsible party, the EPA issued a Record of Decision (ROD) for the site. The ROD required excavation and disposal of PCB-contaminated soils, river, and floodplain sediments; institutional controls; and monitored natural recovery. On May 19, 2010, a covenant deed with restrictions for the former CFC property was finalized. The covenant deed (1) mandates limited use of a portion of the former CFC property to industrial and limited industrial purposes only; (2) prohibits removal of asphalt or concrete that covered the surface of the Restricted Property, unless promptly replaced by similar asphalt or concrete caps; (3) prohibits groundwater use at, in, or under the Restricted Property; (4) requires that owners "manage all soils, media, and/or debris on the Restricted Property;" (5) stipulates that owners "shall not treat," "store," or "dispose" of any hazardous materials on, at, or below the Restricted Property; and (6) provides access, as necessary, for environmental purposes, including environmental investigations, responses, correction actions, or remediation (EPA 2019a).

According to a 2010 Baseline Environmental Assessment (BEA) performed by AKT Peerless, the site has extensive sand formations that begin just below ground surface (bgs) and extend to a maximum investigated depth of 24 feet bgs. The sand is generally fine-to-medium grained, with traces of silt and gravel. The hydrogeology encountered during soil boring activities completed by AKT Peerless in 2010 consisted of a shallow, unconfined groundwater bearing formation with the apparent upper extent of the water table ranging in depth from approximately 6.5 to 19.5 feet bgs. Elevated chlorinated VOC concentrations were reported in soil southwest along the site building, and at a nearby former sump location within the southern portion of the site building. Elevated chlorinated VOC concentrations were also reported in groundwater northwest along the site building (near a former discharge line routed toward the Shiawassee River), and at the former sump location (AKT Peerless 2010).

Based on the 2019 EPA five-year review report, an inspection identified apparent non-compliance with the requirements to maintain the existing asphalt cap parking lot. In addition, the inspection indicated that modifications have been made to the former CFC property, including grading, removal of vegetation, construction of driveway and drainage structures, and filling of wetlands at the northern end of the property with a mixture that included material from the former CFC property (according to a permit application filed with Michigan Department of Environmental Quality [MDEQ]). Lastly, soil and gravel were observed at the grate of a storm drain, suggesting that material from the Restricted Property has washed into the storm drain and deposited in the floodplain and/or the Shiawassee River during rain events. As a result, there is a potential for an ongoing release of PCB-contaminated material from the former CFC property (EPA 2019a).

The site building is currently occupied by the following businesses: a landscaping supply company, an industrial equipment scrapyard, a metal fabricator, a used industrial parts supply company, a soap manufacturer, and a plumbing company.

TETRA TECH

Because the 2010 BEA identified elevated chlorinated VOCs in either soil or groundwater in numerous locations at the site, a vapor intrusion investigation is warranted at the site. Since groundwater sampling will occur as a part of the vapor intrusion investigation, groundwater will also be analyzed for emerging contaminants, including 1,4-dioxane and PFAS.

1.2. OBJECTIVES

The primary objectives of this site assessment are to:

- Determine whether recent modifications made at the site have: impacted historically clean portions of the site, created new routes of exposure to PCBs, or created new conduits for releasing PCBs into the Shiawassee River. Specific areas requiring PCB assessment include areas known to have PCB contamination, areas that underwent remediation on PCBs, areas historically found to not have PCB contamination, and outfalls that drain to the Shiawassee River and its floodplain.
- Evaluate risks at the site associated with contaminants identified by the 2010 BEA (metals, VOCs, and PFAS), but not addressed in the ROD.
- Evaluate groundwater risks associated with emerging contaminants, including 1,4-dioxane and PFAS.

The field activities conducted to achieve these objectives included the following:

- Advancing soil borings and collecting soil samples in various areas of the site including the land clearing areas, the northern portion of the site, former lagoons and northern wetland, former lagoon ditches, and the ditch in the restricted area. Soil samples were field screened for PCBs and metals content. A subset of soil samples were submitted to a laboratory for PCBs and/or metals analyses.
- Sampling landscaping materials in three-sided bays along the eastern boundary of the industrial property for PCBs and/or metals analyses.
- Collecting sediment samples in the retention pond at the northern end of the industrial building and in the Shiawassee River outfalls for PCBs analysis if sediment amount is sufficient.
- Collecting PCB wipe samples at Shiawassee River outfalls.
- Collecting perimeter ambient air samples for PCB analysis.
- Conducting a MIP investigation followed by soil, groundwater, and soil gas sampling for VOC analysis. Groundwater was also analyzed for PFAS.
- Collecting sub-slab soil vapor samples for VOCs analysis where warranted based on exterior soil gas sample results.
- Collecting indoor air samples for VOCs analysis.

The general approach for implementing each of these activities is discussed in Section 4.0 of this Final Assessment Report.

All START field activities were conducted in accordance with the EPA-approved, site-specific Quality Assurance Project Plan (QAPP) Addendum (Tetra Tech 2021b), and the standard operating procedures (SOP) identified in the site-specific Field Sampling Plan (FSP), Revision 3 (Tetra Tech 2021a).

2. INVESTIGATIVE METHODOLOGY

This section describes the general approach and the methods employed to implement assessment activities at the site. Photographic documentation of assessment activities is provided as Appendix D.

2.1. PCBS AND METALS INVESTIGATION

This section describes the general approach and the methods employed to implement the investigation activities for assessing PCBs and metals contamination at the site. The PCBs and metals investigation took place from August 20, 2021 to December 21, 2021, with utility clearing performed by Mateco Drilling Company, drilling performed by EGLE, and all soil logging and sampling performed by START.

2.1.1. Soil Sampling

From August 23 to August 31, 2021, an EGLE drilling technician advanced approximately 250 soil borings via direct push methods at the site, and soil was sampled by START using a combination of composite and discrete sampling. START advanced the soil borings for the former lagoon ditches (LD) decision units LD-04 and LD-05 with a 3-inch diameter hand auger. Proposed soil boring locations were based on the decision units, sample locations, and methodology in the Draft Sampling and Analysis Plan developed by EPA (EPA 2019b).

The land clearing (LC) investigation area was divided into four decision units, with each decision unit comprised of between 6 and 13 soil boring locations (Appendix A, Figure 3A). Three of the northernmost proposed boring locations in land clearing decision units LC-01 and LC-02 were inaccessible due to the presence of steep berms surrounding the retention pond, therefore, those borings were omitted. The former lagoon (FL) and northern wetland (NW) investigation areas included four decision units, with each decision unit comprised of between 2 and 10 soil boring locations (Appendix A, Figure 3B). The LD investigation area included six decision units, with each decision unit comprised of between 3 and 4 soil boring locations (Appendix A, Figure 3C). The northern portion (NP) investigation area included 13 decision units, with each decision unit comprised of between 2 and 6 soil boring locations (Appendix A, Figure 3D). START collected two composite samples from each decision unit to represent two depth intervals: 0 to 6-inch bgs, and 6 to 24-inch bgs. In the restricted area ditch (RD), 10 soil borings were advanced to 7 feet bgs, with discrete soil samples collected by START from 0 to 1 foot bgs, 1 to 3 feet bgs, 3 to 5 feet bgs, and 5 to 7 feet bgs (Appendix A, Figure 3D).

Soil samples were field screened for PCBs using a Dexsil L2000DX Analyzer. If screening of a sample indicated a PCB concentration exceeding 10 mg/kg, the sample was sent for laboratory analysis for PCB Aroclors as described in Sections 2.2 through 2.6. Additionally, 25% of samples for which field screening indicated a PCB Aroclor concentration of ≤ 10 mg/kg were sent for laboratory analysis. All soil samples were also field screened with an XRF analyzer (Olympus Delta Professional Alloy Plus) for metals, and 25% of the soil samples were submitted for laboratory analysis for target analyte list (TAL) metals and hexavalent chromium (chromium VI), as described in Sections 2.2 through 2.6.

On September 15, 2021, START collected seven composite soil samples from the three-sided bays containing landscaping material (LM) on the east portion of the site (Appendix A, Figure 3G). Samples were submitted for analysis for PCB Aroclors, TAL metals, and chromium VI, as described in Sections 2.2 through 2.6.

2.1.2. Outfall Sampling

On September 16, 2022, START conducted outfall soil sampling activities. Insufficient sediment mass was observed within the outfall pipes identified in the field. In order to obtain similar data, 11 soil samples were collected from 0-6 inches bgs immediately downstream of each outfall pipe (Appendix A, Figures 3E, 3F). Three outfall (OF) soil sampling locations (OF-05, OF-08, and OF-09) did not have discharge pipes, but were low areas where surface water flows off-site toward the Shiawassee River. Outfall soil samples were for laboratory analysis for PCB Aroclors, as described in Sections 2.2 through 2.6.

On September 28, 2021, one to three wipes were collected from each of 8 outfall pipes identified at the property, depending on the diameter of the outfall pipe. Pipes with diameters of 4, 6, and 12 inches had 1, 2, and 3 wipes sampled per pipe, respectively. A total of 19 wipe samples were collected from outfall pipes. Wipe samples were submitted for laboratory analysis for PCB Aroclors, as described in Sections 2.2 through 2.6.

2.1.3. Sediment Sampling

On August 25, 2021, START collected five discrete sediment samples from the retention pond (RP) at the northern portion of the site from 0 to 6 inches bgs (Appendix A, Figure 3E). Sediment samples were submitted for laboratory analysis for PCB Aroclors, as described in Sections 2.2 through 2.6.

2.1.4. Perimeter Ambient Air Sampling

From December 20 to 21, 2021, four 34-hour perimeter ambient air (PA) samples were collected along the eastern boundary of the site to assess risk associated with fugitive dust for adjacent residential properties (Appendix A, Figure 3A). One background 34-hour ambient air sample was also collected along the western boundary of the site during the same sampling event. The prevailing wind direction during sampling was from the southwest, and wind speeds varied between 0 and 16 mph. While a 24-hour sampling period would best simulate a residential receptor's exposure, a 34-hour sampling period was selected to satisfy the required reporting limits for residential receptors. Perimeter ambient air samples were submitted for laboratory analysis for PCB Aroclors, as described in Sections 2.2 through 2.6.

2.2. VAPOR INTRUSION INVESTIGATION

This section describes the general approach and the methods employed to implement the vapor intrusion assessment activities both on- and off-site. The vapor intrusion investigation took place from September 15, 2021 to January 5, 2023, with utility clearing, MIP profiling, soil gas probe installations, and on-site temporary monitoring well installation performed by Mateco Drilling Company; drilling for soil resampling and off-site temporary monitoring well installation performed by Terra Probe Environmental, Inc.; interior utility clearing performed by GPRS; and all soil logging, vapor pin installation, and sampling activities performed by START.

2.2.1. Membrane Interface Probe (MIP) Profiling

From September 15 to October 5, 2021, Mateco Drilling Company utilized a MIP to vertically profile total VOCs in subsurface soil to between 15 and 20 feet bgs at 40 locations along the perimeter of the site building (Appendix A, Figure 3I). MIP technology uses heat to volatilize and mobilize contaminants for sampling. Heating the soil or groundwater adjacent to the MIP's semi-permeable membrane volatilizes the VOCs, which then pass through the probe's membrane and into a carrier gas for transport to the ground surface. Once at the ground surface, the volatilized subsurface gases were analyzed via a series of detectors consisting of an electron capture detector (ECD) that detects general halogens (fluorines, chlorines, bromines), a halogen specific detector (XSD) capable of detecting chlorinated halogens (trichloroethene (TCE), tetrachloroethene (PCE), dichloroethane (DCE), vinyl chloride [VC]), a photoionization detector (PID) that detects a broad range of VOCs, and a flame ionization detector (FID) that also detects a broad range of VOCs. A computer in the MIP rig recorded all MIP data in real-time. The MIP profiles produced were used to determine the ideal soil sampling depths situated above the water table. MIP profiles are provided in Appendix G.

2.2.2. Soil Sampling

On October 6 and 7, 2021, 10 subsurface soil samples were collected via direct-push methods at locations and depths where the MIP profiles indicated the presence of VOCs above the water table (Appendix A, Figure 3H). The subsurface soil samples were submitted for laboratory analysis for VOCs, and were received by the CLP laboratory CHEMTEX in Port Arthur, Texas well before the designated holding time. The samples were analyzed by the laboratory after the designated holding time, resulting in the rejection of the majority of sampling results.

On August 9, 2022, the 10 subsurface soil samples were recollected at the same locations and depths to obtain defensible analytical data. The resampled subsurface soil samples were submitted for laboratory analysis for VOCs, to CLP laboratory Chemtech Consulting Group in Mountainside, New Jersey as described in Sections 2.3 and 2.7.

2.2.3. Monitoring Well Installation and Groundwater Sampling

From October 6 to 7, 2021, Mateco Drilling Company installed 15 temporary monitoring wells (TW) on the site within the uppermost portion of the aquifer (Appendix A, Figure 3H). Installed well depths varied from 15 to 24 feet bgs, with 5-foot polyvinyl chloride (PVC) well screens, PVC casing, and were finished with flush-mounted monuments set in a concrete pad. The annulus surrounding the well casing included: concrete from 0 to 0.5 feet bgs, large bentonite chips from 0.5 to 2 feet above top of screen, well gravel from two feet above the well screen to the bottom of screen, and bentonite to bottom of boring (where the boring was advanced deeper than the bottom of well screen). Ten of the wells (TW-01E through TW-28, and TW-46) were selected based on the MIP investigation that surrounded the site building and were installed within the same boring the subsurface soil sample was collected. Five additional temporary monitoring wells (TW-41 through TW-45) were placed downgradient of the building along the western site boundary, between the site building and the Shiawassee River, to monitor potential off-site transport of VOCs, PFAS, and 1,4-dioxane in groundwater.

On October 7 and 8, 2021, Tetra Tech developed the temporary monitoring wells TW-01E through TW-46 with a peristaltic pump, and surged the well with sample tubing throughout development. Each well had a minimum of 3 gallons of groundwater purged from the well during well development, and each was pumped and surged until purge water was visibly clear.

On October 18 and 19, 2021, 15 groundwater samples were collected using low-flow methodology from on-site temporary monitoring wells. A peristaltic pump was used with dedicated high-density polyethylene (HDPE) tubing to collect the groundwater samples. Samples were submitted for laboratory analysis for VOCs, 1,4-dioxane, and PFAS, as described in Sections 2.3 and 2.7.

On October 20, 2021, Tetra Tech and EGLE surveyed top of casing elevations for monitoring wells TW-01E through TW-46.

To delineate potential off-site groundwater migration of VOCs, on August 9 and 10, 2022, five additional temporary monitoring wells (TW-47 through TW-51) were installed on the eastern half of the west adjoining property (Appendix A, Figure 3H). Installed well depths varied from 6.3 to 8 feet bgs, with 5-foot well screens, and were finished with steel stickup covers. Tetra Tech developed those wells on August 11, 2022.

On August 15 and 16, 2022, 18 groundwater samples were collected from 13 on-site temporary monitoring wells and the five off-site wells. On-site monitoring wells TW-43 and TW-46 were not sampled during this sampling event. TW-43 was found destroyed at the time of sampling, likely during recent site grading activities; and TW-46 could not be located after significant effort. TW-46 is believed to have been buried or destroyed during site grading activities. Groundwater samples were submitted for laboratory analysis for VOCs, as described in Sections 2.3 and 2.7.

On September 7, 2022, Tetra Tech and EGLE surveyed top of casing elevations for monitoring wells TW-47 through TW-51.

Monitoring well logs are provided in Appendix E. Groundwater sampling field forms are compiled in Appendix H. A monitoring well inventory is provided in Table 11 of Appendix B.

2.2.4. Soil Gas Probe Installation and Soil Gas Sampling

From October 6 to 7, 2021, Mateco Drilling Company installed 40 soil gas (SG) probes (SG-01 through SG-38, SG-05E and SG-09SE) in the area surrounding the site building (Appendix A, Figure 3I). Installed probes were generally placed 2 feet above groundwater; installation depths varied from 7 to 13.5 feet bgs. Probes were constructed of 6-inch stainless steel well screens, Teflon-lined tubing, and were finished with flush-mounted monuments set in a concrete pad. The annulus surrounding the probe consisted of: concrete from 0 to 0.5 feet bgs, granular bentonite from 0.5 feet bgs to 2.5 feet above top of screen, well gravel from 2.5 feet above top of screen to bottom of screen, and granular bentonite from bottom of screen to bottom of borehole (where borehole depth was greater than bottom of screen).

Three seasonal sampling events occurred in October 2021, March 2022, and May 2022. During each event, 39 soil gas samples were collected from the previously installed probes. Soil gas samples were collected using batch certified SUMMA canisters. A successful helium leak check was performed at each probe prior to sample collection to ensure a closed sampling assembly.

Soil gas probes SG-09, SG-09SE, SG-10, and SG-11 were not sampled during at least one sampling event, as the probe screens were submerged due to a tenant’s routine discharge of distilled water onto the nearby ground surface. In addition, probes SG-13 and SG-14 were inaccessible during at least one sampling event, as several stacked polyethylene 300-gallon totes were placed on top of the probes. The omission of these samples do not present a data gap, as the analytical results collected at or near these locations were at least an order of magnitude lower than screening levels. SG-21’s concrete pad and flush mount monument had been damaged during all three sampling events, but the tubing and seal were not compromised, as the location passed the helium leak check for all three sampling events.

During each sampling event, at least one ambient air sample was collected near the soil gas probe locations. Laboratory-furnished, individually certified summa canisters were used for all ambient air samples.

Soil gas and ambient air samples were submitted for laboratory analysis for VOCs, as described in Sections 2.3 and 2.7.

Soil gas probe logs are provided in Appendix F. Soil gas and ambient air sampling field forms are compiled in Appendix I.

2.2.5. Sub-Slab Soil Gas and Indoor Air Sampling

On June 16, 2022, Tetra Tech and EPA completed a tour inside the site building to observe site conditions, identify areas with potential secondary VOC sources (as they were concentrated in just a few areas), and obtain concurrence on both sub-slab soil gas and indoor air sampling locations. A container inventory was not completed at the site building due to the large quantity of containers and to minimize disruption of building occupants. The building owner was interviewed during the site building tour to help answer vapor intrusion related questions.

On July 6, 2022, Tetra Tech installed 13 vapor pins (SS-01 through SS-05, and SS-07 through SS-14) to conduct sub-slab soil gas sampling within the footprint of the site building. Vapor pins were generally placed in proximity to impacted groundwater and soil gas (Appendix A, Figure 3J). Slab thicknesses varied from 4 inches in the south office area, to between 7 and 14 inches in the warehouse areas. Four vapor pins (SS-08 through SS-11) were installed horizontally in basement walls at mid-wall height. Basement walls were consistently 8 inches thick. The vapor pins were placed along vertical grout lines to avoid tapping into cinderblock voids but were not flush-finished to prevent compromising the thin cinderblock walls. Vapor pins SS-08 and SS-11 are situated on the west wall of the basement tunnel, vapor pin SS-09 is located on the north wall of the basement tunnel, and vapor pin SS-10 is located on the east wall of the basement tunnel. Vapor pins installed in warehouse areas were flush-finished, affixed with stainless steel covers; and vapor pins installed in low-traffic office areas were flush-finished and covered with black plastic covers.

On July 12, 2022 and January 5, 2023, START collected 14 8-hour sub-slab soil gas (SS) samples and 24 8-hour indoor air (IA) samples throughout the industrial building during each sampling event. Sub-slab soil gas sample SS-06 was collected without a vapor pin and was placed within a manhole exposed to underlying soil. Each sub-slab soil gas sample was collocated with an indoor air sample. Sample locations were selected in consultation with EPA and generally were distributed to evaluate the basement tunnel, numerous rooms within the southern office area, partitioned warehouse spaces, and smaller rooms within the warehouses. Laboratory furnished, batch certified SUMMA canisters were used for all sub-slab soil gas samples. A successful helium leak check was performed at each vapor pin prior to sample collection to ensure both a closed sampling assembly and a seal at the vapor pin, with the exception of the four vapor pins installed horizontally in basement walls due to safety concerns.

To evaluate potential outdoor air sources, one or two ambient air (AA) samples were also collected outside of the building during each event. Laboratory furnished, individually certified SUMMA canisters were used for all ambient air samples.

Sub-slab soil gas, indoor air, and ambient air samples were submitted for laboratory analysis for VOCs, as described in Sections 2.2 through 2.6.

Sub-slab soil gas, indoor air, and ambient air sampling field forms are present in Appendix I.

2.3. SAMPLE HANDLING, TRACKING, AND CUSTODY

This section describes sample labeling, sample packaging and shipping procedures, and quality assurance (QA)/quality control (QC) procedures for the soil and groundwater samples.

2.3.1. Sample Labeling

START used Scribe to generate a label for each sample. A sample label was affixed to each sample container sent to the appropriate laboratory. The label included the following information:

- Project number
- CLP case number (if applicable)
- CLP sample number (if applicable)
- Sample name (including location number and sample date)
- Sample collection date and time
- Sample depth (if applicable)
- Preservative (if applicable)
- Sample collector's initials
- Analysis

After being labeled, each sample was preserved as specified in the site-specific FSP (Tetra Tech 2021a).

Labels for samples analyzed by a subcontracted laboratory included the following information:

- Project name
- Sample name (including location number and sample date)
- Sample collection date and time
- Sample collector's initials
- Analysis
- Preservative

2.3.2. Sample Chain of Custody

START used standard sample chain of custody (COC) procedures to maintain and document sample integrity during collection, transportation, storage, and analysis. A sample was considered "in custody" if one of the following statements applied:

- Sample is in a person's physical possession or view.
- Sample is in a secure area with restricted access.
- Sample is placed in a container and secured with an official seal such that the contents of the container cannot be reached without breaking the seal.

START used Scribe to generate and print laboratory and region copies of COC forms. The laboratory copy was sealed inside the lid of the cooler. COC protocol provided an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the laboratory. One COC record was generated for each cooler shipped. The COC record was used to document all samples collected and the analysis requested. The following information was documented on the COC form:

- Project name and number (region copy only, if applicable)
- CLP case number (if applicable)
- CLP sample numbers (if applicable)
- Sampling location (station identification)
- Name and signature of sampler
- Destination of samples (laboratory name)
- Sample identification number
- Date and time of collection (including start and end time/date for soil gas, sub-slab soil gas, indoor air, and ambient air samples)
- Number and type of containers filled
- Analysis requested
- Preservatives used (if applicable)
- Sample designation (grab or composite)
- Special instructions (for example, laboratory needs to sub-sample oversized material or perform additional homogenization)
- Signatures of individuals involved in custody transfer, including the date and time of transfer
- Airbill number (if applicable)
- Project contact and phone number
- Custody seal number
- For soil gas, sub-slab soil gas, indoor air, and ambient air samples – initial and final vacuum pressure readings

Samples analyzed by a subcontracted laboratory did not require Scribe. START used laboratory-provided COC forms for these samples that require the same level of information as the EPA

Scribe-generated COC forms, except for the CLP-specific information (CLP case number and CLP sample numbers).

START followed the procedures in the EPA CLP Guidance for Field Samplers (EPA 2020) to complete the documentation listed above.

START appointed one of its field technical staff members to serve as the sample custodian. When all required documents have been completed, the sample custodian signed and dated the document and list the time of sample collection. The custodian confirmed that all descriptive information is complete on the COC forms, which was included with each shipping container. Two custody seals were used: one custody seal was placed across the latch of the container, and the other affixed on the opposite side of the container lid. The lid was securely taped shut for shipment. The field sample custodian sent the original copies of the COC region copy for samples shipped to a CLP laboratory to the project manager, who in turn submitted these forms to the Region 5 Sample Management Office (SMO), care of Ms. Leah Werner or Mr. Greg Gehrig within 5 working days. The sample custodian also retained and scanned all copies of all COCs (laboratory and region) for the project files.

2.3.3. Sample Packaging and Shipping Procedures

START packaged and shipped samples in accordance with the FSP and QAPP Addendum (Tetra Tech 2021a, 2021b). The following procedures were implemented when samples collected during this project were shipped to a CLP or subcontracted laboratory:

- All sample jars were individually wrapped with bubble wrap or other packing material and placed in their own individual Ziploc-type bags.
- Ice was double bagged in large Ziploc-type bags and placed at the bottom of the cooler. If the cooler has a drain, it was taped shut both inside and outside of the cooler.
- The cooler was lined with bubble wrap or other packing material, and all individually packaged samples was placed into one large plastic bag and tied after all sample jars have been placed. Sufficient packing material was used to prevent sample containers from breaking during shipment.
- Additional ice (double-bagged) was added on top of the tied plastic bag full of samples. Enough ice was added to maintain a sample temperature of 4 ± 2°C. START prepared, labeled, and placed a temperature blank in each cooler.
- The laboratory was notified if (1) sampling personnel suspected that any sample contains anomalously high concentrations (hand-write this anomaly directly on the laboratory copy of

the COC form), or (2) a sampled substance required laboratory personnel to take safety precautions.

- The COC specific to each cooler was sealed inside a plastic bag and taped to the inside of the cooler lid. START personnel ensured that the COC form is signed by all samplers and the custody seal numbers were included on the COC form. A return pre-paid air bill was included with the COC form so the cooler may be returned to START.
- The cooler was closed and taped shut with strapping tape around both ends.
- Signed and dated custody seals were placed on the front and side of each cooler. Wide clear tape was placed over the seals to prevent accidental tearing.
- The air bill, if required, was completed before the samples were relinquished to the carrier.
- The COC was transported within the taped sealed cooler. When the cooler is received at the analytical laboratory, laboratory personnel opened the cooler and signed the COCs to document transfer of samples.
- The Superfund SMO (for CLP laboratory samples) and the project contact person (for subcontracted laboratory samples) were notified if the laboratory expected to receive samples on a Saturday. START called its CLP sample coordinator, who in turn notified the SMO that samples were sent to a CLP laboratory. ASB Region 5 does not accept Saturday delivery.

All shipping containers were labeled as required by the U.S. Department of Transportation (DOT). After they had been packaged, the samples were shipped to the CLP laboratory specified by the EPA Region 5 Regional Sample Control Coordinator, the ASB Region laboratory, or the subcontracted laboratory.

Samples submitted to subcontracted laboratories followed similar packaging and shipping procedures, except for those explicit to CLP. For example, SUMMA canisters for soil gas, sub-slab soil gas, and indoor air samples were not shipped on ice and were shipped back to the laboratory in the boxes used to ship them to the site.

2.3.4. Quality Assurance and Quality Control Procedures

All QA activities were conducted in accordance with the FSP and QAPP Addendum for the Shiawassee River Superfund site (Tetra Tech 2021a, 2021b). A copy of the FSP was maintained by the field sampling team for immediate reference in resolving any QA issues that arose during field activities.

QC samples for all soil, sediment, landscaping materials and groundwater samples sent to the ABS, CLP and subcontracted laboratory were collected at the following frequencies:

- **Field Duplicate:** One per 10 environmental samples was collected, with a minimum of one per sample matrix.
- **Trip Blank Samples:** One trip blank was included in each cooler containing aqueous samples for analysis for VOCs.
- **Matrix spike and matrix spike duplicate (MS/MSD) Samples:** One per 20 environmental samples per matrix collected.
- **Rinsate Blank Samples:** One per day of sampling to verify quality of decontamination procedures of non-disposable equipment (if necessary).

An MS/MSD sample is an environmental sample divided into two separate aliquots, each of which is spiked by the laboratory with known concentrations of target aliquots. The two spiked aliquots, in addition to an unspiked sample aliquot, are analyzed separately, and the results are compared to evaluate the effects of the matrix on the precision and accuracy of the analysis. MS/MSD samples generally require collecting triple sample volume for water samples to be analyzed for VOCs and double sample volume for all other analyses for groundwater samples. MS/MSDs for samples of solid matrices do not require collection of extra volume. All samples were identified as MS/MSD for the laboratory.

QC samples for vapor intrusion samples (soil gas, indoor air, and sub-slab (contingent) were collected at the following frequencies:

Field Duplicate: One per 10 environmental samples was collected. Field duplicate samples consist of two separate samples collected from the same sampling location and depth, using the same equipment and sampling procedures.

Field QA/QC samples were obtained and submitted for analysis for use in assessing the quality of the data that resulted from the field sampling program. No equipment blank samples were necessary since samples were collected using disposable sampling equipment. However, because of the extremely low detection levels of PFAS analysis, equipment blanks were collected from the HDPE and silicone tubing used for groundwater sampling for PFAS analysis only.

2.4. FIELD MEASUREMENTS AND RECORDKEEPING

Sampling activities were documented in a logbook or on field data collection forms using indelible ink in accordance with the FSP and QAPP Addendum (Tetra Tech 2021a, 2021b). The header of each logbook page included the site location name, date, and TO number. At the start of each day, the weather, site conditions, field staff present, subcontractors present, and any safety or other meetings conducted were noted. The collection time, sample identification number, sample depth (if appropriate), sampling location description, field observations, sampler's name, and time of sample collection were recorded in the logbook or on field data sheets for each sample. MS/MSD and field duplicate samples were clearly designated in the logbook or on the field data sheet. Collection of rinsate samples and preparation of trip blanks were documented and collected in the same manner as described in Section 2.2.4.

Each page of the field logbook was dated, numbered (if appropriate), and signed at the bottom by START personnel. Any residual space on the last page of each day's log was crossed out with a single line. Each new sampling day began on a new page in the logbook. Any corrections made during the same day of sampling were crossed out with one single line, "back note." If necessary, corrections or additions were made on a subsequent page with appropriate documentation, although this procedure is not recommended. Corrections or additions are best made on the same day as sampling. The field team leader ensured that all documentation in the logbook was done appropriately and accordingly and checked the logbook daily.

All field logbooks were always kept secure by the field team leader during field work. As soon as possible, all field logbooks were scanned electronically. If electronic scans could not be conducted after 1 week of continuous field work, high-resolution hard copies were made and kept secure until the logbooks could be scanned. All completed field books and any hard copies were stored with the project manager. Field data records were maintained in accordance with the Multi-Media Investigation Manual and Procedures (EPA 1992), Worksheet 29 of the START V QAPP, Revision 3 (Tetra Tech 2022), and the START FSP, Revision 3 (Tetra Tech 2021a).

2.5. DECONTAMINATION PROCEDURES

This section describes the decontamination procedures that START followed for all field sampling activities associated with the Shiawassee River Superfund site assessment. Soil, groundwater, and sediment were sampled using dedicated or disposable equipment; therefore, decontamination of this equipment was not necessary. If dedicated or disposable sampling equipment were not used, general decontamination procedures are described below.

2.5.1. Decontamination of Drilling Equipment

All downhole drilling rods used to advance borings and install monitoring wells were decontaminated before initial drilling and after drilling at each location. The equipment was decontaminated following the general practices presented in the site-specific FSP and QAPP (Tetra Tech 2021a, 2021b).

To prevent cross-contamination, all non-dedicated or non-disposable soil, groundwater, and sediment sampling equipment was decontaminated before sample collection began and after sampling at each location. In accordance with the general decontamination guidelines for sampling equipment documented in the FSP, stainless steel sampling equipment was decontaminated using a three-tier process including a Liquinox wash, a potable water rinse, and a distilled and deionized (DI) water rinse (Tetra Tech 2021a). All water derived from decontamination was collected and temporarily stored in DOT-approved, 55-gallon drums or polyethylene tanks on site for characterization. In lieu of stainless-steel sampling equipment, disposable sampling equipment was used to collect individual samples and to eliminate the need to decontaminate equipment and generate decontamination water.

All water derived from decontamination was collected and temporarily stored in DOT-approved, 55-gallon drums or polyethylene tanks on site or at a designated area on city or county property, as detailed in the site management plan (Tetra Tech 2021c), for characterization and disposal. Disposable sampling equipment (such as tubing, nitrile gloves, and plastic trowels) and personal protective equipment (PPE) were double-bagged and disposed of as dry, industrial waste.

2.6. DISPOSAL OF INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) is waste generated from an activity associated with determining the nature and extent of contamination during the investigation. IDW may include any hazardous waste, media (soil and groundwater), and debris that contains listed hazardous waste or that exhibits a characteristic of a hazardous waste. IDW may also include media and debris that are not hazardous, but that are contaminated with hazardous constituents.

To the extent possible, drilling and sampling techniques that minimize the volume of IDW generated were used during all sampling activities. For example, groundwater samples were collected using low-flow techniques, which reduced the volume of purge water from each well.

IDW generated during the field sampling activities included soil extracted during drilling borings; purge water from groundwater sampling; and wastewater from decontamination and equipment rinsate procedures. All IDW was removed from specific work sites and managed at a central, secure location. All IDW generated during investigation activities was sampled, characterized, and properly disposed.

All water or soil generated during site activities was contained in drums and stored separately. Drummed materials were clearly marked to indicate the date of collection, sample or boring location where the material originated, waste contents, and other generator information. A completed "waste material" label was affixed to the exterior side of each drum before DOT classification that included the site name, address, contents, boring or well depths, operation, accumulation date, and consultant phone number information. All information was completed for each drum. Before off-site disposal, the drums were relabeled with DOT identification and classification information.

All IDW was disposed of as required by state and local regulations after waste characterization analytical results were received for IDW soil and water. Additional IDW generated from site assessment activities included disposable PPE and sampling equipment. Disposable PPE and sampling equipment were managed according to the level of contamination encountered during field activities. In general, PPE and sampling equipment were managed as non-hazardous solid waste, particularly if little contact occurs with the sampling medium and low levels of contaminants were involved. Nonhazardous PPE and sampling equipment waste was double bagged and disposed of as dry, industrial waste.

2.7. ANALYTICAL METHODOLOGY

Table 2 below summarizes the laboratory methods that were used to analyze the various sample media collected by START. Samples collected during the field investigation were analyzed for chemical analysis by either the ASB Region 5 laboratory, a CLP laboratory, or subcontracted laboratories.

Table 2 – Analytical Methods Summary

Parameter	Laboratory	Laboratory Location	Analytical Method
SOIL/LANDSCAPING MATERIAL SAMPLES			
PCBs	CHEMTEX (CLP)	Port Austin, Texas	SW-846: 8082A
TAL Metals	Eurofins TestAmerica	Burlington, Vermont	200.8/6020B
Hexavalent Chromium	ASB	Chicago, Illinois	SW-846: 3060A and 7199

Parameter	Laboratory	Laboratory Location	Analytical Method
VOCs (Soils only)	CHEMTEX (CLP) Chemtech Consulting Group (CLP)	Port Austin, Texas Mountainside, New Jersey	SW-846: 8260C
SEDIMENT SAMPLES			
PCBs	CHEMTEX (CLP)	Port Austin, Texas	SW-846: 8082A
WIPE SAMPLES			
PCBs	CHEMTEX (CLP)	Port Austin, Texas	SW-846: 3580A
AMBIENT AIR SAMPLES			
PCBs	Eurofins TestAmerica	Burlington, Vermont	TO-10A
INDOOR AIR SAMPLES			
VOCs	ASB ALS Environmental	Chicago, Illinois Simi Valley, California	TO-15
GROUNDWATER SAMPLES			
1,4-Dioxane	CHEMTEX (CLP)	Port Austin, Texas	522
PFAS	ALS Environmental	Holland, Michigan	537.1
VOCs	CHEMTEX (CLP) Chemtech Consulting Group (CLP)	Port Austin, Texas Mountainside, New Jersey	SW-846: 8260C
SOIL GAS SAMPLES			
VOCs	ASB	Chicago, Illinois	TO-15
SUB-SLAB SOIL VAPOR SAMPLES			
VOCs	ASB ALS Environmental	Chicago, Illinois Simi Valley, California	TO-15

Notes:
ASB Analytical Services Branch
CLP Contract Laboratory Program
PCB Polychlorinated biphenyl
PFAS Per- and polyfluoroalkyl substances
TAL Target analyte list
VOC Volatile organic compound

As required in the QAPP, START conducted data validation on all data generated from non-CLP laboratories, and all data were deemed useable for the purposes of the project with qualifiers assigned as appropriate, with the exception of VOC analysis of soil samples collected in October 2021 that were analyzed beyond hold times (Tetra Tech 2021b). All data validation reports generated during this assessment are provided in Appendix J. The laboratory analytical results for all samples are summarized in Tables 1 through 10 of Appendix B. The full laboratory analytical reports for the samples are provided in Attachment 1.

3. ENVIRONMENTAL SETTING

This section describes the regional physiography, regional geology and hydrogeology, and site-specific geology and hydrogeology.

3.1. REGIONAL PHYSIOGRAPHY

According to elevation survey work completed during site activities, the site elevation is approximately 887 feet above mean sea level. The site is relatively level.

3.2. REGIONAL GEOLOGY AND HYDROGEOLOGY

"Bedrock Geology of Michigan" indicates that the bedrock of the site is the Saginaw formation of the Michigan Basin from the Pennsylvanian Era (University of Michigan 2003).

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) identifies the surficial soils as either Oakville fine sand, or Spinks-Oakville loamy sands (USDA 2011).

The groundwater in the region is expected to flow southeast towards the Detroit River.

3.3. SITE GEOLOGY AND HYDROGEOLOGY

The general geologic profile of the site consists of fill comprised of gravel and brown medium-grained sand to between 3 and 10 feet bgs. Below that continued brown medium-grained sands to 20 feet bgs. In some borings, brown silty clay seams were first encountered between 5 and 13 feet bgs. Groundwater at the site was encountered between 9 and 20 feet bgs. Site groundwater generally flows to the west, toward the Shiawassee River (Figure 4A and 4B, Appendix A). Groundwater at the west adjoining property generally flows to the east, toward the Shiawassee River (Figure 4B, Appendix A).

The groundwater temperature at the site ranged between 13.33 and 21.75 degrees Celsius. To generate the most-stringent site-specific EPA Vapor Intrusion Screening Levels (VISL), a groundwater temperature of 21.75 degrees Celsius was input into the EPA VISL calculator.

4. RESULTS

The results of the assessment activities are described in this section. The laboratory data packages are provided as Attachment 1, the input parameters used for the EPA screening level calculators are included in Appendix C, and the laboratory data validation reports are provided in Appendix J.

4.1. PCBS AND METALS INVESTIGATION

This section includes the results from the PCBs and Metals investigative activities.

4.1.1. Soil Sampling

Soil samples were analyzed for PCBs, and 25 percent of samples were also analyzed for TAL metals, and chromium VI. The PCB results were compared with the site-specific Long-Term Cleanup Goal (LTCG) of 10,000 µg/kg (microgram per kilogram). Metals results were compared to both the EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC), and the EPA Composite Worker Regional Screening Level (RSL) based off a hazard quotient (HQ) of 1, and a target cancer risk (TR) of 10E-5 (EGLE 2018, EPA 2022). Since landscaping material is being distributed to residences, soil results from landscaping materials were compared to both EGLE Part 201 Generic Residential DCC and EPA Residential RSLs.

Field screening of PCBs in soil samples showed the following samples to be above the LTCG: six of the eight land clearing samples, eight of the 13 of north portion shallow samples, both samples in FL-03, the shallow sample in the northern wetland, three of the 12 former lagoon ditch samples, and all 40 restricted area ditch samples. Compared to the laboratory results for PCBs, the field screening results for PCBs were orders of magnitude higher, and are not reliable results. Field screening of metals in soil samples showed five samples that exceeded the EPA Composite Worker RSL for zirconium. Soil sample field screening results for both PCBs and metals are summarized in Table 12 of Appendix B.

The analytical results for soil samples are summarized in Tables 1A through 2B of Appendix B. Figures 5A through 5E in Appendix A show sample locations and associated detections. There were no PCBs or metals exceedances in soil samples, with the exception of soil from the landscaping material location LM-20. Soil results for LM-20 showed a manganese detection of 2,500 milligrams per kilogram (mg/kg), above the EPA Residential RSL of 1,830 mg/kg; however, the detection was within the EPA Common Concentration Range of 20 to 3,000 mg/kg.

Triplicate samples were collected for the following decision units to determine the repeatability of the sampling methodology: LC-02, LC-03, FL-01, FL-03, NP-05, and NP-08. For those samples, a letter was added to the decision unit number denoting the unique triplicate sample. Nine of the 12 triplicate sample sets met the precision criteria of 30 percent. The triplicate sample sets that did not meet the precision criteria were FL01-00.06, FL03-00.06, and NP05-06.24.

Method detection limits for soil were within the limits for the method approved in the QAPP addendum (Tetra Tech 2021b). The data were qualified based on the validation, and all data are deemed useable (Appendix J).

4.1.2. Outfall Sampling

The analytical results for PCB Aroclors in the nine outfall soil samples are summarized in Table 1A of Appendix B. No PCB Aroclors were detected in any of the outfall soil samples. The 19 wipe samples collected at eight site outfalls were analyzed for PCB Aroclors. No PCB Aroclors were detected in any of the outfall wipe samples.

The CLP laboratory report is included in Attachment 1. All data were deemed useable and were qualified as needed.

4.1.3. Sediment Sampling

The PCB Aroclor results for the five discrete sediment samples collected from the north retention pond are summarized in Table 1A of Appendix B. No PCB Aroclors were detected in any of the retention pond sediment samples.

The CLP laboratory report is included in Attachment 1. All data were deemed useable as reported by the laboratory.

4.1.4. Ambient Air

Perimeter ambient air samples were analyzed for PCB Aroclors, the results of which are provided in Table 4 of Appendix B. No PCB Aroclors were detected in any of the perimeter ambient air samples.

The associated data validation report is included in Appendix I. All data were deemed useable as reported by the laboratory.

4.2. VAPOR INTRUSION INVESTIGATION

This section includes the results from the vapor intrusion investigative activities.

4.2.1. Soil Sampling

The analytical results for VOCs in soil samples are summarized in Table 5 of Appendix B, and Figure 5E in Appendix A is a map showing locations and associated sample detections. Soil sample VOC results were compared to the EGLE Part 201 Generic Residential Drinking Water Protection Criteria (DWPC), EGLE Residential Volatilization to Indoor Air Pathway Screening Level (VIAPSL) for Soil, and the EPA Soil to Groundwater RSLs based off an HQ of 1, and a TR of 10E-5 (EGLE 2018, EPA 2023).

The 10 soil samples collected in October 2021 were analyzed for VOCs. Though the laboratory received the samples well before the method holding time, the samples were analyzed by the laboratory after the method holding time. As a result, all non-detect results from that sampling event were rejected. VOC detections in the soil samples included:

- Methyl acetate concentration in sample location SB-05 below the EGLE DWPC, EGLE VIAPSL, and the EPA RSL.
- TCE concentration in sample location SB-17 above the EGLE DWPC, EGLE VIAPSL, and the EPA RSL.

To obtain usable data, in August 2022 the 10 soil samples were recollected and analyzed for VOCs. VOC detections in the soil samples included:

- Methyl acetate concentration at sample location SB-05 below EGLE DWPC and EPA RSL.
- Toluene concentrations at sample locations SB-01E and SB-22 above the EPA RSL. Toluene was also detected in sample location SB-17 at a concentration below the EGLE DWPC, EGLE VIAPSL, and the EPA RSL.

The CLP laboratory reports are included in Attachment 1. All data from the samples collected in August 2022 were deemed useable and were qualified as needed.

4.2.2. Groundwater Sampling

The analytical results for VOCs, 1,4-dioxane, and PFAS in groundwater samples are summarized in Table 5 of Appendix B, and Figures 5F and 5G in Appendix A show sample locations and associated chlorinated VOC and PFAS detections, respectively. The site water table varied between 8.5 and 20 feet bgs. Groundwater VOC (including 1,4-dioxane) and PFAS results were compared to the EGLE Part 201 Generic Residential Drinking Water Criteria (DWC); EPA Residential VISL for Groundwater based off a groundwater temperature of 21.75 degrees Celsius, an HQ of 1, and a TR of 10E-5; and the EPA Residential Tapwater RSLs based off an HQ of 0.1, and a TR of 10E-5. Groundwater PFAS results were also compared with the EGLE Drinking Water Maximum Contaminant Levels (MCL).

The 15 groundwater samples collected in October 2021 were analyzed for VOCs, 1,4-dioxane, and PFAS. The 20 groundwater samples collected in August 2022 were analyzed for VOCs. Exceedances in the groundwater samples included:

- *Cis*-1,2-DCE concentration at sample location TW-17 above the EGLE DWPC, EPA VISL, and the EPA RSL. The c*is*-1,2-DCE concentration at sample location TW-44 was above both the EGLE DWPC and the EPA RSL.
- TCE concentrations at sample locations TW-17, TW-42, and TW-44 above the EGLE DWPC, EPA VISL, and the EPA RSL.
- VC concentrations at sample locations TW-17 and TW-44 at concentrations above the EGLE DWPC, EPA VISL, and the EPA RSL. VC at sample location TW-28 was above the EPA RSL.
- Perfluorooctanoic acid (PFOA) at sample locations TW-12, TW-15NW, TW-28, TW-44 at concentrations above the EGLE DWC and EGLE MCL.

The data validation report for the PFAS data is provided in Appendix I, and the CLP laboratory reports for the 1,4-dioxane and VOC results are included in Attachment 1. All groundwater data were deemed useable and were qualified as needed.

4.2.3. Soil Gas Sampling

The analytical results for VOCs in soil gas and ambient air samples are summarized in Tables 7 and 10 of Appendix B, respectively. Figures 6A through 6C in Appendix A are maps showing sample locations and associated chlorinated VOC detections along with VOC exceedances for individual sampling events.

The CLP laboratory reports are included in Attachment 1. All soil gas and ambient air data were deemed useable and were qualified as needed.

Soil Gas Results

Soil gas VOC results were compared to the EGLE Nonresidential VIAPSL for Soil Vapor and the EPA Commercial VISL for Soil Gas based on a groundwater temperature of 21.75 degrees Celsius, an HQ of 1, and a TR of 10E-5 (EGLE 2013, EPA 2023). Soil gas sampling events occurred in October 2021, March 2022, and May 2022. During each event, between 37 and 39 soil gas samples were collected for VOCs analysis. VOC exceedances in the soil gas samples included:

- *Cis*-1,2-DCE concentration at sample location SG-17 above the EGLE VIAPSL and EPA VISL. *Cis*-1,2-DCE was present at sample location SG-19 at a concentration above the EGLE VIAPSL.
- PCE concentration at sample locations SG-19 and SG-29 above the EGLE VIAPSL.
- TCE concentrations at ten sample locations (SG-16, SG-17, SG-18, SG-19, SG-20, SG-33, SG-34, SG-35, SG-36, and SG-37) above both the EGLE VIAPSL and the EPA VISL. TCE concentrations at sample locations SG-30 and SG-31 were above the EGLE VIAPSL.
- Acrolein concentration at sample location SG-31 above both the EGLE VIAPSL and EPA VISL. The acrolein concentration at sample location SG-24 was above the EGLE VIAPSL.
- Naphthalene concentration at sample location SG-09 above the EGLE VIAPSL.

Detected concentrations of chlorinated VOCs were generally highest in the samples collected during the October 2021 sampling event.

4.2.4. Sub-Slab Soil Gas and Indoor Air Sampling

The analytical results for VOCs in sub-slab soil gas and indoor air samples are summarized in Tables 8 and 9 of Appendix B, respectively. Figure 5H in Appendix A is a map showing sample locations and associated chlorinated VOC detections along with VOC exceedances.

The data validation reports are provided in Appendix J, and laboratory reports are included in Attachment 1. All sub-slab soil gas, indoor air, and ambient air data were deemed useable and were qualified as needed.

Sub-Slab Soil Gas Results

Sub-slab soil gas VOC results were compared to the EGLE Nonresidential VIAPSL for Soil Vapor and the EPA Commercial VISL for Soil Gas based on a groundwater temperature of 21.75 degrees Celsius, an HQ of 1, and a TR of 10E-5 (EGLE 2013, EPA 2023).

Fourteen sub-slab soil gas samples were collected for VOCs analysis during each of the sampling events that took place in July 2022 and January 2023. VOC exceedances in the sub-slab soil gas samples included:

- 1,1,2-trichloroethane (TCA) concentration at sample location SS-11 (duplicate) above the EGLE VIAPSL.
- PCE concentration at sample location SS-11 above both the EGLE VIAPSL and the EPA VISL. PCE concentrations at sample locations SS-04, SS-05, and SS-07 were above the EGLE VIAPSL and the EPA VISL.
- TCE concentrations at five sample locations (SS-01, SS-03, SS-07, SS-10, and SS-11) above both the EGLE VIAPSL and the EPA VISL. The TCE concentration at sampling location SS-04 was above the EGLE VIAPSL.
- Acrolein concentration at sample location SS-09 above the EGLE VIAPSL.
- Chloroform concentrations at sample locations SS-07 and SS-11 above both the EGLE VIAPSL and EPA VISL.

Detected concentrations of chlorinated solvents in sub-slab soil gas were generally highest in the samples collected during the July 2022 sampling event.

Indoor Air Results

Indoor air sample results during sub-slab soil gas sampling events are included in Table 9 of Appendix B. Indoor air VOC results were compared to the EGLE Nonresidential Recommended Interim Action Screening Level RIASL for Indoor Air and the EPA Composite Worker Air RSL for air based on a groundwater temperature of 21.75 degrees Celsius, an HQ of 1, and a TR of 10E-5 (EGLE 2020, EPA 2023).

Twenty-four indoor air samples were collected for VOCs analysis at each sampling event in July 2022 and January 2023. VOC exceedances in the indoor air samples included:

- 1,4-Dichlorobenzene (DCB) concentration at sample location IA-14 above both the EGLE RIASL and EPA RSL.
- Acrolein concentrations at sample locations IA-07 and IA-13 above the EPA RSL.
- Chloroform concentrations at six sample locations at (IA-01, IA-02, IA-03, IA-04, IA-08, and IA-15) above both the EGLE VIAPSL and EPA RSL.

Trans-1,2-DCE, PCE, and TCE were detected in indoor air, but at concentrations below EGLE RIASL and EPA RSLs. TCE concentrations at sample locations IA-10 and IA-11 were 1.4 micrograms per cubic meter (µg/m^3) and 1.8 µg/m^3 respectively – just below the EGLE RIASL of

2.0 µg/m^3. It is possible that concentrations at those locations could increase over time and cause an indoor air health risk. The following dynamic factors could increase indoor air concentrations over time: groundwater contamination migration, groundwater table elevation fluctuations, seasonal conditions, and worsening building deterioration.

4.2.5. Ambient Air Sampling

Ambient air VOC results were compared to the EGLE Nonresidential Recommended Interim Action Screening Level (RIASL) for Indoor Air and the EPA Composite Worker Air RSL for air based on a groundwater temperature of 21.75 degrees Celsius, an HQ of 1, and a TR of 10E-5 (EGLE 2020, EPA 2023). VOC exceedances in ambient air samples included:

- The ambient air sample collected at AA-25 in October 2021 had an acrolein detection above the EPA RSL.
- Ambient air samples collected at AA-12 and AA-25 in May 2022 contained chloroform at concentrations exceeding the EGLE RIASL; chloroform concentrations exceeded the EPA RSL in AA-12.

Ambient air sample results during soil gas, sub-slab soil gas, and indoor air sampling events are included in Table 10 of Appendix B.

4.3. QUALITY ASSURANCE/QUALITY CONTROL

The QA/QC sample results were evaluated as part of the data review process. START prepared a laboratory data validation report, which is included in Appendix J. All data were deemed useable and qualified as needed.

5. SUMMARY AND RECOMMENDATIONS

From August 13, 2021 through January 5, 2023, START conducted site assessment activities for both the site and the west adjoining property. The site is located at 2440 West Highland Road, in Howell, Livingston County, Michigan. As requested by EPA, START completed and documented the assessment activities involving both a PCBs and metals investigation and a vapor intrusion investigation.

The field investigation included: (1) drilling approximately 250 soil borings for soil sampling; (2) collecting 40 MIP profiles; (3) installation and sampling of 20 temporary monitoring wells; and (3) installation and sampling of 40 soil gas probes; (4) installation of 13 vapor pins and sampling sub-slab soil gas; and (5) sampling indoor air, ambient air and perimeter ambient air. The following sections summarize findings related to both the PCBs and metals investigation, and the vapor intrusion investigation.

5.1. PCBS AND METALS INVESTIGATION

From the various composite and discrete soil samples collected from the approximate 250 soil borings, and seven landscaping material areas – all PCB Aroclor detections were below the site-specific LTCG of 10,000 µg/kg. For metal results in soils, only one manganese detection exceeded EPA RSL, but the value was within EPA's Common Concentration Range.

PCB Aroclors were not detected in any perimeter air samples, or in soil and wipe samples collected from the eleven site outfalls.

5.2. VAPOR INTRUSION INVESTIGATION

Ten soil samples were collected for VOC analysis along the perimeter of the site building. Soil results at three locations contained VOCs at concentrations above either EGLE DWC or EPA RSLs.

Twenty temporary monitoring wells were installed both on- and off-site. Groundwater samples were collected for analyses of VOCs, 1,4-dioxane, and PFAS. The site water table varied from 9 to 20 feet bgs. Groundwater results at six monitoring wells showed chlorinated VOCs (*cis*-1,2-DCE, TCE, and VC) above either the EGLE DWC or the EPA RSLs; and four monitoring wells showed detections of PFOA above the EGLE GSIC.

Forty temporary soil gas probes were installed along the perimeter of the site building. Three rounds of soil gas samples were collected for analyses of VOCs. Soil gas results at 14 soil gas probes showed VOCs (acrolein, *cis*-1,2-DCE, naphthalene, PCE, and TCE) above either the EGLE VIAPSL or the EPA VISL.

Thirteen temporary vapor pins were installed throughout the site building. Two rounds of sub-slab soil gas samples were collected for analyses of VOCs. Sub-slab soil gas results at eight vapor pins showed VOCs (acrolein, chloroform, *cis*-1,2-DCE, PCE, 1,1,2-TCA, and TCE) above either the EGLE VIAPSL or the EPA VISL.

Two rounds of indoor air samples were collected for analyses of VOCs. The indoor air samples were collocated with the sub-slab soil gas samples. Indoor air results at nine locations showed VOCs (1,4-DCB, acrolein, and chloroform) above either the EGLE RIASL or the EPA RSL. TCE concentrations in indoor air at two sample locations (IA-10 and IA-11) were just below the EGLE RIASL.

Ambient air samples were collected for analysis of VOCs during the three soil gas sampling events, as well as the two sub-slab soil gas/indoor air sampling events. One ambient air sample collected during the soil gas sampling event in October of 2021 had an acrolein detection above the EGLE RIASL.

5.3. CONCLUSIONS AND RECOMMENDATIONS

Based on the data obtained during PCB and metals investigation activities – the previous land clearing and regrading activities that have occurred at the site have not resulted in a direct contact risk for PCBs or metals in shallow site soils or landscaping materials. Additionally, PCBs were not detected in perimeter ambient air, therefore, no off-site inhalation risk associated with PCBs was identified.

There is a vapor intrusion risk at the site building. Elevated VOC concentrations in sub-slab soil gas, along with the presence of the same VOCs in indoor air, suggest that soil gas is infiltrating the site building. Additionally, indoor air concentrations of TCE are just below the EGLE RIASL presently, however those concentrations could increase over time. The following dynamic factors could increase indoor air concentrations over time: groundwater contamination migration, groundwater table elevation fluctuations, seasonal conditions, and worsening building deterioration.

It is recommended that a sub-slab depressurization system be installed in the building to generate a pressure gradient in areas surrounding SS-10 and SS-11, as those locations showed TCE exceedances in sub-slab soil gas, as well as TCE concentrations in indoor air just below the EGLE RIASL.

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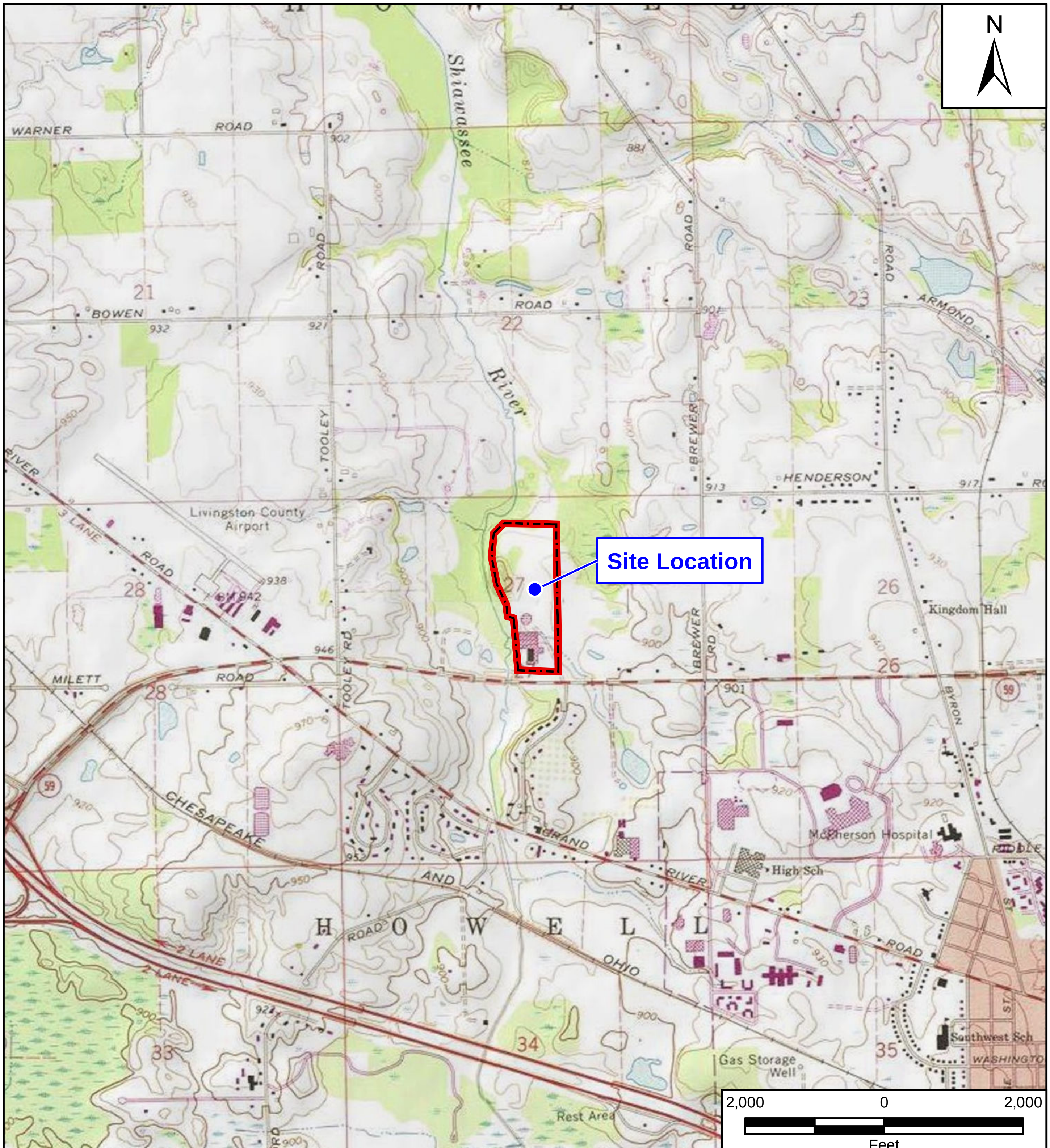
APPENDIX A. FIGURES



Reference Map

Legend

Approximate Site Boundary

Source: USGS 7.5 Minute Topographic Quadrangle Map:
Howell, MI 1983

Shiawassee River Superfund Site
22440 W. Highland Road
Howell, Livingston County, MI

Figure 1
Site Location Map

TETRA TECH

Prepared For: US EPA

Prepared By: Tetra Tech

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Date Saved: 7/20/2020

EPA Contract No.: 68HE0519D0005

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Approximate Site Boundary

Shiawassee River Superfund Site
22440 W. Highland Road
Howell, Livingston County, MI

Figure 2
Site Layout Map

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

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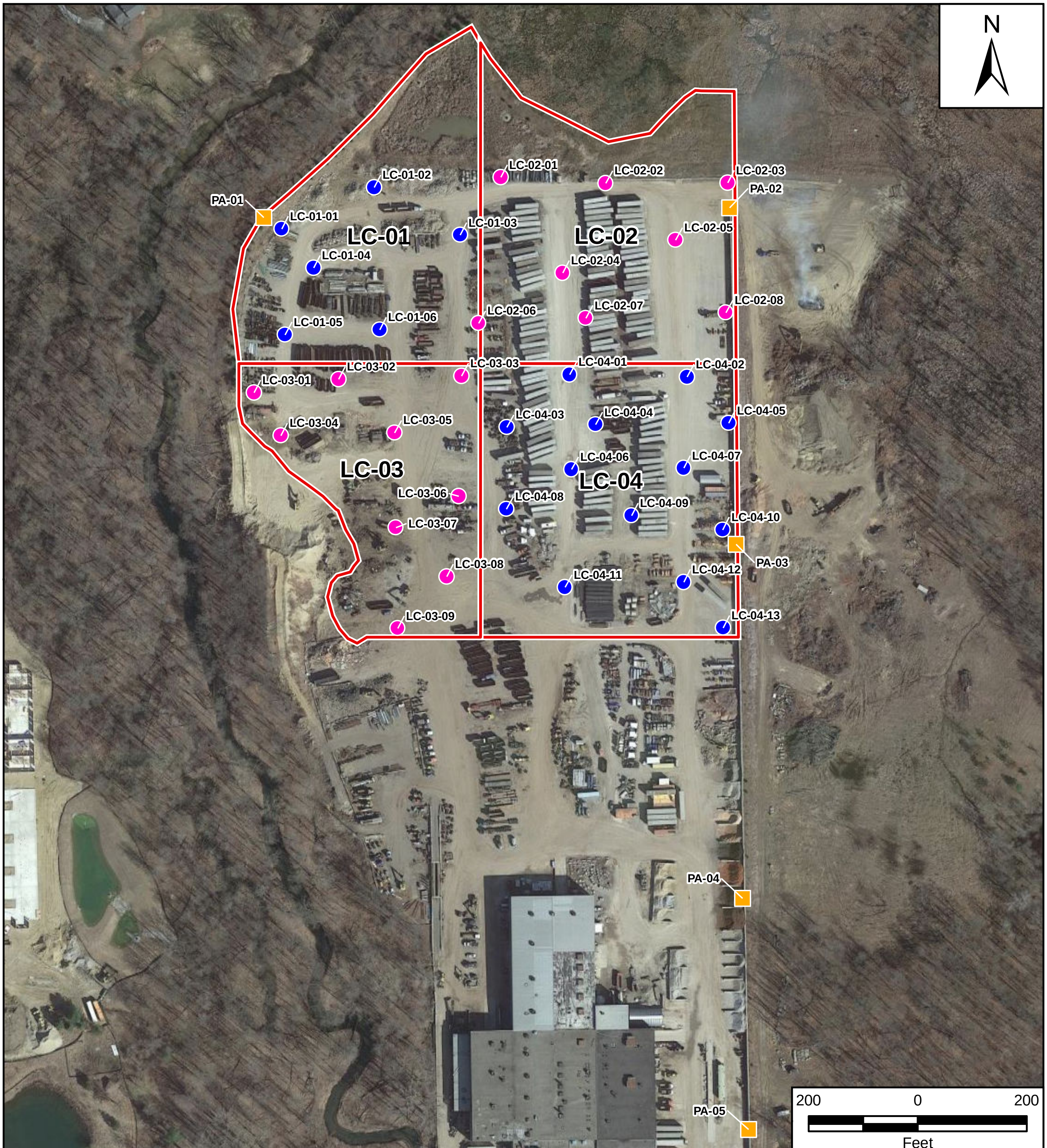

Legend

- Air Sample Location (PCB analysis only)
- Composite Soil Sample
- Composite Triplicate Soil Sample
- Land Clearing Boundary

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3A

Soil and Perimeter Air Sample Location Map - Land Clearing

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

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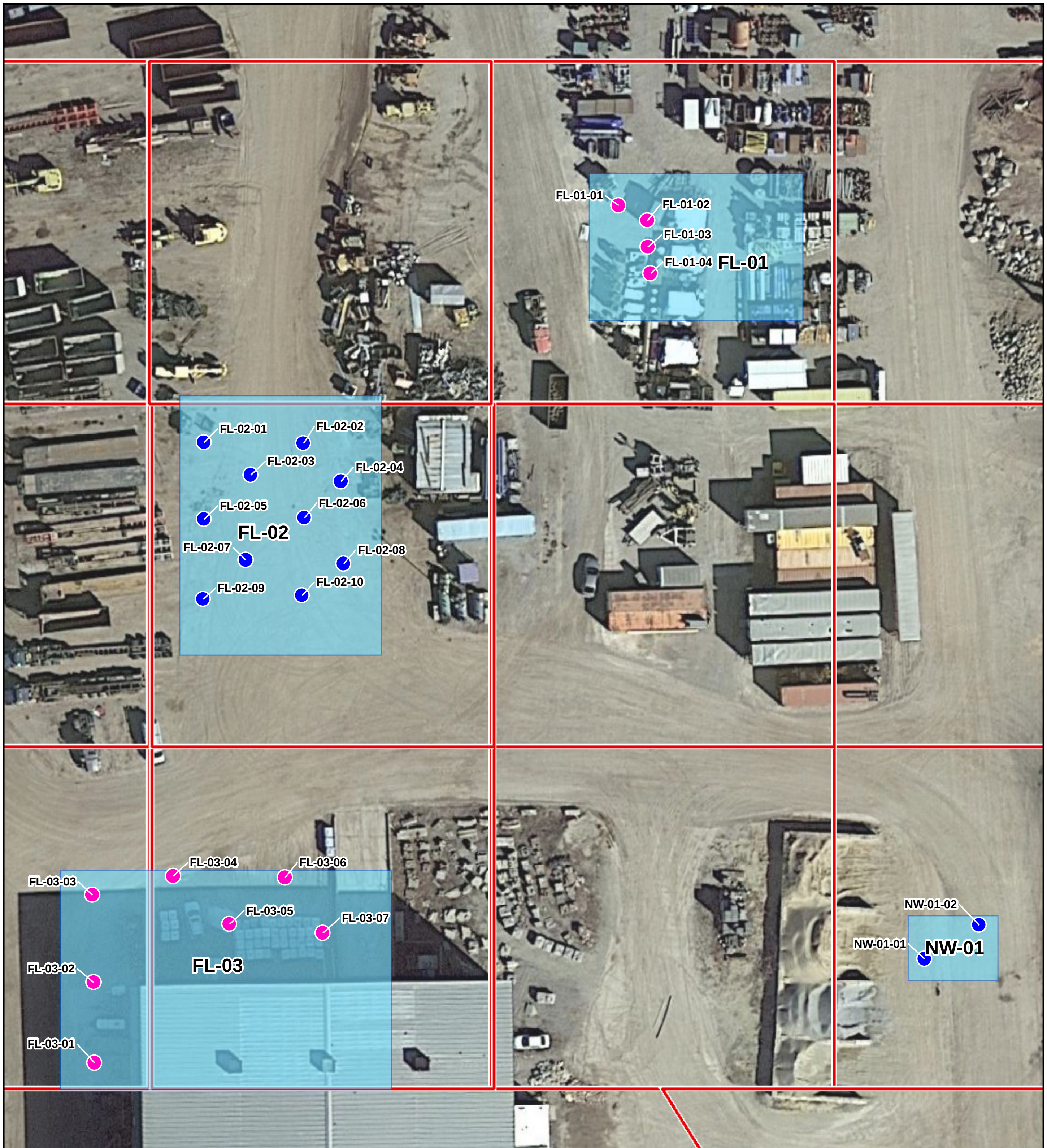

Legend

- Aliquot Location for Composite Soil Sample
- Aliquot Location for Composite Triplicate Soil Sample
- Former Lagoon Ditch Boundary
- Northern Portion Boundary

N

50 0 50

Feet

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3B

Soil Sample Location Map
Former Lagoon/Northern Wetland

TETRA TECH

Prepared For: US EPA	Prepared By: Tetra Tech

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Projection: Lambert Conformal Conic
Datum: North American 1983

Legend

- Aliquot Location for Composite Soil Sample
- Former Lagoon Ditch Boundary
- Northern Portion Boundary

N

50 0 50

Feet

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3C

Soil Sample Location Map
Former Lagoon Ditches

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

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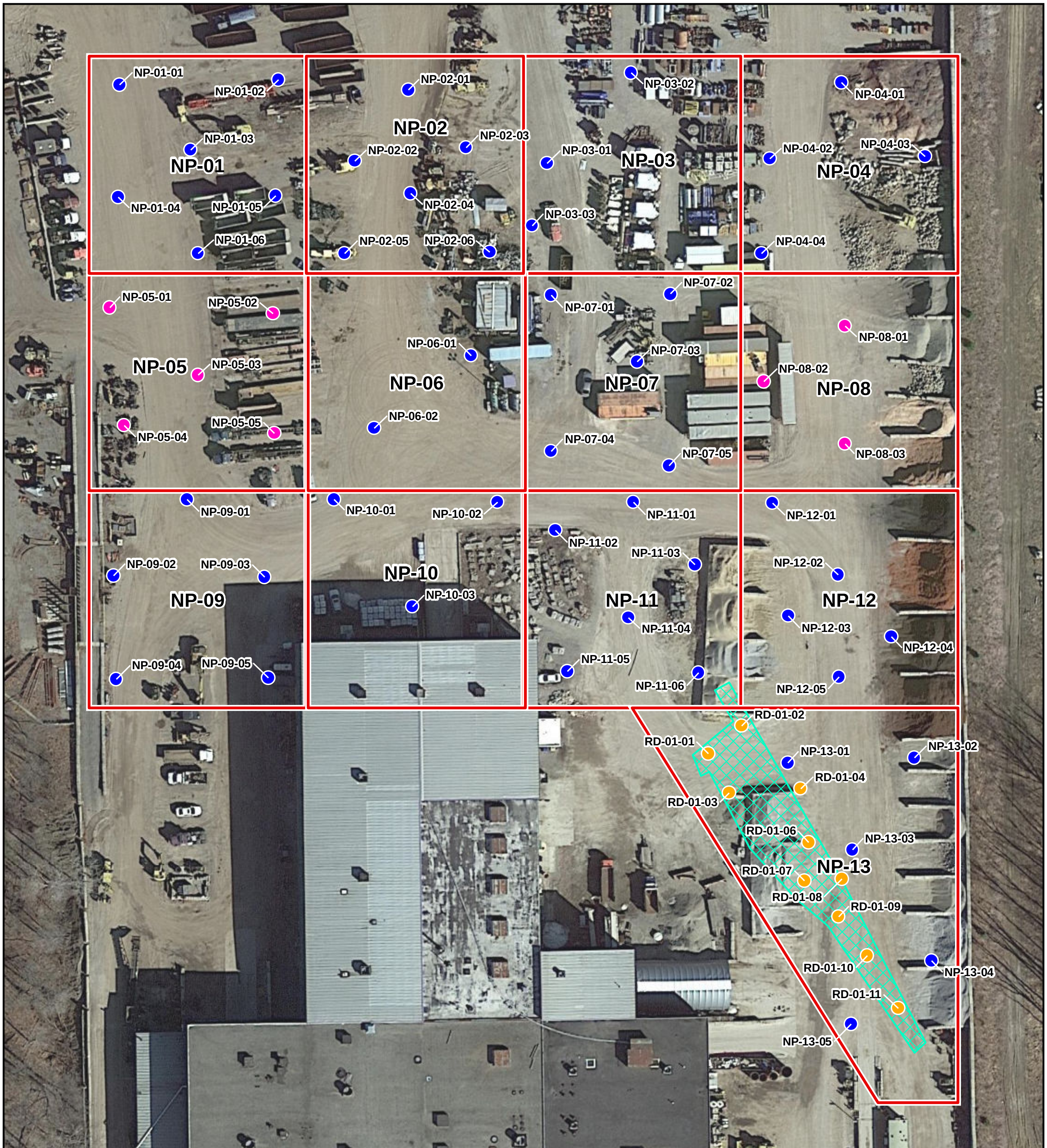

Legend

- Discrete Interval Soil Samples
- Aliquot Location for Composite Soil Sample
- Aliquot Location for Composite Triplicate Soil Sample
- Northern Portion Boundary
- Ditch Boundary

N

50 0 50

Feet

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3D

Soil Sampling Location Map
Northern Portion and Ditch

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

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Date Saved: 2/23/2022

EPA Contract No.: 68HE0519D0005

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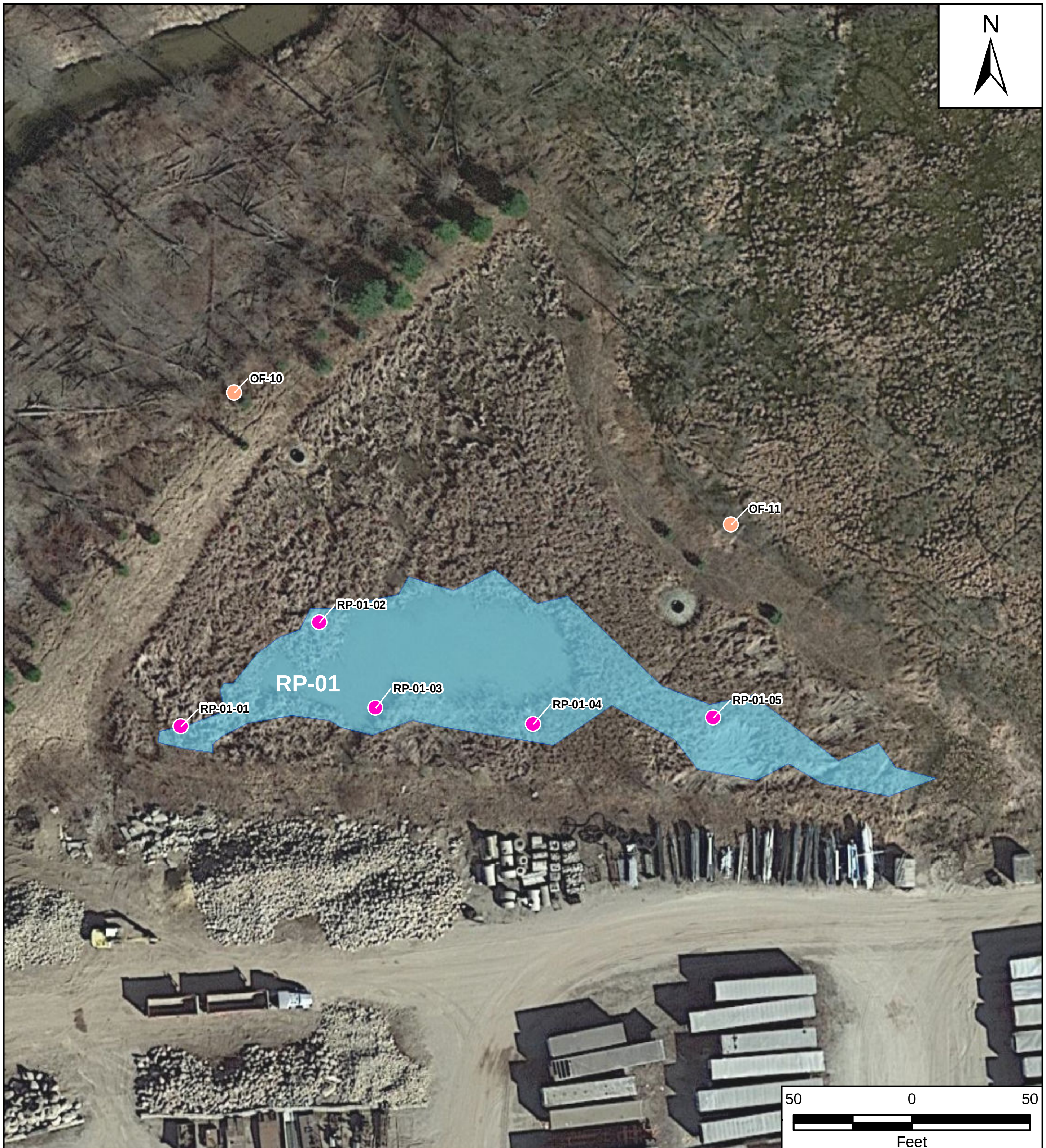

Legend

- RP Points Discretes - (5)
- Outflow Drain
- Former Lagoon/Wetland area

OF = Outfall

RP = Retention Pond

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3E
Sediment/Soil/Wipe Sampling Location Map
Retention Pond and Northern Outfalls

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: X:\G\9031B065\002O\Projects\mxd\2021-08\Fig3E-RPSamples.mxd

Date Saved: 2/23/2022 EPA Contract No.: 68HE0519D0005 TO/TOLIN: 68HE0520F0065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Legend

- Grab Soil and Wipe Sample at Outfall
- Grab Soil Sample at Outfall

OF = Outfall

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3F
Soil/Wipe Sampling Location Map
Western Outfalls

TETRA TECH

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File Path: X:\G9031\B0651\002O\Projects\mxd\2021-08\Fig3F-OFSamples.mxd

Date Saved: 2/23/2022

EPA Contract No.: 68HE0519D0005

TO/TOLIN: 68HE0520F0065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

File Path: X:\G9031\B0651002O\Projects\mxd\2021-08\Fig3G-LMSamples.mxd

Legend

Composite Landscape Material Sample

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 3G
Landscape Materials Inventory and Sample Location Map

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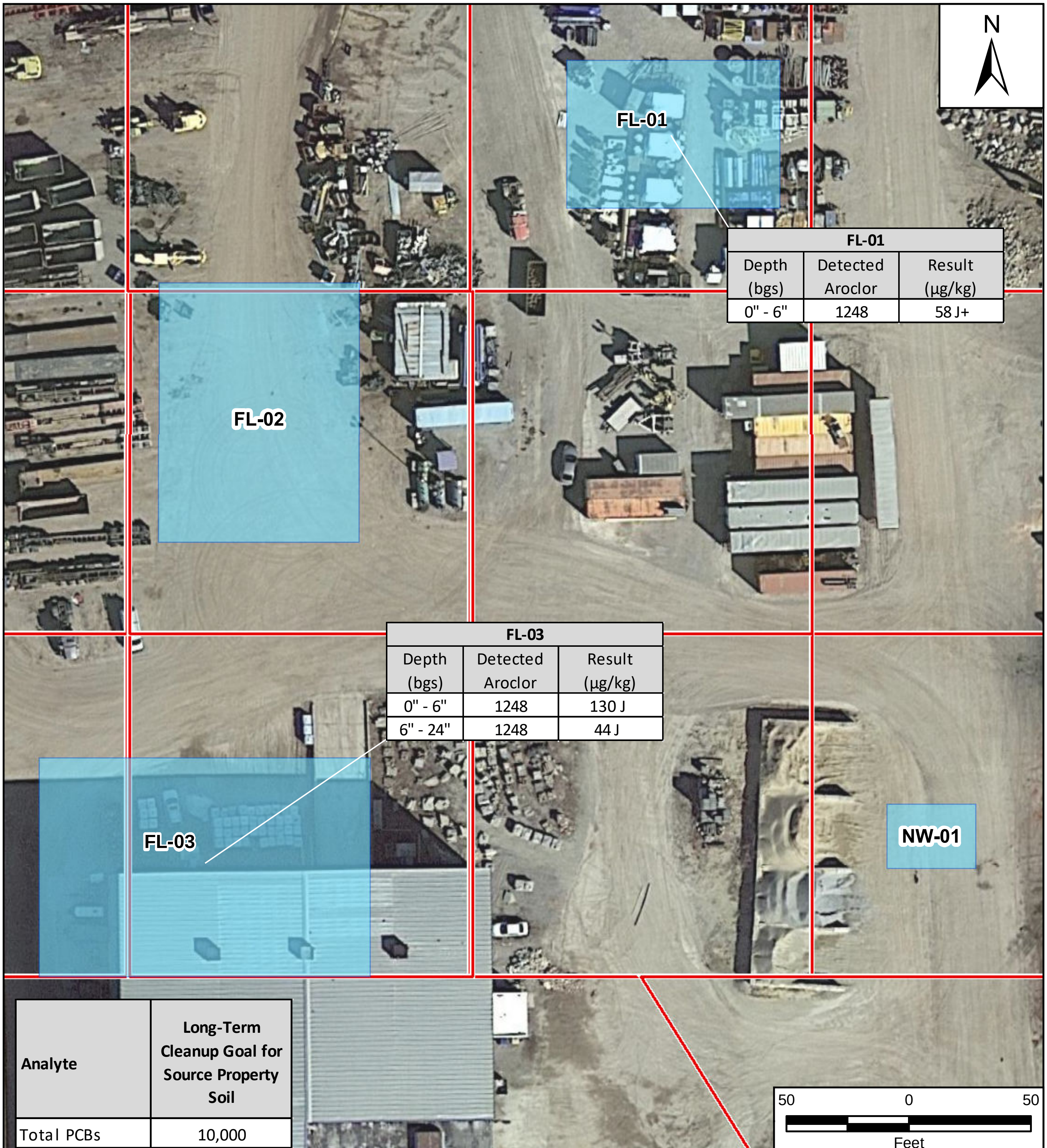
EPA Contract No.: 68HE0519D0005

TO/TOLIN: 68HE0520F0065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



FL-01		
Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 6"	1248	58 J+

FL-03		
Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 6"	1248	130 J
6" - 24"	1248	44 J

Analyte	Long-Term Cleanup Goal for Source Property Soil
Total PCBs	10,000

Legend

Former Lagoon Boundary

Northern Portion Boundary

All concentrations provided in micrograms per kilogram (µg/kg).
Samples were collected from August 23 to September 16, 2021.

bgs Below ground surface
FL Former lagoon
J Value is considered an estimate for quality control reasons.
J+ Value is considered an estimate for quality control reasons, and may be biased high.
PCBs Polychlorinated biphenyls

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 5A
Soil PCB Detections Map
Former Lagoon/Northern Wetland

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: X:\G9031\B065\002O\Projects\mxd\2022-05\Fig5A.mxd

Date Saved: 5/9/2022 EPA Contract No.: 68HE0519D0005 TO/TOLIN: F0031-B065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

LD-05		
Depth (bgs)	Detected Aroclor	Result (µg/kg)
6" - 24"	1248	160 J

LD-06		
Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 6"	1248	60 J
6" - 24"	1248	230 J

Analyte	Long-Term Cleanup Goal for Source Property Soil
Total PCBs	10,000

Legend

Former Lagoon Ditch Boundary

All concentrations provided in micrograms per kilogram (µg/kg).
Samples were collected on August 30, 2021.

bgs Below ground surface
J Value is considered an estimate for quality control reasons.
LD Lagoon ditch
PCBs Polychlorinated biphenyls

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 5B
Soil PCB Detections Map
Former Lagoon Ditches

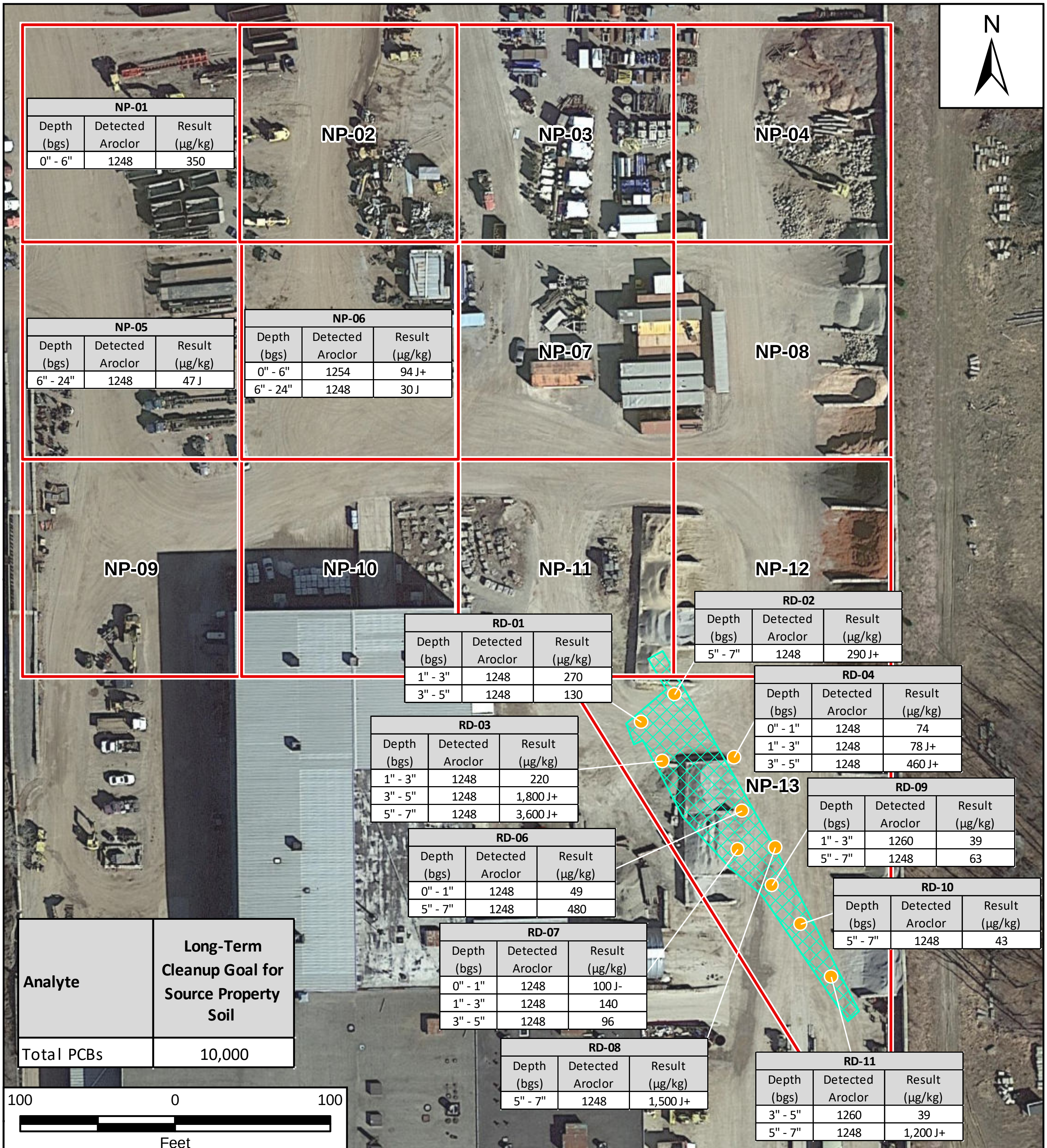
TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: X:\G\9031\B065\002O\Projects\mxd\2022-05\Fig5B.mxd

Date Saved: 5/9/2022 EPA Contract No.: 68HE0519D0005 TO/TOLIN: F0031-B065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



NP-01

Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 6"	1248	350

NP-05

Depth (bgs)	Detected Aroclor	Result (µg/kg)
6" - 24"	1248	47 J

NP-06

Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 6"	1254	94 J+
6" - 24"	1248	30 J

RD-01

Depth (bgs)	Detected Aroclor	Result (µg/kg)
1" - 3"	1248	270
3" - 5"	1248	130

RD-02

Depth (bgs)	Detected Aroclor	Result (µg/kg)
5" - 7"	1248	290 J+

RD-03

Depth (bgs)	Detected Aroclor	Result (µg/kg)
1" - 3"	1248	220
3" - 5"	1248	1,800 J+
5" - 7"	1248	3,600 J+

RD-04

Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 1"	1248	74
1" - 3"	1248	78 J+
3" - 5"	1248	460 J+

RD-06

Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 1"	1248	49
5" - 7"	1248	480

RD-07

Depth (bgs)	Detected Aroclor	Result (µg/kg)
0" - 1"	1248	100 J-
1" - 3"	1248	140
3" - 5"	1248	96

RD-08

Depth (bgs)	Detected Aroclor	Result (µg/kg)
5" - 7"	1248	1,500 J+

RD-09

Depth (bgs)	Detected Aroclor	Result (µg/kg)
1" - 3"	1260	39
5" - 7"	1248	63

RD-10

Depth (bgs)	Detected Aroclor	Result (µg/kg)
5" - 7"	1248	43

RD-11

Depth (bgs)	Detected Aroclor	Result (µg/kg)
3" - 5"	1260	39
5" - 7"	1248	1,200 J+

Analyte	Long-Term Cleanup Goal for Source Property Soil
Total PCBs	10,000

Legend

Discrete Interval Soil Samples | Ditch Boundary | Northern Portion Boundary

All concentrations provided in micrograms per kilogram (µg/kg).
Samples were collected from August 24 to 31, 2021.

bgs Below ground surface
J Value is considered an estimate for quality control reasons.
J- Value is considered an estimate for quality control reasons, and may be biased low.
J+ Value is considered an estimate for quality control reasons, and may be biased high.
NP Northern portion
PCBs Polychlorinated biphenyls
RD Restricted ditch

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 5C
Soil PCB Detections Map Northern Portion and Restricted Ditch

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: X:\G\9031\B065\002O\Projects\mxd\2022-05\Fig5C.mxd

Date Saved: 5/9/2022 EPA Contract No.: 68HE0519D0005 TO/TOLIN: F0031-B065 Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Analyte	EPA Residential Regional Screening Levels	EPA Common Range
Aroclor 1248	2,270	NE
Manganese	1,830	20 - 3,000

LEGEND

Composite Landscape Material Sample

All concentrations provided in micrograms per kilogram (µg/kg).

Samples collected from September 15 to 16, 2021.

##	Red values indicate an exceedance of EPA Residential Regional Screening Level for Soil (Hazard Quotient 1; Target Risk 10^{-5}), however, the sample concentration is within the EPA Common Concentration Range for soils.
bgs	Below ground surface
J-	Value is considered an estimate for quality control reasons, and may be biased low.
LM	Landscaping materials
NE	Not established
PCBs	Polychlorinated biphenyls

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 5D
Landscape Materials PCB Detections and Metal Exceedances Map

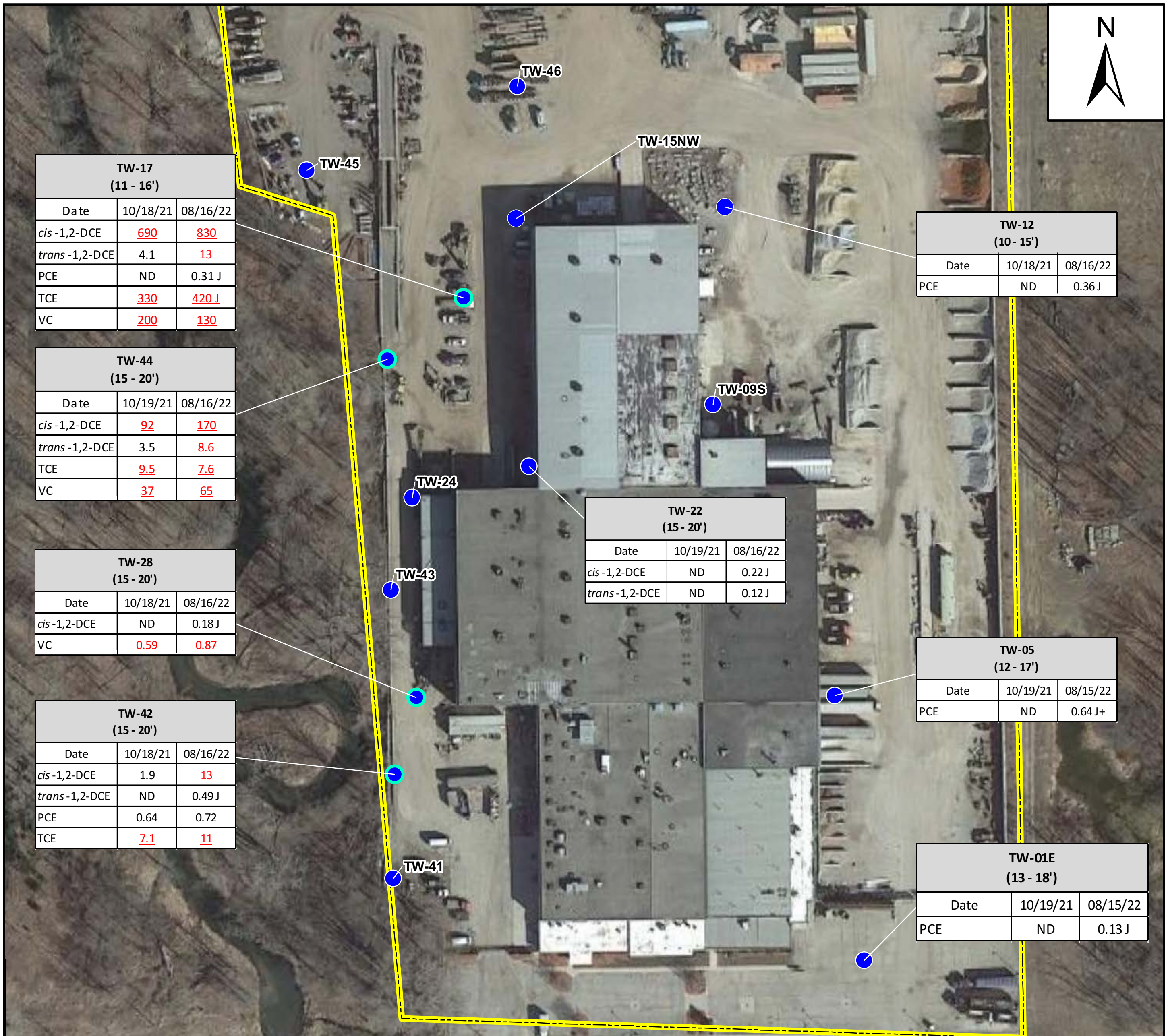
TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: X:\G9031\B065\002O\Projects\mxd\2022-05\Fig5D.mxd

Date Saved: 5/9/2022 EPA Contract No.: 68HE0519D0005 TO/TOLIN: F0031-B065

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



TW-17 (11 - 16')		
Date	10/18/21	08/16/22
cis-1,2-DCE	<u>690</u>	<u>830</u>
trans-1,2-DCE	4.1	13
PCE	ND	0.31 J
TCE	<u>330</u>	<u>420 J</u>
VC	<u>200</u>	<u>130</u>

TW-12 (10 - 15')		
Date	10/18/21	08/16/22
PCE	ND	0.36 J

TW-44 (15 - 20')		
Date	10/19/21	08/16/22
cis-1,2-DCE	<u>92</u>	<u>170</u>
trans-1,2-DCE	3.5	8.6
TCE	<u>9.5</u>	<u>7.6</u>
VC	<u>37</u>	<u>65</u>

TW-22 (15 - 20')		
Date	10/19/21	08/16/22
cis-1,2-DCE	ND	0.22 J
trans-1,2-DCE	ND	0.12 J

TW-28 (15 - 20')		
Date	10/18/21	08/16/22
cis-1,2-DCE	ND	0.18 J
VC	0.59	0.87

TW-05 (12 - 17')		
Date	10/19/21	08/15/22
PCE	ND	0.64 J+

TW-42 (15 - 20')		
Date	10/18/21	08/16/22
cis-1,2-DCE	1.9	13
trans-1,2-DCE	ND	0.49 J
PCE	0.64	0.72
TCE	<u>7.1</u>	<u>11</u>

TW-01E (13 - 18')		
Date	10/19/21	08/15/22
PCE	ND	0.13 J

All concentrations provided in micrograms per liter (µg/L).

##	Red values ndicate an exceedance of EPA Residential Tapwater RSL.
<u>##</u>	<u>Underlined</u> indicate an exceedance of EGLE Part 201 Generic Residential DWC.
DCE	Dichloroethene
J	Value is considered an estimate for quality control reasons.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
DWC	Drinking Water Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
ND	Not Detected
RSL	Regional Screening Level
PCE	Tetrachloroethene
TCE	Trichloroethene
VC	Vinyl chloride

100 0 100
Feet

Legend

- Groundwater Sample Location with a Screening Level Exceedance
- Groundwater Sample Location
- Source Property Boundary

Analyte	EPA Residential Tapwater RSL	EGLE Part 201 Generic Residential DWC
cis-1,2-DCE	2.5	70
trans-1,2-DCE	6.8	100
PCE	4.1	5.0
TCE	0.28	5.0
VC	0.19	2.0

Shiawassee River Superfund Site
2440 W. Highland Road
Howell, Livingston County, MI

Figure 5F
Groundwater Chlorinated VOC Detections Map

TETRA TECH

Prepared For: US EPA | Prepared By: Tetra Tech

File Path: G:\G9031-START V\Michigan\Shiawassee River Site\mxd\2023-07\Fig5F-GWChlorinatedVOCDetections.mxd

Date Saved: 7/11/2023 EPA Contract No.: 68HE0519D0005 TO/TOLIN: 0072-0001CB105

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

APPENDIX B. TABLES

Table 1A
Soil and Sediment: Polychlorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample Name	Matrix	Location Description	Sample Type	Sample Date	Sample Depth (bgs)	Result	
						Detected Aroclor	Total PCBs (µg/kg)
Long-Term Cleanup Goal for Source Property Soil *:						NA	10,000
SR-SO-FL01A-00.06-083021	Soil	Former Lagoon	Composite	08/30/21	0" - 6"	NA	36 UJ
SR-SO-FL01B-00.06-083021	Soil	Former Lagoon	Composite	08/30/21	0" - 6"	NA	36 UJ
SR-SO-FL01C-00.06-083021	Soil	Former Lagoon	Composite	08/30/21	0" - 6"	**1248**	**58 J+**
SR-SO-FL01A-06.24-083021	Soil	Former Lagoon	Composite	08/30/21	6" - 24"	NA	35 UJ
SR-SO-FL01B-06.24-083021	Soil	Former Lagoon	Composite	08/30/21	6" - 24"	NA	36 UJ
SR-SO-FL01C-06.24-083021	Soil	Former Lagoon	Composite	08/30/21	6" - 24"	NA	35 UJ
SR-SO-FL01D-06.24-083021	Soil	Former Lagoon	Composite	08/30/21	6" - 24"	NA	35 UJ
SR-SO-FL03A-00.06-082721	Soil	Former Lagoon	Composite	08/27/21	0" - 6"	**1248**	**80 J**
SR-SO-FL03B-00.06-082721	Soil	Former Lagoon	Composite	08/27/21	0" - 6"	**1248**	**130 J**
SR-SO-FL03C-00.06-082721	Soil	Former Lagoon	Composite	08/27/21	0" - 6"	**1248**	**130 J**
SR-SO-FL03A-06.24-082721	Soil	Former Lagoon	Composite	08/27/21	6" - 24"	**1248**	**44 J**
SR-SO-FL03B-06.24-082721	Soil	Former Lagoon	Composite	08/27/21	6" - 24"	**1248**	**33 J**
SR-SO-FL03C-06.24-082721	Soil	Former Lagoon	Composite	08/27/21	6" - 24"	NA	35 UJ
SR-SO-FL03D-06.24-082721	Soil	Former Lagoon	Composite	08/27/21	6" - 24"	NA	36 UJ
SR-SO-LC01-00.06-082321	Soil	Land Clearing	Composite	08/23/21	0" - 6"	NA	35 U
SR-SO-LC01-06.24-082321	Soil	Land Clearing	Composite	08/23/21	6" - 24"	NA	35 U
SR-SO-LC02A-00.06-082421	Soil	Land Clearing	Composite	08/24/21	0" - 6"	NA	35 U
SR-SO-LC02B-00.06-082421	Soil	Land Clearing	Composite	08/24/21	0" - 6"	NA	37 U
SR-SO-LC02C-00.06-082421	Soil	Land Clearing	Composite	08/24/21	0" - 6"	NA	35 U
SR-SO-LC02A-06.24-082421	Soil	Land Clearing	Composite	08/24/21	6" - 24"	NA	35 U
SR-SO-LC02B-06.24-082421	Soil	Land Clearing	Composite	08/24/21	6" - 24"	NA	35 U
SR-SO-LC02C-06.24-082421	Soil	Land Clearing	Composite	08/24/21	6" - 24"	NA	40 U
SR-SO-LC02D-06.24-082422	Soil	Land Clearing	Composite	08/24/21	6" - 24"	NA	34 U
SR-SO-LC03A-00.06-082321	Soil	Land Clearing	Composite	08/23/21	0" - 6"	NA	34 U
SR-SO-LC03B-00.06-082321	Soil	Land Clearing	Composite	08/23/21	0" - 6"	NA	34 U
SR-SO-LC03C-00.06-082321	Soil	Land Clearing	Composite	08/23/21	0" - 6"	NA	34 U
SR-SO-LC03A-06.24-082321	Soil	Land Clearing	Composite	08/23/21	6" - 24"	NA	34 U
SR-SO-LC03B-06.24-082321	Soil	Land Clearing	Composite	08/23/21	6" - 24"	NA	34 U
SR-SO-LC03C-06.24-082321	Soil	Land Clearing	Composite	08/23/21	6" - 24"	NA	36 U
SR-SO-LC04-00.06-082321	Soil	Land Clearing	Composite	08/23/21	0" - 6"	NA	35 U
SR-SO-LC04-06.24-082321	Soil	Land Clearing	Composite	08/23/21	6" - 24"	NA	34 U
SR-SO-LD02-00.06-083021	Soil	Lagoon Ditch	Composite	08/30/21	0" - 6"	NA	35 UJ
SR-SO-LD04-06.24-083021	Soil	Lagoon Ditch	Composite	08/30/21	6" - 24"	NA	35 UJ
SR-SO-LD04D-06.24-083021	Soil	Lagoon Ditch	Composite	08/30/21	0" - 6"	NA	34 UJ
SR-SO-LD05-00.06-083021	Soil	Lagoon Ditch	Composite	08/30/21	0" - 6"	NA	36 UJ
SR-SO-LD05-06.24-083021	Soil	Lagoon Ditch	Composite	08/30/21	6" - 24"	**1248**	**94 J**
SR-SO-LD05D-06.24-083021	Soil	Lagoon Ditch	Composite	08/30/21	6" - 24"	**1248**	**160 J**
SR-SO-LD06-00.06-083021	Soil	Lagoon Ditch	Composite	08/30/21	0" - 6"	**1248**	**60 J**
SR-SO-LD06-06.24-083021	Soil	Lagoon Ditch	Composite	08/30/21	6" - 24"	**1248**	**230 J**
SR-SO-NP01-00.06-082421	Soil	Northern Portion	Composite	08/24/21	0" - 6"	**1248**	**350**
SR-SO-NP01-06.24-082421	Soil	Northern Portion	Composite	08/24/21	6" - 24"	NA	35 U
SR-SO-NP02-00.06-082421	Soil	Northern Portion	Composite	08/24/21	0" - 6"	NA	34 U
SR-SO-NP02-06.24-082421	Soil	Northern Portion	Composite	08/24/21	6" - 24"	NA	34 U
SR-SO-NP03-00.06-082421	Soil	Northern Portion	Composite	08/24/21	0" - 6"	NA	35 U

Table 1A
Soil and Sediment: Polychlorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample Name	Matrix	Location Description	Sample Type	Sample Date	Sample Depth (bgs)	Result	
						Detected Aroclor	Total PCBs (µg/kg)
					Long-Term Cleanup Goal for Source Property Soil *:	NA	10,000
SR-SO-NP03-06.24-082421	Soil	Northern Portion	Composite	08/24/21	6" - 24"	NA	35 U
SR-SO-NP05A-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	34 U
SR-SO-NP05B-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	34 U
SR-SO-NP05C-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	34 U
SR-SO-NP05A-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	39 U
SR-SO-NP05B-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	**1248**	**47 J**
SR-SO-NP05C-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	34 U
SR-SO-NP06-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	**1254**	**94 J+**
SR-SO-NP06-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	**1248**	**30 J**
SR-SO-NP08A-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	35 U
SR-SO-NP08B-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	36 U
SR-SO-NP08C-00.06-082521	Soil	Northern Portion	Composite	08/25/21	0" - 6"	NA	36 U
SR-SO-NP08A-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	41 U
SR-SO-NP08B-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	36 U
SR-SO-NP08C-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	35 U
SR-SO-NP08D-06.24-082521	Soil	Northern Portion	Composite	08/25/21	6" - 24"	NA	36 UJ
SR-SO-NP09-00.06-082621	Soil	Northern Portion	Composite	08/26/21	0" - 6"	**1248**	**450**
SR-SO-NP11-06.24-082621	Soil	Northern Portion	Composite	08/26/21	6" - 24"	**1248**	**210 J+**
SR-SO-NP11D-06.24-082622	Soil	Northern Portion	Composite	08/26/21	6" - 24"	**1248**	**420 J+**
SR-SO-NP12-00.06-082621	Soil	Northern Portion	Composite	08/26/21	0" - 6"	NA	35 U
SR-SO-NP13-00.06-082621	Soil	Northern Portion	Composite	08/26/21	0" - 6"	NA	35 U
SR-SO-NP13-06.24-082621	Soil	Northern Portion	Composite	08/26/21	6" - 24"	NA	35 U
SR-SO-OF01-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	47 U
SR-SO-OF02-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	37 U
SR-SO-OF03-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	41 U
SR-SO-OF04-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	45 U
SR-SO-OF05-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	42 U
SR-SO-OF06-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	37 U
SR-SO-OF07-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	44 U
SR-SO-OF08-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	35 U
SR-SO-OF09-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	38 U
SR-SO-OF10-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	48 U
SR-SO-OF11-091621	Soil	Outfall	Discrete Interval	09/16/21	0" - 6"	NA	71 U
SR-SO-RD-01-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	40 U
SR-SO-RD-01-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	**1248**	**270**
SR-SO-RD-01-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**130**
SR-SO-RD-01-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	NA	38 U
SR-SO-RD-02-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	34 U
SR-SO-RD-02-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	NA	34 U
SR-SO-RD-02-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	NA	35 U
SR-SO-RD-02-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**290 J+**
SR-SO-RD-03-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	38 U
SR-SO-RD-03-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	**1248**	**220**
SR-SO-RD-03-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**1,800 J+**

Table 1A
Soil and Sediment: Polychlorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample Name	Matrix	Location Description	Sample Type	Sample Date	Sample Depth (bgs)	Result	
						Detected Aroclor	Total PCBs (µg/kg)
Long-Term Cleanup Goal for Source Property Soil *:						NA	10,000
SR-SO-RD-03-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**3,600 J+**
SR-SO-RD-04-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	**1248**	**74**
SR-SO-RD-04-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	**1248**	**78 J+**
SR-SO-RD-04-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**460 J+**
SR-SO-RD-04-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	NA	36 U
SR-SO-RD-06-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	**1260**	**49**
SR-SO-RD-06-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	NA	34 U
SR-SO-RD-06-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	NA	35 U
SR-SO-RD-06-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**480**
SR-SO-RD-07-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	**1260**	**100 J-**
SR-SO-RD-07-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	**1248**	**140**
SR-SO-RD-07-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**96**
SR-SO-RD-07-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	NA	37 U
SR-SO-RD-08-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	38 U
SR-SO-RD-08-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	NA	36 U
SR-SO-RD-08-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	NA	36 U
SR-SO-RD-08-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**1,500 J+**
SR-SO-RD-09-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	37 U
SR-SO-RD-09-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	**1260**	**39**
SR-SO-RD-09-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**63**
SR-SO-RD-09-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	NA	43 U
SR-SO-RD-10-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	NA	34 U
SR-SO-RD-10-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	NA	34 U
SR-SO-RD-10-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	NA	35 U
SR-SO-RD-10-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**43**
SR-SO-RD-11-00.01-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	0' - 1'	**1248**	**260**
SR-SO-RD-11-01.03-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	1' - 3'	NA	36 U
SR-SO-RD-11-03.05-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	3' - 5'	**1248**	**39**
SR-SO-RD-11-05.07-083121	Soil	Restricted Ditch	Discrete Interval	08/31/21	5' - 7'	**1248**	**1,200 J+**
SR-SD-RP01-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	44 U
SR-SD-RP02-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	42 U
SR-SD-RP03-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	44 U
SR-SD-RP04-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	44 U
SR-SD-RP05-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	42 U
SR-SD-RP06-00.06-082421	Sediment	Retention Pond	Composite	08/24/21	0" - 6"	NA	40 U

Notes:

All values are provided in micrograms per kilogram (µg/kg).

##	**Boldface** value indicates that the analyte was detected.
*	Long-Term Preliminary Remediation Goal for Source Property Soils referenced in the 2014 Five-Year Review Report determined to be more stringent than the EGLE Part 201 Generic Nonresidential Direct Contact Criterion of 16,000 µg/kg.
EGLE	Michigan Department of Environment, Great Lakes, and Energy
µg/kg	Micrograms per kilogram
J	Value is considered an estimate for quality control reasons.
J-	Value is considered an estimate for quality control reasons, and may be biased low.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
NA	Not applicable
PCB	Polychlorinated biphenyl
U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 1B
Soil and Sediment: Metals Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Analyte	**EPA Composite Worker Regional Screening Levels (RSL) ***	**EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC) ***	**Sample ID:**	**SR-SO-LC02A-06.24-082421**	**SR-SO-LC02B-06.24-082421**	**SR-SO-LC02C-06.24-082421**	**SR-SO-LC02D-06.24-082422**	**SR-SO-LC03A-00.06-082321**	**SR-SO-LC03B-00.06-082321**	**SR-SO-LC03C-00.06-082321**	**SR-SO-NP01-00.06-082421**	**SR-SO-NP05A-00.06-082521**
			Location Description:	**Land Clearing**	**Land Clearing**	**Land Clearing**	**Land Clearing**	**Land Clearing**	**Land Clearing**	**Land Clearing**	**North Portion**	**North Portion**
			Sample Type:	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
			Sample Date:	**08/24/21**	**08/24/21**	**08/24/21**	**08/24/21**	**08/23/21**	**08/23/21**	**08/23/21**	**08/24/21**	**08/25/21**
			Sample Depth: (bgs)	**6" - 24"**	**6" - 24"**	**6" - 24"**	**6" - 24"**	**0" - 6"**	**0" - 6"**	**0" - 6"**	**0" - 6"**	**0" - 6"**
Aluminum	NE	370,000		**3,200**	**3,100**	**3,200**	**3,300**	**3,500**	**3,600**	**4,500**	**3,100**	**4,100**
Antimony	467	670		5.7 UJ	6.5 UJ	5.2 UJ	6.0 UJ	5.8 UJ	5.6 UJ	6.1 UJ	6.2 UJ	4.3 UJ
Arsenic	30	37		**2.2**	**1.8**	**2.1**	**2.5**	**3.6**	**3.8**	**5.5**	**2.4**	**4.7**
Barium	21,700	130,000		**16 J**	**15 J**	**15 J**	**15 J**	**28**	**39**	**37**	**19 J**	**46**
Beryllium	2,290	370,000		**0.18 J**	**0.17 J**	**0.18 J**	**0.19 J**	**0.29 J**	**0.28 J**	**0.35 J**	**0.20 J**	**0.34 J**
Cadmium	100	2,100		0.48 U	0.54 U	0.44 U	0.50 U	0.48 U	0.46 U	0.51 U	0.52 U	**0.42 J+**
Calcium	NE	NE		**6,300 J+**	**4,700 J+**	**7,900 J+**	**7,100 J+**	**65,000 J+**	**75,000 J+**	**76,000 J+**	**11,000 J+**	**100,000 J+**
Chromium, Hexavalent	63	9,200		0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	**0.40 J**	**0.40 J**	0.20 UJ	0.20 UJ	**1.0 J**
Chromium, Trivalent †	1,750,000	1,000,000		**6.4**	**5.3**	**5.3**	**5.8**	**9.0**	**17**	**13**	**6.3**	**13**
Chromium, Total	NE	NE		**6.4**	**5.3**	**5.3**	**5.8**	**9.4**	**17**	**13**	**6.3**	**14**
Cobalt	347	9,000		**2.0 J**	**2.1 J**	**1.9 J**	**2.2 J**	**2.7 J**	**3.1 J**	**3.5 J**	**2.0 J**	**3.0 J**
Copper	46,700	73,000		**3.3**	**3.0**	**3.3**	**4.5**	**13**	**11**	**15**	**4.8**	**28**
Iron	818,000	580,000	mg/kg	**5,400**	**4,800**	**5,600**	**6,100**	**8,600**	**11,000**	**11,000**	**5,300**	**12,000**
Lead	NE	900		**2.7**	**2.3**	**2.5**	**2.7**	**11**	**13**	**14**	**5.2**	**33**
Magnesium	NE	1,000,000		**2,300**	**1,800**	**2,800**	**2,700**	**16,000**	**11,000**	**20,000**	**4,600**	**41,000**
Manganese	25,600	90,000		**130 J**	**100 J**	**120 J**	**150 J**	**290 J**	**490 J**	**320 J**	**91 J**	**260 J**
Mercury	46	580		**0.0079 J**	**0.0078 J**	**0.0086 J**	**0.0088 J**	**0.020 J**	0.090 U	**0.029 J**	**0.0073 J**	**0.0083 J**
Nickel	11,100	150,000		**5.3**	**4.7**	**4.9**	**5.7**	**8.6**	**8.7**	**12**	**5.7**	**12**
Potassium	NE	NE		**250 J**	**240 J**	**240 J**	**270 J**	**470 J**	**750**	**660**	**380 J**	**510**
Selenium	5,840	9,600		**0.39 J**	**0.45 J**	**0.42 J**	**1.0 J**	3.4 U	**0.57 J**	3.6 U	**0.41 J**	**0.37 J**
Silver	5,840	9,000		0.96 U	1.1 U	0.87 U	1.0 U	0.96 U	0.93 U	1.0 U	1.0 U	0.71 U
Sodium	NE	1,000,000		480 U	540 U	440 U	500 U	480 U	460 U	510 U	520 U	360 U
Thallium	12	130		2.1 UJ	1.8 UJ	2.6 UJ	2.0 UJ	1.9 UJ	2.4 UJ	**0.40 J-**	2.2 UJ	**0.27 J-**
Vanadium	5,830	5,500		**8.1**	**7.9**	**9.9**	**8.9**	**13**	**17**	**18**	**9.4**	**19**
Zinc	350,000	630,000		**14**	**12**	**14**	**15**	**36**	**42**	**49**	**18**	**62**

Notes:

All values are provided in milligrams per kilogram (mg/kg).

##	**Boldface** value indicates that the analyte was detected.
*	Because there were no exceedances of EGLE DCC and EPA RSLs (Hazard Quotient 1; Target Risk 10^{-5}), EPA Common Concentration Ranges and EGLE Statewide Default Background Levels were not listed in the table. EPA Common Concentratoin Ranges can be found in Table 4-2 in the 1992 Remedial Investigation for the site. EGLE Statewide Default Background Levels are provided in the Part 201 Nonresidential soil criteria tables.
†	Trivalent Chromium values calculated as the difference between Total Chromium and Hexavalent Chromium.
DDC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
J	Value is considered an estimate for quality control reasons.
J-	Value is considered an estimate for quality control reasons, and may be biased low.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
mg/kg	Milligrams per kilogram
NE	Not established
RSL	Regional Screening Level
U	Not detected above listed reporting limit
UJ	Not detected above listed reporting limit, which is considered approximate due to deficiencies in one or more quality control criteria.

Table 1B
Soil and Sediment: Metals Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Analyte	EPA Composite Worker Regional Screening Levels (RSL) *	EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC) *	Sample ID:	SR-SO-NP05B-00.06-082521	SR-SO-NP05C-00.06-082521	SR-SO-NP08A-00.06-082521	SR-SO-NP08B-00.06-082521	SR-SO-NP08B-06.24-082521	SR-SO-NP08C-00.06-082521	SR-SO-NP08D-06.24-082521	SR-SO-NP10-00.06-082621	SR-SO-FL01A-00.06-083021
			Location Description:	**North Portion**	**North Portion**	**North Portion**	**North Portion**	**North Portion**	**North Portion**	**North Portion**	**North Portion**	**Former Lagoon**
			Sample Type:	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
			Sample Date:	**08/25/21**	**08/25/21**	**08/25/21**	**08/25/21**	**08/25/21**	**08/25/21**	**08/25/21**	**08/26/21**	**08/30/21**
			Sample Depth: (bgs)	**0" - 6"**	**0" - 6"**	**0" - 6"**	**0" - 6"**	**6" - 24"**	**0" - 6"**	**6" - 24"**	**0" - 6"**	**0" - 6"**
Aluminum	NE	370,000		**4,400**	**3,700**	**3,800**	**5,800**	**3,200**	**3,700**	**3,900**	**4,800**	**5,200**
Antimony	467	670		4.5 UJ	5.8 UJ	5.9 UJ	6.3 UJ	5.7 UJ	6.1 UJ	6.8 UJ	6.1 UJ	5.6 UJ
Arsenic	30	37		**4.6**	**4.9**	**3.1**	**6.3**	**2.1**	**3.7**	**2.6**	**3.9**	**5.4**
Barium	21,700	130,000		**49**	**48**	**26**	**45**	**16 J**	**47**	**20 J**	**41**	**44**
Beryllium	2,290	370,000		**0.33 J**	**0.31 J**	**0.37 J**	**0.40 J**	**0.19 J**	**0.47 J**	**0.23 J**	**0.44 J**	**0.40 J**
Cadmium	100	2,100		**0.58 J+**	**0.50 J+**	0.49 U	0.53 U	0.47 U	0.51 U	0.57 U	0.51 U	0.46 U
Calcium	NE	NE		**90,000 J+**	**76,000 J+**	**53,000 J+**	**140,000 J+**	**16,000 J+**	**150,000 J+**	**15,000 J+**	**110,000 J+**	**94,000 J+**
Chromium, Hexavalent	63	9,200		0.20 UJ	0.20 UJ	0.20 UJ	**0.20 J**	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U
Chromium, Trivalent †	1,750,000	1,000,000		**18**	**13**	**8.3**	**12**	**6.3**	**13**	**6.7**	**11**	**16**
Chromium, Total	NE	NE		**18**	**13**	**8.3**	**12**	**6.3**	**13**	**6.7**	**11**	**16**
Cobalt	347	9,000		**3.1 J**	**3.0 J**	**2.3 J**	**3.5 J**	**2.0 J**	**1.9 J**	**2.3 J**	**2.8 J**	**3.8 J**
Copper	46,700	73,000		**24**	**20**	**6.8**	**13**	**3.8**	**8.9**	**5.5**	**14**	**14**
Iron	818,000	580,000	mg/kg	**12,000**	**11,000**	**9,200**	**9,800**	**5,100**	**6,800**	**5,900**	**7,600**	**9,200**
Lead	NE	900		**52**	**24**	**8.0**	**14**	**4.0**	**5.8**	**4.7**	**8.2**	**15**
Magnesium	NE	1,000,000		**27,000**	**23,000**	**13,000**	**24,000**	**4,000**	**64,000**	**3,100**	**33,000**	**22,000**
Manganese	25,600	90,000		**390 J**	**230 J**	**270 J**	**330 J**	**130 J**	**350 J**	**150 J**	**250 J**	**300 J**
Mercury	46	580		0.098 U	**0.013 J**	**0.0094 J**	**0.018 J**	**0.0089 J**	0.10 U	**0.0096 J**	**0.009 J**	**0.023 J**
Nickel	11,100	150,000		**12**	**11**	**6.8**	**11**	**5.3**	**7.2**	**6.4**	**8.5**	**13**
Potassium	NE	NE		**510**	**520**	**530**	**730**	**360 J**	**610**	**440 J**	**550**	**700**
Selenium	5,840	9,600		2.6 U	3.4 U	3.5 U	3.7 U	3.3 U	3.6 U	**0.65 J**	3.6 U	3.2 U
Silver	5,840	9,000		0.75 U	0.96 U	0.99 U	1.1 U	0.94 U	1.0 U	1.1 U	1.0 U	0.93 U
Sodium	NE	1,000,000		370 U	480 U	490 U	530 U	470 U	510 U	570 U	510 U	460 U
Thallium	12	130		**0.48 J-**	**0.31 J-**	2.6 UJ	1.9 UJ	2.4 UJ	**0.35 J-**	2.9 UJ	**0.27 J-**	2.3 UJ
Vanadium	5,830	5,500		**23**	**17**	**11**	**17**	**9.2**	**15**	**10**	**11**	**16**
Zinc	350,000	630,000		**70**	**70**	**25**	**51**	**18**	**23**	**25**	**40**	**92**

Notes:

All values are provided in milligrams per kilogram (mg/kg).

##	**Boldface** value indicates that the analyte was detected.
*	Because there were no exceedances of EGLE DCC and EPA RSLs (Hazard Quotient 1; Target Risk 10^{-5}), EPA Common Concentration Ranges and EGLE Statewide Default Background Levels were not listed in the table. EPA Common Concentratoin Ranges can be found in Table 4-2 in the 1992 Remedial Investigation for the site. EGLE Statewide Default Background Levels are provided in the Part 201 Nonresidential soil criteria tables.
†	Trivalent Chromium values calculated as the difference between Total Chromium and Hexavalent Chromium.
DDC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
J	Value is considered an estimate for quality control reasons.
J-	Value is considered an estimate for quality control reasons, and may be biased low.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
mg/kg	Milligrams per kilogram
NE	Not established
RSL	Regional Screening Level
U	Not detected above listed reporting limit
UJ	Not detected above listed reporting limit, which is considered approximate due to deficiencies in one or more quality control criteria.

Table 1B
Soil and Sediment: Metals Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Analyte	EPA Composite Worker Regional Screening Levels (RSL) *	EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC) *	Sample ID:	SR-SO-FL01B-00.06-083021	SR-SO-FL01C-00.06-083021	SR-SO-FL03A-00.06-082721	SR-SO-FL03B-00.06-082721	SR-SO-FL03C-00.06-082721	SR-SO-LD03-06.24-083021	SR-SO-LD04-00.06-083021	SR-SO-LD05-06.24-083021	SR-SO-LD05D-06.24-083021
			Location Description:	Former Lagoon	Former Lagoon	Former Lagoon	Former Lagoon	Former Lagoon	Lagoon Ditch	Lagoon Ditch	Lagoon Ditch	Lagoon Ditch
			Sample Type:	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
			Sample Date:	08/30/21	08/30/21	08/27/21	08/27/21	08/27/21	08/30/21	08/30/21	08/30/21	08/30/21
			Sample Depth: (bgs)	0" - 6"	0" - 6"	0" - 6"	0" - 6"	0" - 6"	6" - 24"	0" - 6"	6" - 24"	6" - 24"
Aluminum	NE	370,000		**5,200**	**4,900**	**7,300**	**6,500**	**5,200**	**3,100**	**4,100**	**5,200**	**11,000**
Antimony	467	670		6.6 UJ	5.5 UJ	5.6 U	4.7 U	6.4 U	5.7 U	6.6 U	5.9 U	5.9 U
Arsenic	30	37		**4.1**	**4.6**	**4.8**	**5.8**	**4.5**	**2.8**	**4.5**	**2.7**	**4.1**
Barium	21,700	130,000		**52**	**48**	**49**	**43**	**47**	**20**	**38**	**29**	**33**
Beryllium	2,290	370,000		**0.38 J**	**0.34 J**	**0.63**	**0.54**	**0.36 J**	**0.20 J**	**0.31 J**	**0.30 J**	**0.33 J**
Cadmium	100	2,100		0.55 U	0.46 U	0.47 U	0.39 U	0.54 U	0.47 U	0.55 U	0.49 U	0.49 U
Calcium	NE	NE		**100,000 J+**	**120,000 J+**	**110,000**	**120,000**	**110,000**	**17,000**	**84,000**	**52,000**	**44,000**
Chromium, Hexavalent	63	9,200		0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Chromium, Trivalent ┼	1,750,000	1,000,000		**12**	**11**	**12**	**10**	**12**	**7.2**	**12**	**7.5**	**9.3**
Chromium, Total	NE	NE		**12**	**11**	**12**	**10**	**12**	**7.2**	**12**	**7.5**	**9.3**
Cobalt	347	9,000		**3.6 J**	**3.4 J**	**3.5 J**	**3.4 J**	**3.6 J**	**2.2 J**	**3.0 J**	**2.1 J**	**2.6 J**
Copper	46,700	73,000		**11**	**13**	**14 J**	**14 J**	**14 J**	**10 J**	**12 J**	**6.3 J**	**7.6 J**
Iron	818,000	580,000	mg/kg	**7,900**	**8,800**	**8,400**	**8,900**	**9,300**	**5,900**	**9,600**	**6,200**	**7,500**
Lead	NE	900		**12**	**14**	**8.7 J**	**10 J**	**10 J**	**5.5 J**	**9.3 J**	**5.1 J**	**5.7 J**
Magnesium	NE	1,000,000		**23,000**	**18,000**	**32,000**	**21,000**	**19,000**	**6,800**	**22,000**	**13,000**	**17,000**
Manganese	25,600	90,000		**290 J**	**310 J**	**350**	**270**	**270**	**110**	**280**	**230**	**190**
Mercury	46	580		**0.023 J**	**0.022 J**	0.11 U	**0.010 J**	**0.014 J**	0.11 U	**0.0097 J**	**0.0085 J**	**0.0082 J**
Nickel	11,100	150,000		**11**	**12**	**11**	**10**	**12**	**6.5**	**9.6**	**6.2**	**8.3**
Potassium	NE	NE		**790**	**760**	**680**	**580**	**600**	**350 J**	**560**	**350 J**	**490**
Selenium	5,840	9,600		3.8 U	3.2 U	3.3 U	2.7 U	3.8 U	3.3 U	3.9 U	**0.68 J**	3.5 U
Silver	5,840	9,000		1.1 U	0.91 U	0.94 U	0.78 U	1.1 U	0.94 U	1.1 U	0.99 U	0.99 U
Sodium	NE	1,000,000		550 U	460 U	**450 J**	**320 J**	**420 J**	**91 J**	**110 J**	**65 J**	**170 J**
Thallium	12	130		**0.39 J-**	**0.25 J-**	2.3 U	2.0 U	2.7 U	2.4 U	2.8 U	2.5 U	2.5 U
Vanadium	5,830	5,500		**16**	**16**	**14**	**13**	**14**	**8.7**	**15**	**11**	**14**
Zinc	350,000	630,000		**67**	**73**	**40**	**39**	**42**	**32**	**53**	**25**	**31**

Notes:

All values are provided in milligrams per kilogram (mg/kg).

##	**Boldface** value indicates that the analyte was detected.
*	Because there were no exceedances of EGLE DCC and EPA RSLs (Hazard Quotient 1; Target Risk 10^{-5}), EPA Common Concentration Ranges and EGLE Statewide Default Background Levels were not listed in the table. EPA Common Concentratoin Ranges can be found in Table 4-2 in the 1992 Remedial Investigation for the site. EGLE Statewide Default Background Levels are provided in the Part 201 Nonresidential soil criteria tables.
┼	Trivalent Chromium values calculated as the difference between Total Chromium and Hexavalent Chromium.
DDC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
J	Value is considered an estimate for quality control reasons.
J-	Value is considered an estimate for quality control reasons, and may be biased low.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
mg/kg	Milligrams per kilogram
NE	Not established
RSL	Regional Screening Level
U	Not detected above listed reporting limit
UJ	Not detected above listed reporting limit, which is considered approximate due to deficiencies in one or more quality control criteria.

Table 1B
Soil and Sediment: Metals Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Analyte	EPA Composite Worker Regional Screening Levels (RSL) *	EGLE Part 201 Generic Nonresidential Direct Contact Criteria (DCC) *	Sample ID:	SR-SO-RD-01-03.05-083121	SR-SO-RD-02-01.03-083121	SR-SO-RD-03-01.03-083121	SR-SO-RD-04-01.03-083121	SR-SO-RD-06-05.07-083121	SR-SO-RD-08-01.03-083121	SR-SO-RD-09-01.03-083121	SR-SO-RD-10-05.07-083121	SR-SO-RD-11-03.05-083121
			Location Description:	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch	Restricted Ditch
			Sample Type:	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval	Discrete Interval
			Sample Date:	08/31/21	08/31/21	08/31/21	08/31/21	08/31/21	08/31/21	08/31/21	08/31/21	08/31/21
			Sample Depth: (bgs)	3' - 5'	1' - 3'	1' - 3'	1' - 3'	5' - 7'	1' - 3'	1' - 3'	5' - 7'	3' - 5'
Aluminum	NE	370,000		**3,300**	**3,800**	**4,100**	**9,400**	**6,700**	**4,400**	**2,700**	**5,100**	**2,800**
Antimony	467	670		5.7 U	5.1 U	6.4 U	6.5 U	7.6 U	5.7 U	6.6 U	6.6 U	6.5 U
Arsenic	30	37		**3.5**	**1.8**	**2.7**	**3.7**	**3.4**	**3.6**	**3.8**	**1.9**	**4.2**
Barium	21,700	130,000		**19**	**13 J**	**15 J**	**56**	**40**	**45**	**29**	**33**	**13 J**
Beryllium	2,290	370,000		**0.25 J**	**0.20 J**	**0.22 J**	**0.48 J**	**0.39 J**	**0.50**	**0.22 J**	**0.22 J**	**0.22 J**
Cadmium	100	2,100		0.48 U	0.43 U	0.53 U	0.54 U	0.63 U	0.47 U	0.55 U	0.55 U	0.54 U
Calcium	NE	NE		**61,000**	**1,100**	**5,500**	**4,900**	**9,500**	**87,000**	**190,000**	**1,800**	**74,000**
Chromium, Hexavalent	63	9,200		0.20 U	0.20 U	0.20 U	**0.30**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chromium, Trivalent †	1,750,000	1,000,000		**16**	**6.3**	**7.8**	**15**	**15**	**9.1**	**8.0**	**6.9**	**7.0**
Chromium, Total	NE	NE		**16**	**6.3**	**7.8**	**15**	**15**	**9.1**	**8.0**	**6.9**	**7.0**
Cobalt	347	9,000		**2.6 J**	**2.0 J**	**2.2 J**	**5.5**	**4.4 J**	**2.5 J**	**2.0 J**	**2.3 J**	**2.3 J**
Copper	46,700	73,000		**7.3 J**	**3.0 J**	**4.2 J**	**12 J**	**16 J**	**8.4 J**	**8.9 J**	**3.0 J**	**7.8 J**
Iron	818,000	580,000	mg/kg	**7,800**	**5,400**	**6,200**	**12,000**	**10,000**	**7,500**	**7,100**	**5,800**	**6,300**
Lead	NE	900		**4.7 J**	**2.9 J**	**4.3 J**	**5.2 J**	**8.7 J**	**5.8 J**	**6.0 J**	**4.0 J**	**10 J**
Magnesium	NE	1,000,000		**12,000**	**930**	**1,800**	**2,900**	**4,400**	**27,000**	**66,000**	**1,100**	**34,000**
Manganese	25,600	90,000		**310**	**74**	**120**	**190**	**160**	**280**	**310**	**170**	**170**
Mercury	46	580		**0.0080 J**	0.095 U	0.11 U	0.11 U	**0.021 J**	0.10 U	**0.017 J**	**0.022 J**	**0.026 J**
Nickel	11,100	150,000		**7.9**	**5.3**	**6.2**	**14**	**14**	**8.2**	**7.7**	**5.5**	**8.4**
Potassium	NE	NE		**400 J**	**220 J**	**240 J**	**1,100**	**960**	**580**	**520 J**	**250 J**	**540**
Selenium	5,840	9,600		3.3 U	**0.35 J**	**0.42 J**	**0.58 J**	**0.94 J**	3.3 U	3.9 U	3.9 U	3.8 U
Silver	5,840	9,000		0.95 U	0.85 U	1.1 U	1.1 U	1.3 U	0.94 U	1.1 U	1.1 U	1.1 U
Sodium	NE	1,000,000		**140 J**	**85 J**	**270 J**	**1,200**	**1,200**	**380 J**	**1,600**	**270 J**	**190 J**
Thallium	12	130		2.4 U	2.1 U	2.6 U	2.7 U	3.2 U	2.4 U	**0.44 J**	2.8 U	2.7 U
Vanadium	5,830	5,500		**14**	**9.7**	**10**	**20**	**17**	**12**	**13**	**10**	**11**
Zinc	350,000	630,000		**26**	**13**	**19**	**34**	**68**	**30**	**28**	**26**	**20**

Notes:

All values are provided in milligrams per kilogram (mg/kg).

##	**Boldface** value indicates that the analyte was detected.
*	Because there were no exceedances of EGLE DCC and EPA RSLs (Hazard Quotient 1; Target Risk 10^{-5}), EPA Common Concentration Ranges and EGLE Statewide Default Background Levels were not listed in the table. EPA Common Concentratoin Ranges can be found in Table 4-2 in the 1992 Remedial Investigation for the site. EGLE Statewide Default Background Levels are provided in the Part 201 Nonresidential soil criteria tables.
†	Trivalent Chromium values calculated as the difference between Total Chromium and Hexavalent Chromium.
DDC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
J	Value is considered an estimate for quality control reasons.
J-	Value is considered an estimate for quality control reasons, and may be biased low.
J+	Value is considered an estimate for quality control reasons, and may be biased high.
mg/kg	Milligrams per kilogram
NE	Not established
RSL	Regional Screening Level
U	Not detected above listed reporting limit
UJ	Not detected above listed reporting limit, which is considered approximate due to deficiencies in one or more quality control criteria.

Table 2A
Landscaping Materials: Polychlorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample Name	Sample Type	Sample Date	Result (µg/kg)		
			Aroclor 1248	Aroclor 1254	Aroclor 1260
EPA Residential Regional Screening Levels (RSL) *:			2,270	1,170	2,400
SR-LM-01-091521	Composite	09/15/21	**160 J-**	36 UJ	36 UJ
SR-LM-05-091521	Composite	09/15/21	36 U	36 U	36 U
SR-LM-18-091521	Composite	09/15/21	37 U	37 U	37 U
SR-LM-19-091521	Composite	09/15/21	35 U	35 U	35 U
SR-LM-20-091521	Composite	09/15/21	35 U	35 U	35 U
SR-LM-21-091521	Composite	09/15/21	34 U	34 U	34 U
SR-LM-22-091621	Composite	09/16/21	35 U	35 U	35 U

Notes:

All values are provided in micrograms per kilogram (µg/kg).

**Boldface** value indicates that the analyte was detected.

* EPA Residential Regional Screening Levels (RSL) (Hazard Quotient 1; Target Risk 10^{-5}) were determined to be more stringent than the EGLE Part 201 Generic Residential Direct Contact Criterion of 4,000 µg/kg for PCBs.

µg/kg Micrograms per kilogram
EGLE Michigan Department of Environment, Great Lakes, and Energy
J- The result is an estimated quantity but the results may be biased low.
ND Not detected
PCB Polychlorinated biphenyl
RSL Regional Screening Level (November 2022)
U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 2B
Landscaping Materials: Metals Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Analyte	EPA Residential Regional Screening Levels (RSL)	EPA Common Concentration Range *	EGLE Part 201 Generic Residential Direct Contact Criteria (DCC)	Sample ID:	SR-LM-01-091521	SR-LM-05-091521	SR-LM-18-091521	SR-LM-19-091521	SR-LM-20-091521	SR-LM-21-091521	SR-LM-22-091621
				Sample Type:	Composite	Composite	Composite	Composite	Composite	Composite	Composite
				Sample Date:	09/15/21	09/15/21	09/15/21	09/15/21	09/15/21	09/15/21	09/15/21
Aluminum	77,400	10,000 - 300,000	50,000		**5,200**	**4,200**	**2,200**	**1,900**	**40,000**	**1,700**	**1,300**
Antimony	31	NE	180		5.9 UJ	5.6 UJ	5.7 UJ	6.2 UJ	5.1 UJ	5.2 UJ	4.3 UJ
Arsenic	6.8	1 - 50	7.6		**5.8**	**4.5**	**3.4**	**3.4**	**1.0**	**3.4**	**3.5**
Barium	15,300	10 - 3,000	37,000		**43**	**41**	**8.6 J**	**8.4 J**	**240**	**5.2 J**	**230**
Beryllium	156	0.1 - 40	410		**0.46 J**	**0.33 J**	**0.15 J**	**0.13 J**	**6.6**	**0.12 J**	**0.094 J**
Cadmium	7.1	0.01 - 0.7	550		**0.58**	**0.38 J**	**0.20 J**	**0.22 J**	**0.093 J**	**0.22 J**	**0.15 J**
Calcium	NE	NE	NE		**100,000**	**120,000**	**46,000**	**80,000**	**220,000**	**100,000**	**210,000**
Chromium, Hexavalent	3.0	NE	2,500		**0.60 J**	**0.40 J**	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Chromium, Trivalent ┼	117,000	NE	790,000		**41**	**56**	**5.2**	**5.2**	**4.2**	**4.4**	**3.5**
Chromium, Total	NE	1 - 1,000	NE		**42 J**	**56 J**	**5.2 J**	**5.2 J**	**4.2 J**	**4.4 J**	**3.5 J**
Cobalt	23	1 - 40	2,600		**4.0 J**	**2.7 J**	**2.5 J**	**2.2 J**	**0.96 J**	**2.0 J**	**1.0 J**
Copper	3,130	2 - 100	20,000		**27 J**	**11 J**	**10 J**	**6.9 J**	**0.99 J**	**6.3 J**	**7.8 J**
Iron	54,800	NE	160,000	mg/kg	**27,000 J**	**14,000 J**	**7,000 J**	**5,900 J**	**1,200 J**	**5,300 J**	**2,900 J**
Lead	NE	2 - 200	400		**20**	**9.6**	**3.3**	**3.3**	1.7 U	**2.8**	**5.7**
Magnesium	NE	600 - 6,000	1,000,000		**24,000**	**26,000**	**10,000**	**15,000**	**50,000**	**14,000**	**130,000**
Manganese	1,830	20 - 3,000	25,000		**1,400 J**	**1,300 J**	**170 J**	**210 J**	**2,500**	**180 J**	**87 J**
Mercury	11	0.01 - 0.3	160		**0.017 J**	0.092 U	0.11 U	0.094 U	0.10 U	0.088 U	**0.010 J**
Nickel	825	5 - 500	40,000		**15**	**10**	**7.1**	**6.5**	**0.17 J**	**5.1**	**5.1**
Potassium	NE	NE	NE		**660**	**450 J**	**240 J**	**300 J**	**2,900**	**240 J**	**670**
Selenium	391	0.1 - 2	2,600		**0.61 J**	3.3 U	3.3 U	3.6 U	**2.3 J**	3.0 U	2.5 U
Silver	391	0.01 - 5	2,500		0.98 U	0.94 U	0.95 U	1.0 U	0.85 U	0.86 U	0.72 U
Sodium	NE	NE	1,000,000		**190 J**	**220 J**	**51 J**	**74 J**	**1,800**	**76 J**	**240 J**
Thallium	0.78	NE	35		**0.64 J-**	**0.54 J-**	2.4 UJ	2.6 UJ	2.1 UJ	2.1 UJ	1.8 UJ
Vanadium	393	20 - 500	570		**37 J**	**55 J**	**9.3 J**	**7.6 J**	**8.1 J**	**6.7 J**	**6.5 J**
Zinc	23,500	10 - 300	170,000		**80 J**	**210 J**	**20 J**	**21 J**	**0.34 J**	**12 J**	**5.4 J**

Notes:

All values are provided in milligrams per kilogram (mg/kg).

##	**Boldface** value indicates that the analyte was detected.
(shaded)	Value exceeds EPA Residential Regional Screening Level (RSL) (Hazard Quotient 1; Target Risk 10^{-5}), however, it is within the EPA Common Concentration Range for soils.
*	Source: U.S. EPA. 1983. Office of Solid Waste and Emergency Response, Hazardous Waste Land Treatment, SW874 . Page 273. April.
┼	Trivalent chromium values calculated as the difference between Total Chromium and Hexavalent Chromium.
DDC	Direct Contact Criteria
EGLE	Michigan Department of Environment, Great Lakes, and Energy
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity but the results may be biased low.
mg/kg	Milligrams per kilogram
NE	Not established
RSL	Regional Screening Level (November 2022)
U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 3
Wipes: Polychorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample ID	Sample Date	Outfall Pipe Description	Sub-Location Description	Sample Area (cm^2)	PCB Result (µg/100 cm^2)
				PCB Spill Cleanup Requirement (40 CFR 761.125) *:	10
SR-WP-OF01S-092821	09/28/21	12" Corrugated Aluminum	South portion of pipe invert	100	1.0 U
SR-WP-OF01C-092821	09/28/21		Center portion of pipe invert	100	1.0 U
SR-WP-OF01N-092821	09/28/21		North portion of pipe invert	100	1.0 U
SR-WP-OF02S-092821	09/28/21	12" Corrugated Aluminum	South portion of pipe invert	100	1.0 U
SR-WP-OF02C-092821	09/28/21		Center portion of pipe invert	100	1.0 U
SR-WP-OF02N-092821	09/28/21		North portion of pipe invert	100	1.0 U
SR-WP-OF03S-092821	09/28/21	12" Corrugated Aluminum	South portion of pipe invert	100	1.0 U
SR-WP-OF03C-092821	09/28/21		Center portion of pipe invert	100	1.0 U
SR-WP-OF03N-092821	09/28/21		North portion of pipe invert	100	1.0 U
SR-WP-OF04C-092821	09/28/21	4" Corrugated HDPE, Black	Center portion of pipe invert	100	1.0 U
SR-WP-OF06C-092821	09/28/21	4" Perforated PVC, White	Center portion of pipe invert	100	1.0 U
SR-WP-OF07S-092821	09/28/21	6" Solid PVC, White	South portion of pipe invert	100	1.0 U
SR-WP-OF07N-092821	09/28/21		North portion of pipe invert	100	1.0 U
SR-WP-OF10SW-092821	09/28/21	12" Corrugated Aluminum	Southwest portion of pipe invert	100	1.0 U
SR-WP-OF10C-092821	09/28/21		Center portion of pipe invert	100	1.0 U
SR-WP-OF10NE-092821	09/28/21		Northeast portion of pipe invert	100	1.0 U
SR-WP-OF11NW-092821	09/28/21	12" Corrugated Aluminum	Northwest portion of pipe invert	100	1.0 U
SR-WP-OF11C-092821	09/28/21		Center portion of pipe invert	100	1.0 U
SR-WP-OF11SE-092821	09/28/21		Southeast portion of pipe invert	100	1.0 U

Notes:

All concentrations are provided in micrograms per 100 cubic centimeter (µg/100 cm^2).

*	Requirement for PCB Spill Cleanup at nonrestricted location of low-contact, outdoor surfaces (40 CFR 761.125 [c][4][iv]).
µg/100 cm^2	Micrograms per 100 square centimeters
CFR	Code of Federal Regulations
cm^2	Square centimeter
HDPE	High-density polyeurothane
PVC	Polyvinyl chloride
U	The analyte was analyzed for, but was not detected at or above the associated value (reporting limit).

Table 4
Perimeter Air: Polychorinated Biphenyls (PCBs) Results
Shiawassee River Superfund Site Assessment
2440 W. Highland Road
Howell, Michigan

Sample ID	Tube Number	Time Details					Flow Rates			Sample Volume (L)	PCB Results ($\mu g/m^3$)
		Start Date	Start Time	End Date	End Time	Sample Period (min)	Initial (L/min)	Final (L/min)	Average (L/min)		
EPA Residential Regional Screening Level (RSL) for Ambient Air *:											**0.0490**
SR-PA-01-122121	91253	12/20/21	6:00	12/21/21	17:00	2,100	5.070	5.010	5.040	10,584	0.0047 U
SR-PA-02-122121	91253	12/20/21	6:05	12/21/21	17:05	2,100	5.050	5.000	5.025	10,553	0.0047 U
SR-PA-03-122121	79688	12/20/21	6:10	12/21/21	17:10	2,100	5.030	5.050	5.040	10,584	0.0047 U
SR-PA-06-122121 (Duplicate of PA-03)	79687	12/20/21	6:25	12/21/21	17:25	2,100	5.080	5.010	5.045	10,595	0.0047 U
SR-PA-04-122121	79688	12/20/21	6:15	12/21/21	17:15	2,100	5.130	5.010	5.070	10,647	0.0047 U
SR-PA-05-122121	79685	12/20/21	6:20	12/21/21	17:20	2,100	5.090	5.000	5.045	10,595	0.0047 U
SR-PA-FB-122121	79687	12/20/21	-	12/21/21	-	-	-	-	-	-	0.0046 U

Notes:

All concentrations are provided in micrograms per cubic meter ($\mu g/m^3$).

*	EPA Residential Air Regional Screening Level (Hazard Quotient 1; Target Risk 10^{-5}).
##	**Boldface** value indicates that the analyte was detected.
$\mu g/m^3$	Micrograms per cubic meter
L/min	Liters per minute
min	Minute
PCB	Polychlorinated biphenyl
RSL	Regional Screening Level (November 2022)
U	The analyte was analyzed for, but was not detected at or above the associated value (reporting limit).

APPENDIX D

LIVINGSTONDAILY.COM NEWSPAPER ADS

NATION & WORLD BRIEFS

FROM WIRE REPORTS

Biden approves Medal of Honor for helicopter pilot in Vietnam

WASHINGTON – As an Army first lieutenant and Cobra helicopter pilot during the Vietnam War, Larry Taylor flew hundreds of missions and saved countless lives. But no rescue flight was as daring, or as meaningful to Taylor, as the one for which he will receive the Medal of Honor from President Joe Biden.

President Joe Biden will recognize Taylor at a ceremony this week, the White House announced Friday.

Taylor was engaged by enemy fire at least 340 times and was forced down five times, according to the Army. He received scores of combat decorations, including the Silver Star, a Bronze Star and two Distinguished Flying Crosses.

Taylor left Vietnam in August 1968, a couple months after that flight. He was released from active duty in August 1970, having attained the rank of captain, and was discharged from the Army Reserve in October 1973.

Statue believed to depict Marcus Aurelius seized from museum

NEW YORK – A headless bronze statue believed to depict the Roman emperor and philosopher Marcus Aurelius was ordered seized from the Cleveland Museum of Art by New York authorities investigating antiquities looted from Turkey.

A warrant signed by a judge in Manhattan on Aug. 14 ordered the seizure of the statue, which the museum acquired in 1986.

The 76-inch statue dates from A.D. 180 to A.D. 200 and is worth $20 million, according to the district attorney's office.

Todd Mesek, a spokesperson for the museum, said it "takes provenance issues very seriously and reviews claims to objects in the collection carefully and responsibly."

Nobel Foundation retracts invites to Russia, Belarus, Iran

STOCKHOLM – The Nobel Foundation on Saturday retracted its invitation for representatives of Russia, Belarus and Iran to attend this year's Nobel Prize award ceremonies in December after the controversial decision "provoked strong reactions."

Several Swedish lawmakers said Friday they would boycott this year's Nobel Prize award ceremonies in the Swedish capital, Stockholm, after the private foundation that administers the prestigious awards changed its position from a year earlier and invited representatives of the three countries to attend.

The Nobel Foundation said earlier it had extended invitations to all countries with diplomatic missions in Sweden and Norway to the Dec.10 event since that "promotes opportunities to convey the important messages of the Nobel Prize to everyone."

FERPA

Continued from Page 1A

Aug. 29, and confirmed no wrongdoing had been found.

The statement from Allen Law Group received by The Daily from Hartland Consolidated Schools reads:

"On March 1, 2023, the Hartland Consolidated Schools District engaged the law firm of The Allen Law Group, PC, to conduct an independent fact-finding investigation and provide a legal opinion into complaints received from district parents alleging that you violated the Family Educational Rights and Privacy Act when your husband, Board Member Glenn Gogoleski, disclosed student information on a public podcast.

"Please allow this letter to serve as notice that ALG has completed its investigation, and based upon the evidence and witness statements, there was insufficient evidence to show that you violated FERPA."

Glenn Gogoleski made the comments on the podcast "This Is My Brain" on Feb. 19, where he was a guest.

He was joined by HCS Trustee Greg Keller, former school board candidate Robert Merwin and Larry Parsons, as well as host Jeremy Scott Gibbs.

During the podcast, Gogoleski mentioned his wife, Jeannine, works in one of the school offices. At one point, the group was discussing the need for board members to request access to enter school buildings. Gogoleski said he would test his theory in two weeks when his personal calendar opened up.

No wrongdoing was found on the part of Jeannie Gogoleski, an employee of Hartland Consolidated Schools, after an investigation into violations of the Family Education Rights and Privacy Act. LIVINGSTON DAILY FILE PHOTO

"I'm going to every school and I'm going to find out how far I can get in without an escort," he said.

He continued to say:

"The other things, too, what I want to do is spend a little bit of time just sitting in the offices. I will tell you, because my wife works in one of the school offices, there is so much that goes on that doesn't get reported, doesn't get watched. I want to see that. I want to see the kids that are the problems. I want to see the kids that come into the office and swear and throw things.

"Right now, when a kid has a meltdown in a class, you know what they do? They evacuate the rest of the class so that the child can be talked down from his little meltdown. They need three administrators to be there to secure the child, to bring him down to the office and when I say secure I'm not talking about grabbing them by the scruff of the neck, I'm talking about talking to him, getting him and coaxing him down to the office, things like that. It's sickening. This is why I could never ever, ever be a teacher because if I was I would be a news highlight reel. I really would."

Gogoleski has repeatedly claimed on social media he's been misquoted in regards to the podcast, which The Daily reviewed again for this article.

After the podcast aired, district parents contacted Superintendent Hughes with requests to have Jeannine Gogoleski investigated for violating FERPA. Hughes sent out a newsletter which outlined those concerns.

"The community reached out to me and other board members in large numbers stipulating a concern that personal information protected under the Family Educational Rights and Privacy Act has been provided to Mr. Gogoleski by a school employee," Hughes wrote. "Parents are concerned that people who have no right to know details about their children are now in possession of this information. I have committed to a complete and thorough investigation into this concern."

But Jeannine feels she was tried in the court of public opinion.

"I was guilty until proven innocent," she wrote in a statement to The Daily earlier this year.

Jeannine Gogoleski has been employed at HCS for 15 years. She's worked in food service, as a media paraprofessional and as a secretary.

"Each of these positions has allowed me to interact with every school in the district. Through the years I have bought kids lunches, snacks, prom dresses, tickets to school plays, etc. I have also mentored for Reaching Higher, flexing my schedule (making up the time), as most meetings are held during the day. I was told, 'You do not have to make up the time.' I always did, as mentors were needed."

In June 2022, Jeannine ran for a trustee seat on the Cromaine District Library Board.

"Interesting, that come August, I was of course being accused of wanting to ban books, get rid of books, etc. Very few people ever sent me any correspondence or asked why I was running. I have never wanted to ban books, ever. I believe freedom of choice and reading brings knowledge. I mean really, who wants to ban Captain Underpants or The Holy Bible?" Jeannine wrote to The Daily, expressing frustration that she hasn't been separated publicly from her husband.

"It seems with all the articles about me, I am always referred to as the wife of Glenn Gogoleski. It would be nice and very progressive of you and your reporting, to think of me not just as someone's wife, but as an independent woman with my own thoughts, opinions and feelings."

— Contact reporter Patricia Alvord at palvord@livingstondaily.com.

NOTICE OF PUBLIC HEARING HOWELL TOWNSHIP ZONING BOARD OF APPEALS 3525 BYRON ROAD, MI 48855, 517 546 2817

The Howell Township Zoning Board of Appeals will be holding the following Public Hearing on **Tuesday, September 19, 2023 at 6:30 p.m.** to consider the following request:

PETITIONER: Clarke Thompson, File# PZBA-2023-05, PARCEL #4706-16-400-022, 3200 Warner Road, Howell MI, 48855 (full legal description available upon request).
ARTICLE XIV – SUPPLEMENTAL REGULATIONS, SECTION 14.07 – ACCESSORY BUILDING PROVISIONS, ITEM B.
REQUEST: Applying for a Fifty Five (60) foot dimensional variance to allow for an accessory building to be located in front of the rear line of the house.
The Public is invited to submit written comments on the proposed request to the Zoning Administrator at inspector@howelltownshipmi.org or at Howell Township Hall, 3525 Byron Rd., Howell MI, 48855 any time prior to 5:00 p.m. on **Monday, September 18, 2023.**

Howell Township,
Zoning Board of Appeals Staff

LV-008791385

GENOA TOWNSHIP ZONING BOARD OF APPEALS SEPTEMBER 19, 2023 6:30 P.M.

The Genoa Township Zoning Board of Appeals will hold a public hearing on Tuesday, September 19, 2023 at Genoa Township Hall, 2911 Dorr Road, Brighton, MI, 48116 to review the following variance request:

1. 23-26…A request by Treasure Rousselo, 3520 Pineridge Lane, a waterfront yard setback variance, size variance and any other variance deemed necessary by the Zoning Board of Appeals to allow for a non-conforming deck to remain.
2. 23-27…A request by Tim Chouinard, 924 Sunrise Park, for a side and rear yard setback variance and any other variance deemed necessary by the Zoning Board of Appeals to construct a detached accessory structure.
3. 23-28…A request by Andrew Perri, 5311 Brighton Road, for setback variances and any other variance deemed necessary by the Zoning Board of Appeals to allow for outdoor commercial recreation at am existing commercial building.
4. 23-29…A request by Matt DeLapp/Faulkwood Shores Singh LLC, 300 S. Hughes, for a front yard setback variance and any other variance deemed necessary by the Zoning Board of Appeals to construct the new Faulkwood Shores Golf Course Clubhouse.
5. 23-30…A request by Ben Cross and Chris Bonk, 5680 Glen Echo Drive, for a height and setback variances and any other variance deemed necessary by the Zoning Board of Appeals to construct new retaining walls and a fence.

Please address any written comments to the Genoa Township Zoning Board of Appeals at 2911 Dorr Road, Brighton, MI 48116 or via email at amy@genoa.org. All materials relating to this request may be examined at the Township Hall during regular business hours.

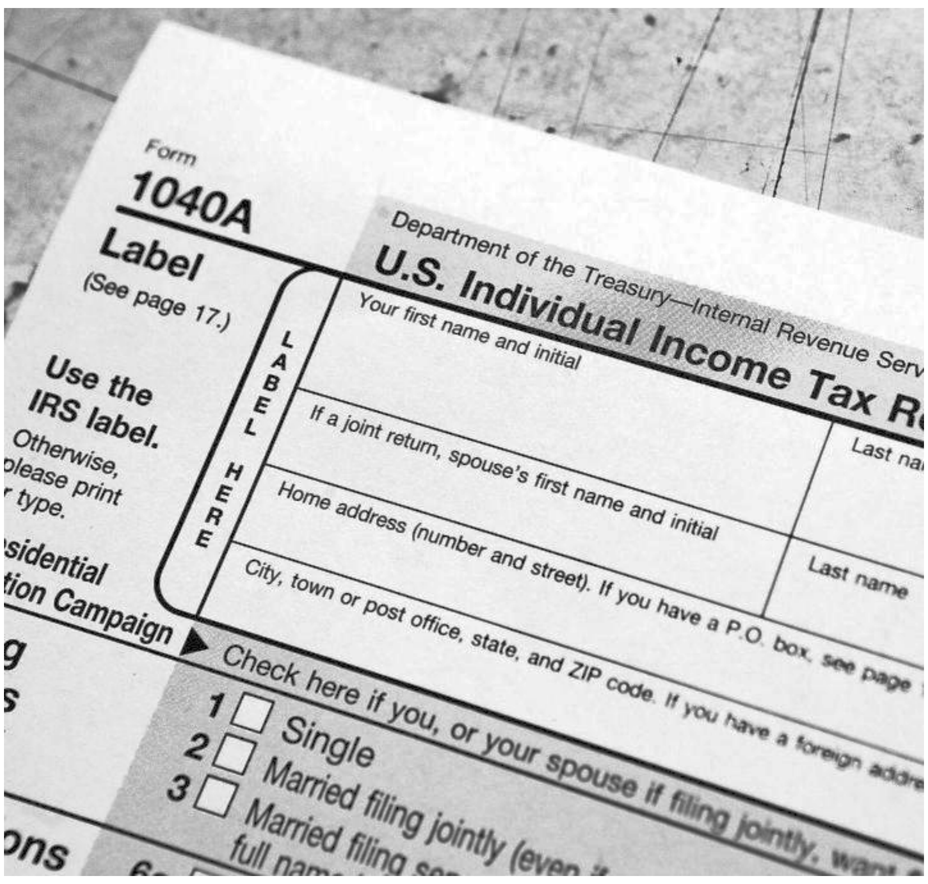
Genoa Township will provide necessary reasonable auxiliary aides and services to individuals with disabilities who are planning to attend. Please contact the Genoa Township Hall at (810) 227-5225 at least seven (7) days in advance of the meeting if you need assistance.

Published LCP: Sept. 3, 2023

LV-0008791376

Deadline day doesn't have to be taxing

Daniel de Visé
USA TODAY



The standard deduction for 2023 was $13,850 for individuals and $27,700 for married couples filing jointly. For 2024, it increased to $14,600 for individuals and $29,200 for married couples filing jointly. CHIP EAST/REUTERS FILE

Tax season 2024 is nearly over.

Many have already filed returns, but some people have put it off. Monday, however, is Tax Day. The deadline is always on April 15 unless that date falls on a weekend or holiday.

Here are answers to common questions that crop up during tax return preparation:

Does the IRS offer free tax preparation?

Yes. Select taxpayers in some states are able to prepare and file their 2023 federal income taxes online directly to the IRS through the Direct File pilot. And the IRS Free File program offers free filing to taxpayers with limited income.

The agency anticipated that hundreds of thousands of taxpayers, at least, will join the pilot program, which is available to individuals but not to businesses.

Initially, the pilot was available to eligible taxpayers in Arizona, California, Florida, Massachusetts, Nevada, New Hampshire, New York, South Dakota, Tennessee, Texas, Washington state and Wyoming.

What are the new income tax brackets?

Income tax brackets jumped by 7% for 2023. Income tax is progressive: The more a person earns, the more they pay as a percentage of their earnings. Each bracket represents a range of incomes subject to a particular income tax rate. Tax brackets rose again in 2024.

Here are the 2023 tax brackets:

For individual filers:

- 37% for incomes over $578,125.
- 35% for incomes over $231,250.
- 32% for incomes over $182,100.
- 24% for incomes over $95,375.
- 22% for incomes over $44,725.
- 12% for incomes over $11,000.
- 10% for income below $11,000.

For married couples filing jointly:

- 37% for income greater than $693,750.
- 35% for incomes over $462,500.
- 32% for incomes over $364,200.
- 24% for incomes over $190,750.
- 22% for incomes over $89,450.
- 12% for incomes over $22,000.
- 10% for income below $22,000.

Here is a look at how the tax brackets changed for 2024, which will be used when filing in 2025 for this year. For example, in the top individual tax bracket, the 2024 income threshold was raised from $578,126 to $609,351. This means that more than $30,000 in individual income will be taxed at 35% instead of 37%.

What is the new standard deduction?

The standard deduction for 2023 was $13,850 for individuals and $27,700 for married couples filing jointly. For 2024, it increased to $14,600 for individuals and $29,200 for married couples filing jointly.

People over 65 qualify for an additional standard deduction. For 2023, it's $1,850 if you are single or filing as a head of household and $1,500 for married taxpayers. For 2024, the figures rise to $1,950 and $1,550, respectively.

Have itemized deductions changed?

Itemized deductions "mostly remain the same" in 2023, according to Charles Schwab. A few specifics:

- **State and local taxes**: Taxpayers who itemize may deduct up to $10,000 in property, sales or income taxes they have already paid to local or state governments.
- **Mortgage interest**: Taxpayers can generally deduct interest paid on the first $750,000 of mortgage debt, according to NerdWallet. People who bought a house before Dec. 16, 2017, may deduct interest on the first $1 million.
- **Medical expenses**: Only medical and dental expenses that exceed 7.5% of one's adjusted gross income can be deducted.

What is the Social Security tax limit for 2024?

There's a limit to how much of a person's earnings are taxed by the Social Security Administration, at a rate of 6.2%. (Self-employed workers pay 12.4%.)

In 2023, wages beyond $160,200 were not taxed for Social Security. In 2024, the limit rose to $168,600.

When a person reaches the Social Security tax limit, they get to keep that much more of their earnings.

What are the new IRA and 401(k) contribution limits?

Employees who participate in company retirement plans could generally contribute $22,500 to their 401(k) in 2023, up from $20,500 in 2022.

Those who didn't participate in an employer-sponsored plan could contribute $6,500 to an individual retirement account (IRA).

People 50 and older have higher limits.

For 2024, the limits rise to $23,000 and $7,000.

What about health savings account limits, child tax credits?

HSA contribution limits were $3,850 for individual coverage and $7,750 for family coverage in 2023, according to Fidelity. In 2024, they rise to $4,150 and $8,300.

The 2023 child tax credit is worth up to $2,000 per qualifying dependent under age 17, according to NerdWallet. The income limit remains the same in 2024. The credit decreases if a filer's modified adjusted gross income exceeds $200,000, or $400,000 for a married couple filing jointly.

Where can I find a tax refund estimator?

TurboTax, H&R Block, NerdWallet and AARP all offer tax refund estimators.

Those receiving a refund can expect it a month or less after filing, in most cases.

The IRS says it issues most refunds within 21 calendar days. Paper returns, however, can take four weeks or more. Allow time for the refund check to reach your bank account or mailbox.

APPENDIX E

EXCERPT OF THE DRAFT *2020-2021 BASLEINE SAMPLING DATA REPORT*
PREPARED BY CTI AND ASSOCIATES, INC. AND ARCADIS U.S., INC.
DATED FEBRUARY 2024

2020-2021 BASELINE SAMPLING DATA REPORT

SHIAWASSEE RIVER SUPERFUND SITE
HOWELL, MICHIGAN
USEPA ID: MID980794473

FEBRUARY 2024

Submitted to:

United States Environmental Protection Agency,
Region V
77 West Jackson Boulevard, SR-6J
Chicago, IL 60604-3590

Prepared by:

CTI and Associates, Inc.
28001 Cabot Drive; Suite 250
Novi, MI 48377

and

Arcadis U.S., Inc.
28550 Cabot Drive; Suite 500
Novi, MI 48377

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LIST OF ACRONYMS AND ABBREVIATIONS

2020 FSP	2020 LTMP Baseline Sampling Event Field Sampling Plan
°C	degrees Celsius
%	percent
Arcadis	Arcadis U.S., Inc.
BAL	blank action limit
CF	correction factor
CFC	Cast Forge Company
C_{free}	freely dissolved polychlorinated biphenyl concentrations
cfs	cubic feet per second
COC	chain-of-custody
CTI	CTI and Associates, Inc.
cy	cubic yard
EDD	electronic data deliverable
EMPC	estimated maximum possible concentration
Eurofins	Eurofins Environment Testing in Knoxville, Tennessee
ft	feet or foot
ft/s	feet per second
FYR	Five-Year Review
HCA	hierarchical clustering analysis
k_e	elimination rate value
ISM	incremental sampling methodology
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDPE	low-density polyethylene
LiDAR	Light Detection and Ranging
LTM	long-term monitoring
LTMP	Long-Term Monitoring Plan
M-59	Michigan State Highway M-59
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
mg/day	milligram per day
mg/day-ft	milligram per day per foot
mg/kg	milligram per kilogram

mg/kg-lipid	milligram per kilogram lipid
mg/kg-OC	milligram per kilogram organic carbon
mg/L	milligrams per liter
MNR	monitored natural recovery
MS	matrix spike
mS/cm	microSiemens per centimeter
MSD	matrix spike duplicate
ng/L	nanogram per liter
NTU	Nephelometric Turbidity Units
Pace	Pace Analytical Services, LLC
PC	principal component
PCA	principal component analysis
PCB	polychlorinated biphenyl
PCB-4	2,2'-dichlorobiphenyl
PRC	performance reference compound
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
Report	2020-2021 Baseline Sampling Data Report
RL	Reporting Limit
ROD	Record of Decision
RPD	relative percent difference
RS	River Station
SDG	sample delivery group
Site	Shiawassee River Superfund Site (MID980794473), Howell, Michigan
SOP	Standard Operating Procedure
SWAC	surface weighted average concentration
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
Warzyn	Warzyn, Inc. of Novi, Michigan

EXECUTIVE SUMMARY

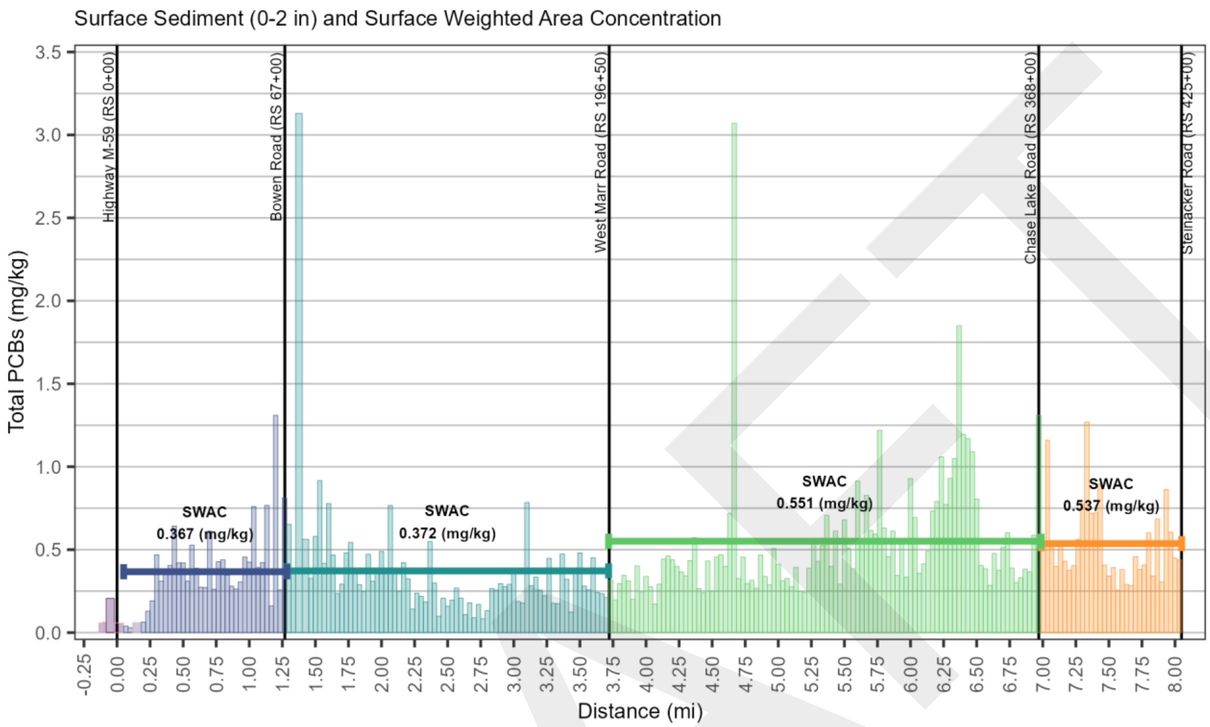
This 2020-2021 Baseline Sampling Data Report (Report) summarizes the baseline sampling results for the Shiawassee River Superfund Site (MID980794473) located approximately 2 miles northwest of the City of Howell in Livingston County, Michigan (the Site; **Figure 1-1**). The Shiawassee River Superfund Site includes the former Cast Forge Company (CFC) facility (now called Hayes Lemmerz International) in Howell, Michigan, and approximately 8 miles of the Shiawassee River downstream to the Steinacker Road crossing. The baseline sampling was completed to provide information that will assist in the development of a long-term monitoring plan (LTMP) and to support evaluation of monitored natural recovery (MNR) at the Site under the Five-Year Review process (CTI and Associates, Inc. [CTI] and Arcadis U.S., Inc. [Arcadis], 2020). A separate report will be prepared to present an evaluation of MNR at the Site.

The baseline sampling was completed at the Site between Michigan State Highway 59 (M-59) and Steinacker Road and upstream of M-59 (i.e., upstream area), in accordance with the 2020 LTMP Baseline Sampling Event Field Sampling Plan (CTI and Arcadis, 2020) and included collection of the following:

- Time-averaged surface water samples at 12 locations using SP3™ samplers;
- Two rounds of discrete (grab) surface water samples from the 12 SP3™ sampler locations;
- Fish samples from five sample locations (11 fish samples at each location); and
- Composite sediment samples from surface (0 to 2 inches) and subsurface (2 to 6 inches) intervals at 243 transects.

The data presented in this Report establish a baseline measurement of polychlorinated biphenyl (PCB) concentrations at the Site in surface water, fish, and sediment, and provide insight into current Site conditions relative to available historical data. Average baseline surface sediment (0 to 2 inch) total PCB Aroclor concentrations were less than 1 milligram per kilogram (mg/kg), with only 13 of 239 (5 percent [%]) of surface samples greater than 1 mg/kg (**Figure ES-1**). Total PCB Aroclor surface weighted average concentrations (SWACs) in surface sediment were below 1 mg/kg across the entire baseline sampling area, ranging from 0.37 to 0.55 mg/kg in individual reaches (excluding the upstream area). When the baseline sediment data were examined on a length-weighted basis for comparison to the historical 0- to 6-inch sampling interval, SWAC values in River Mile 1 (i.e., the first mile of the Site) were of similar magnitude to the composite sample concentrations measured in 2013 (2015; 1.05 mg/kg and 1.02 mg/kg, respectively). In each of River Miles 2 through 8, length-weighted baseline SWAC values for the 0- to 6-inch interval were all lower than those measured in 2013 (2015). Baseline white sucker fish tissue spatial patterns were consistent with spatial patterns in baseline surface sediment concentrations, with relatively low results upstream of the Site, highest results at the Bowen Road sampling location, and a subsequent decrease in the downstream direction. The highest white sucker total PCB congener fish tissue concentrations observed in this baseline dataset were also noted at Bowen Road within River Mile 2, which had the highest level of total Aroclor PCBs detected in a 2021 surface sediment sample from 0 to 2 inches (**Figure ES-1**).

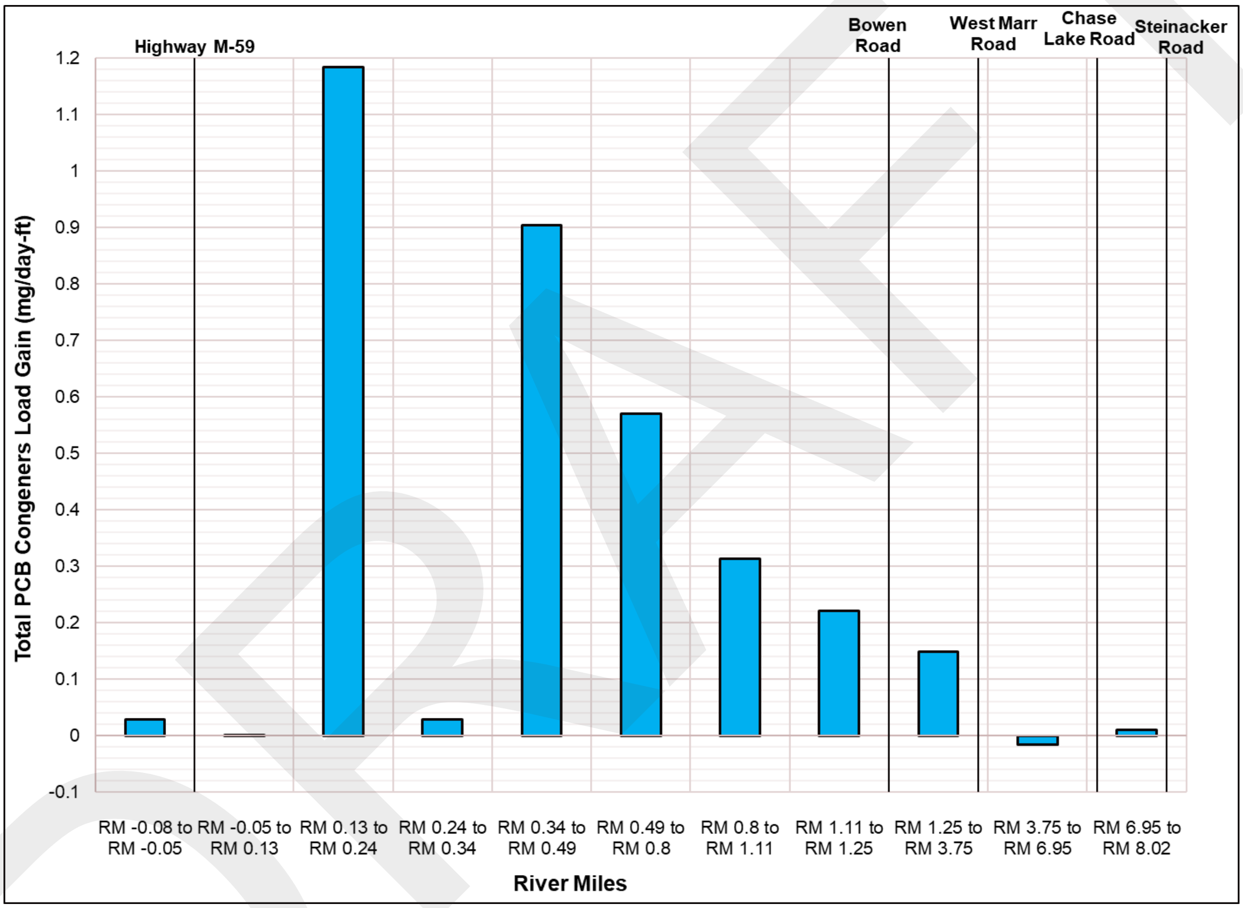
Figure ES-1: Sediment Surface Weighted Area Concentration (SWAC) Total PCBs



Notes:
in = inch
mi = mile

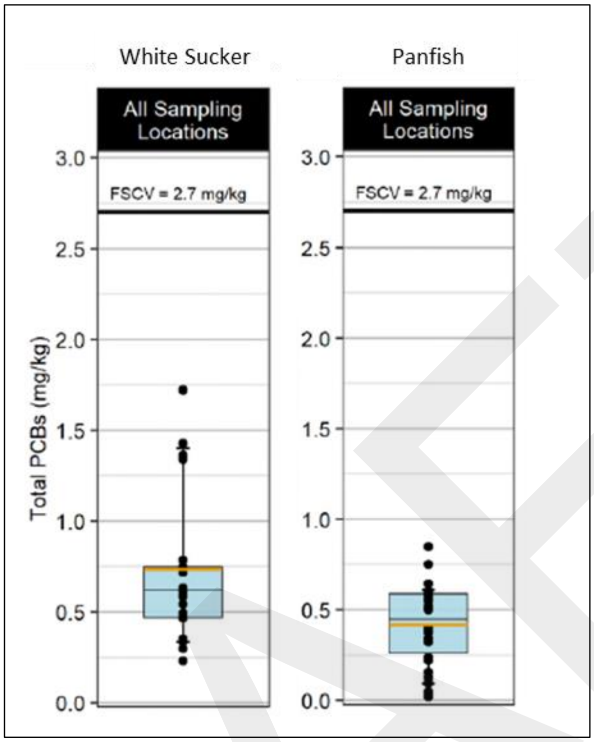
Discrete surface water baseline sample results exhibited increases in total PCB congener concentrations from the upstream to downstream direction between M-59 and Bowen Road, with concentrations subsequently decreasing in the downstream direction. The load gain analysis of freely dissolved PCB concentrations (C_{free}) was consistent with a historical source of PCB contributions to the water column between M-59 and Bowen Road and could be indicative of adjacent land-disturbing activities. The load gain analysis shows that PCB contributions to surface water decrease downstream of Bowen Road (**Figure ES-2**). Spatial patterns in total PCB congener panfish tissue seem to reflect the spatial trends noted for C_{free}, with an increase in PCB concentrations from the upstream of M-59 (ISM-29) to downstream, peaking at West Marr Road, then beginning to decrease moving farther downstream. This is consistent with the primary route of exposure for panfish, which typically occurs either through direct contact with surface water or through their consumption as part of the aquatic food chain in the same water body (Gobas et al., 1999). Multiple factors affect fish bioaccumulation of PCBs and impart variability in observed fish tissue concentrations; however, maximum concentrations of wet-weight total PCB congeners measured in both white sucker and panfish skin-on fillet samples during the baseline sampling were below the fish consumption screening value for the “Do Not Eat” meal category (2.7 mg/kg; Michigan Department of Community Health, 2016) (**Figure ES-3**). The PCB composition across homologue groups in surface water and fish tissue samples was examined through multivariate analysis, including Principal Component Analysis (PCA) and cluster analysis. In surface water samples, the PCB composition demonstrated a transition from less chlorinated congeners to higher chlorinated congeners adjacent to the former CFC facility, potentially reflecting a greater portion of weathered versus un-weathered PCBs entering the water column or potentially a differences in PCB sources to the river. In fish tissue samples, there is a noticeable difference between the ISM-29 samples and those at downstream sampling locations, suggesting that fish caught at ISM-29, upstream of M-59, may be exposed to a different source of PCBs compared to fish in the sampling locations downstream of M-59. Additionally, while the difference in PCB analysis methods precludes more rigorous statistical comparison, 2021 PCB congener concentrations results were lower than those observed historically (pre-2017) for similar fish species and sampling locations.

Figure ES-2: Total PCB Load Gain by River Mile



Notes:
mg/day-ft = milligrams per day per foot
RM = river mile

Figure ES-3: Total PCB Congeners in 2021 Fish Samples



Note:
FSCV = Fish Consumption Screening Value for "Do Not Eat" Meal Category (Michigan Department of Community Health, 2016)[1]

Data generated from this sampling effort will be used for comparison to long-term monitoring data to evaluate the ongoing status of MNR at the Site. This baseline dataset supplements existing Site data in biotic and abiotic matrices and will be used to develop the LTMP for the Site.

[1] The comparison to FSCV is presented as a line of evidence to demonstrate progress toward reducing risks to fish consumers. Any revisions to the consumption advisories will be subject to further sampling and data review by the State of Michigan.

1.0 INTRODUCTION

CTI and Associates, Inc. (CTI) and Arcadis U.S., Inc. (Arcadis) prepared this 2020-2021 Baseline Sampling Data Report (Report) on behalf of Adient, LLC to present the results of sampling for polychlorinated biphenyls (PCBs) in fish tissue, water, and sediment conducted at the Shiawassee River Superfund Site (MID980794473) located in Howell, Michigan (the Site). The Shiawassee River Superfund Site includes the former Cast Forge Company (CFC) facility (now called Hayes Lemmerz International) in Howell, Michigan, and approximately 8 miles of the Shiawassee River downstream to the Steinacker Road crossing.

Prior to the Site being listed on the National Priority List in 1983, response actions were initiated at the Site to address discharges of process cooling water to the river from the CFC facility. Initial response actions began in 1976 after the Michigan Department of Natural Resources (MDNR) identified the CFC facility as the primary source of PCB contamination in the South Branch of the Shiawassee River. Response actions included modifying the facility wastewater system in 1977 to eliminate use of a settling tank and constructing an unlined overflow ditch and an overflow lagoon. In 1981, the Michigan Attorney General and CFC executed a Consent Judgement with the following actions:

- Re-route the existing storm drain north of the plant building;
- Install soil erosion protection (a berm);
- Remove PCB-contaminated muck from the discharge area west of the plant and from the river;
- Remove the lined lagoon, including standing water, sediments, and the plastic liner;
- Remove contaminated soil from the flatlands area;
- Properly transport and dispose of all contaminated material at an off-site facility.

Subsequent remedial actions were conducted under the direction of the Michigan Department of Environment, Great Lakes, and Energy (formerly the Michigan Department of Environmental Quality [MDEQ] and MDNR) in 1981 and 1982, which included the removal of an estimated 2,531 pounds of PCBs in 1,805 cubic yards (cy) of river sediment, primarily in the section of the river between the former CFC facility and Bowen Road. Additional remedial actions were completed by ENTACT, LLC in 2004 and 2005, which included excavation and disposal of 364 cy of PCB-contaminated sediments and soils from the Site, its adjacent floodplain, and the river.

1.1 Site Location

The Site is located approximately 2 miles northwest of the City of Howell in Livingston County, Michigan (**Figure 1-1**). As defined in the 2001 Record of Decision (ROD; United States Environmental Protection Agency [USEPA] 2001b), the Site includes the 52.42-acre property located at 2440 West Highland Road (Michigan State Highway 59 [M-59]), in Howell, Livingston County, Michigan, and approximately 8 miles of the Shiawassee River downstream to Steinacker Road. The property is currently owned by Mr. Vern Brockway of Lucy Road Resources, LLC, which engages in tire sales and repair and landscape supply. The property consists of the main facility building and several open parking and equipment storage areas. The property is bordered on the north and east by wetlands, to the south by M-59, and to the west by the South Branch of the Shiawassee River, which is the focus of this Report. The surrounding areas are mixed land uses, including farming, light industrial operations, residential properties, and undeveloped forests and fields.

1.2 Site Description

As described in the 2020 Long-Term Monitoring Plan (LTMP) Baseline Sampling Event Field Sampling Plan (2020 FSP; CTI and Arcadis, 2020), the regional topography slopes gently northward with occasional low discontinuous hills and low-lying, glacially derived kettle lakes and lowlands. The average area ground surface elevation is approximately 900 feet (ft) above mean sea level. The Site is underlain by unconsolidated glacial till consisting of predominantly clays and silts with interspersed sand units. River and floodplain soils are underlain by more recent alluvial deposits and Carlisle muck soils (Warzyn, Inc. of Novi, Michigan [Warzyn], 1992).

The Shiawassee River is 20 to 45 ft in width, with a reported average width of 25 ft during normal stream flows. River flow is to the north and eventually flows into Lake Huron. Portions of the river downstream of the former CFC facility have been historically channelized and straightened presumably for the purposes of flood control. The depth of water under summer low flow conditions is 1 to 2 ft, with thalweg (the deepest part of the channel with most flow) depths of up to 5 ft along the outer edge of river bends. The floodplain is heavily vegetated with interspersed woodland and marshy areas. Land use adjacent to the Shiawassee River is predominantly agricultural or undeveloped.

On April 21, 2011, a Light Detection and Ranging (LiDAR) survey was conducted to establish a new base map for the Site. The data was used to generate topographic contours from M-59 to north of Lovejoy Road on either side of the Shiawassee River. These data were used to establish stationing along the river center line and generate a hydraulic profile of Shiawassee River stage at the time of the survey. A hydraulic profile based on the 2011 LiDAR survey is presented on Figure 4 of the 2020 FSP (CTI and Arcadis, 2020). Based on this profile, four major transitions in surface water slope were identified and are used as the basis to characterize the river into four reaches, beyond what was observed during the 1992 remedial investigation (Warzyn, 1992).

- Reach 1 has a slope of about 4.8 ft per mile in the first 3.75 miles between M-59 and West Marr Road. Under the flow conditions at the time of the survey, water levels were minimally affected by the Bowen Road culvert. Under high flow, the culvert restricts flow and water noticeably backs up behind the culvert. Field observations during the sampling event in 2013 in this portion of the river indicated shallow water flow with sandy bottom and finer grained deposits in the meanders and upstream/downstream of the Bowen Road Crossing. Fine silt and sand mixtures were noted for the remaining portions of this section of the river.
- Reach 2 has a slope of about 2.1 ft per mile downstream of West Marr Road to a point about midway between West Marr Road and Chase Lake Road (3.75 miles downstream of M-59 to 6.25 miles downstream). Field observations during the sampling event in 2013 in this portion of

the river indicated fine silt and sand mixtures for this section of the river. The water depth was 1.0 to 1.5 ft throughout this portion of the river.

- Reach 3 has a slope of about 1.1 ft per mile from the midway point between West Marr Road and Chase Lake Road to just downstream of Chase Lake Road (6.25 miles downstream of M-59 to 7.25 miles downstream). Field observations during the sampling event in 2013 in this portion of the river indicated slow moving water and fine sediment high organic content. No conveyance of sand was observed under conditions during the sample event. The depth of water was observed to be 24 inches or less in this portion of the river. The Chase Lake Road Bridge has backwater areas upstream and downstream on both sides of the river, allowing for accumulation of fine sediments.
- Reach 4 has a slope of about 1.6 ft per mile from downstream of Chase Lake Road to just beyond Steinacker Road (7.25 miles downstream of M-59 to 8.25 miles downstream). Field observations during the sampling event in 2013 in this portion of the river indicated fine silt and sand mixtures. The water depth observed was 1.0 to 1.5 ft throughout this portion of the river. Backwater areas exist upstream and downstream of the Steinacker Road Bridge, similar to that described at Chase Lake Bridge, allowing for accumulation of fine sediments.

The 8-mile segment of the river where sampling has occurred is bordered by forested floodplains, rural areas, residential areas, and wetlands. Additional information on the Site can be found in the ROD (USEPA, 2001b).

1.3 ROD Summary and Implementation Status

This Report was prepared in support of the ROD issued by USEPA on September 28, 2001, and the Third Five-Year Review (FYR) for the Site completed on August 22, 2019. The remedy outlined in the ROD included remediating sediment for the first mile (River Mile 1) and remediating one additional area of sediment in the second mile to achieve a 5 milligram per kilogram (mg/kg) preliminary remediation goal for PCBs in the river sediment, followed by monitored natural recovery (MNR) of PCB levels in the river. The goal was to reach an approximate average PCB concentration of approximately 1 mg/kg of PCBs in the sediment immediately after active remediation. ROD implementation is ongoing under the FYR process, including monitoring to evaluate long-term changes in PCB concentrations, as detailed below.

1.4 Five-Year Review Process

The FYR process for this Site includes community notification/involvement, site interviews, monitoring, data review, and site inspection. The most recent FYR was conducted in 2019 (USEPA, 2019). Previous FYRs were conducted in 2009 and 2014. A public notice was made available in the Livingston County Daily Press & Argus on November 4, 2018. The notice stated that a FYR was being conducted and invited the public to submit comments to the USEPA. The results of the review and report are available at the Site information repository located at the Howell Carnegie District Library at 314 West Grand River, Howell, Michigan.

The 2019 FYR report (USEPA, 2019) indicated four issues concerning the Site:

- A LTMP had not yet been prepared to evaluate the progress of MNR at the Site.
- An operations and maintenance plan had not yet been prepared for the Site to ensure the effectiveness of existing institutional controls.
- Existing institutional controls from 2010 may no longer address all areas with remaining contamination due to activities at the former CFC property by the current owner(s).
- A current data evaluation is necessary to evaluate the status of MNR.

To address these issues, the 2019 FYR recommended: preparing and implementing a LTMP to evaluate the progress of MNR and determine whether additional response actions are necessary to meet the long-term cleanup goals established in the ROD; preparing an operations and maintenance plan; evaluating the effectiveness of existing institutional controls; and conducting a baseline sampling event to evaluate PCB concentrations in surface water, sediment, and fish.

1.5 Baseline Sampling Program Overview

The baseline sampling program described in the 2020 FSP (CTI and Arcadis, 2020) was intended to address two of the four issues identified in the 2019 FYR (USEPA, 2019), evaluate the status of MNR at the Site, and provide information to assist the development of the LTMP. Baseline data would also be used for comparison to long-term monitoring (LTM) data to evaluate the ongoing status of MNR at the Site and to determine whether any additional action may be necessary to achieve long-term cleanup goals established in the ROD. Results of the baseline sampling event are summarized herein, and will:

- Provide and/or supplement baseline PCB concentrations in various Site media;
- Provide data and information for the development of an LTMP for the Site; and
- Provide information for USEPA's next FYR.

The remainder of this Report summarizes the baseline sampling program, including field data collected in 2020 and 2021, laboratory analytical data, and the results of data validation performed to confirm that data of known and documented quality are used for the project.

2.0 SUMMARY OF FIELD SAMPLING ACTIVITIES

2.1 Surface Water Sampling Program

Surface water sampling was conducted by CTI and ARCADIS between September and November 2020. PCB concentrations in river surface water were measured in both time-averaged samples, using SP3™ samplers, and discrete (grab) samples. Pursuant to the 2020 FSP (CTI and Arcadis, 2020), collection of surface water samples was timed with rainfall events so that samples were collected at least 3 days after a rainfall event greater than 0.25 inch, and at least 2 weeks after a rainfall event greater than 1 inch. **Table 2-1** summarizes precipitation data for the September 1, 2020, through November 8, 2021, timeframe.

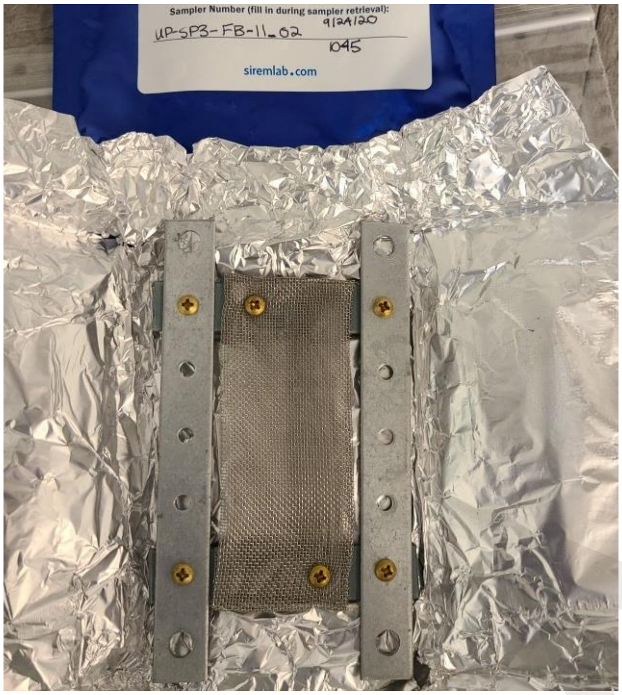
Surface water samples were collected at 12 locations along the river (see **Figure 2-1**). Prior to collecting the first discrete surface water samples and deploying the SP3™ samplers, water quality parameters were measured using a YSI water quality meter at each location. These parameters included water temperature, pH, specific conductivity, turbidity, and dissolved oxygen (**Table 4-1**). At each sample location, an average flow velocity was measured over 40 seconds using a FlowTracker2® meter (**Table 2-2**). Additionally, the approximate channel width, ordinary high-water mark, and maximum water depth were measured at each sample location (**Table 2-2**) and recorded in a field logbook. Field notes are included in **Appendix A**.

Prior to deployment of SP3 ™ samplers at each of the 12 sample locations, field-filtered discrete surface water samples were collected. The discrete surface water samples were collected on September 22, 23, and 24, 2020, from the center of the channel at mid-depth and field-filtered through a 0.45-micron filter. Seven samples were collected between M-59 and Bowen Road (BR-04 through BR-10), one at West Marr Road bridge (MR-03), one at the Chase Lake Road bridge (CL-02), one at the Steinaker Road bridge (SR-01), and two "upstream" locations. The "upstream" samples (UP-11 and UP-12) were collected from the south side of the West Highland Road bridge, upstream of the former CFC facility. This September 2020 sampling is referred to as Round 1 sampling event in this Report.

SP3™ samplers were constructed by SiREM and consisted of a 13-micrometer-thick low-density polyethylene (LDPE) sheet (approximately 4x10 centimeters). The LDPE sheet was housed in a pre-cleaned mesh envelope and attached to a stainless-steel support frame, as shown in Photograph 1 below. Each sampler was spiked with performance reference compounds (PRCs) consisting of 10 non-native PCB congeners (PCB-14, PCB-36, PCB-78, PCB-104, PCB-121, PCB-142, PCB-155, PCB-184, PCB-192, and PCB-204) to estimate the extent of disequilibria between the primary PCBs associated with the passive sampler and the rest of the environmental phases during deployment. These 10 PRCs were selected because they are typically not found in commercial Aroclor mixtures and, therefore, would not interfere with PCB measurements in the SP3™ samplers. The PRC correction approach to obtain the freely dissolved PCB concentrations (C_{free})[2] is discussed in detail in Section 4.2 of this Report. Prior to shipment, each sampler was placed in an opaque re-sealable mylar bag (pre-cleaned at the laboratory), which was then placed in a

[2] C_{free} is defined as steady-state, free phase PCB congener concentrations in surface water.

clear Ziploc bag along with a unique sample label. During shipping and storage, necessary precautions were taken to ensure that samplers were stored at 4 degrees Celsius (°C) and away from light.



Photograph 1. SP3™ Sampler
Location: UP-SP3-FB-11_02

Photograph 2. Deployed SP3™ Sampler
Location: BR-SP3-05

SP3™ samplers were installed at each of the 12 sampling locations in an upstream to downstream direction (from south [UP-SP3-12] to north [SR-SP3-01]) on September 24, 2020. SP3™ samplers were placed at the thalweg to allow the device to remain completely submerged over the period of deployment. During SP3™ deployment, each sampler was removed from the opaque re-sealable bag and the support frame was fastened to a metal stake. The metal stake was driven into the sediment using a hand sledge to secure the sampler in the river's thalweg. Photograph 2 above shows the SP3™ sampler deployed at sample location BR-SP3-05. The opaque bag was retained for re-use following the sampler retrieval. Sampler deployment was completed in accordance with the LDPE Sampling Standard Operating Procedure (SOP) (CTI and Arcadis, 2020). The samplers were deployed for approximately 44 to 45 days.

On November 7 and 8, 2020, a second round of field-filtered discrete surface water samples was collected prior to the retrieval of the SP3™ samplers and is referred to as Round 2 sampling event is this Report. The discrete sample was collected immediately downstream of the SP3™ sampler (within a foot) deployed at that location to minimize potential sediment resuspension. Following surface water sampling, the SP3™ sampler was retrieved from the sample location. The SP3™ sampler was detached from the metal stake and carefully removed from the water column. Excess debris, if present (typically leaves or sticks), was removed from the sampler by hand, followed by a quick rinse using river water. The sampler was patted dry using a paper towel, wrapped in aluminum foil, and placed in an opaque re-sealable bag. The sampler was then packed into another re-sealable plastic bag and packaged in a cooler with ice packs. All SP3™ samplers were sent to Eurofins Environment Testing in Knoxville, Tennessee (Eurofins) and all surface water grab samples were sent to Pace Analytical Services, LLC (Pace) in Minneapolis, Minnesota for laboratory analysis of PCB congeners. SP3™ samplers were retrieved from downstream to upstream (i.e., from north [SR-SP3-01] to south [UP-SP3-12]). **Table 2-3** summarizes SP3™ deployment and retrieval dates, times, and duration for each sample location. A total of 12 SP3™ samples (and three SP3™ field blanks) and 24 discrete samples were collected along with four field duplicate samples, two matrix spike (MS) and matrix spike duplicate (MSD) samples, and four equipment blanks (see **Exhibit 2-1**).

2.2 Fish Sampling

Fish tissue sampling was conducted in May 2021 per the 2020 FSP (CTI and Arcadis, 2020). Fish were collected from five previously sampled locations to meet the size class requirements outlined in the 2020 FSP (CTI and Arcadis, 2020): Bowen Road, West Marr Road, Chase Lake Road, ISM-MI-27, and ISM-29 (see **Figure 2-2**). The size classes targeted were consistent with the requirements included in Attachment 4 of Fish Contaminant Monitoring Program – Fish Collection Procedures (MDEQ 2014). If target sizes could not be achieved, the largest size available was collected.

Electrofishing was completed with backpack electrofishing units. The field crew placed a block net at the upstream end of the transect they were sampling, when necessary. The field crew used two backpack electrofishing units to complete one pass going upstream in the 800-ft extent, from the downstream boundary to the upstream boundary of the sampling location. Fish were stunned by the backpack units and/or placed in holding nets, coolers, and buckets until community composition data could be collected.

Prior to collecting the fish sample, a fish community survey was conducted based generally on the Great Lakes and Environmental Assessment Section Procedure #51, MDEQ Manual of Fisheries Survey Methods II (MDEQ 1997). Field observations/data were recorded including fish sizes (in 1-inch or 2.5-centimeter increments), species, and counts of fish collected. Eleven fish were collected at each of the five sampling locations for laboratory submittal. The target size classes specified in the 2020 FSP (CTI and Arcadis, 2020) were not met for all the samples, as further described in Section 5. Therefore, in accordance with the 2020 FSP (CTI and Arcadis, 2020), similar-sized fish of each species were collected, to the extent possible, from each location to reduce potential variability associated with fish size and age.

Fish were measured, weighed, and inspected for external anomalies, then placed in sealable plastic bags in a cooler with ice prior to shipment to the laboratory. At the laboratory, fish were scaled and then filleted to include the skin and all flesh from the back of the head to the tail and from the top of the back down to the belly flap area. All fins, tails, heads, viscera, and major bones were removed. A total of 55 fish were submitted to two Pace laboratories for analysis of PCB congeners (Minneapolis, Minnesota) and lipid concentrations (Green Bay, Wisconsin) in fillets; see **Exhibit 2-1**.

2.3 Sediment Sampling

Sediment sampling was conducted from July 12 to August 27, 2021. Sediment cores were collected from approximately 30 evenly spaced transects per mile (240 transects total), resulting in approximately

486 composite sediment samples (**Figures 2-3a through 2-3f**). Four background sampling transects were located upstream of the former CFC facility (three south of M-59 and one north of M-59 adjacent to the Site), resulting in eight additional composite samples (see **Exhibit 2-1**). In areas where the river is braided, transects were sited in the widest branch of the stream. Before sediment sampling commenced, a survey was conducted, and endpoints of each transect location were marked (**Figures 2-3a through 2-3f**).

Sediment sample collection began at the downstream end of the Site and progressed upstream to eliminate the potential for disturbance of sediments and subsequent localized transport to downstream sampling locations. Sediment samples were collected in accordance with the SOP for Sediment Push-Core Collection (CTI and Arcadis, 2020) using hand-pushed Lexan tubes. During the core extraction process, field personnel recorded the transect locations, times of core retrievals, water depths, penetration depths, field recovery depths, and probe depths.

Each sediment transect sample was composed of five subsamples spaced evenly across the stream channel, combined into one composite sample each for the 0- to 2-inch and 2- to 6-inch intervals. The 0- to 2-inch interval was selected to determine the PCB concentrations in the surface sediment interval tied most closely to fish tissue concentrations, and the 2- to 6-inch interval was selected to support comparison to prior samples collected at the Site via 0- to 6-inch length-weighted comparisons. In the event of refusal at a subsample location, the subsample was moved slightly (an inch or so) upstream so that the even distribution of samples in a transect was maintained.

The retrieved sediment cores were transported from the river to the sediment processing station. The processing team photographed each core, documenting the inner and outer views. Additionally, the processing team measured for each core the core recovery, interval depth, primary component, secondary or minor components, plasticity, dilatancy, angularity, sorting, moisture content, and consistency, and recorded the Munsell color, United States Geological Survey classification, and the presence or absence of sheens. All photographs and data collected in the project master files were uploaded to the central Microsoft SharePoint site as described in Section 2.6.

For each sediment subsample location, one 0- to 2-inch sample and one 2- to 6-inch sample were collected. The sampling intervals were then composited across the transect, resulting in one composite sample from the 0- to 2-inch interval and one composite sample from the 2- to 6-inch interval at each transect. The chain-of-custody (COC) was maintained and frequently checked for completeness and correctness by the Processing Team Leader as cores were sampled and stored in coolers on ice for shipment. Transect composite samples were packed and shipped to Pace in Green Bay, Wisconsin and analyzed for PCB Aroclors and total organic carbon (TOC).

2.4 Field Deviations

Deviations occurred during the field event. Sampling locations BG-2, T-200, and T-32 were relocated approximately 50 ft to the north to maintain a 50-ft upstream distance from a utility line at Chase Lake Road bridge.

Delivery of two sample coolers containing sediment samples was delayed by FedEx, resulting in the exceedance of the preservation criteria of 6ºC. One cooler containing samples collected on July 28 and 29, 2021, was delivered to the laboratory on August 2, 2021, at a temperature of 19ºC. Another cooler containing samples collected on August 11, 2021, was delivered to the laboratory on August 18, 2021, at a temperature of 21.5ºC. As discussed in Section 3.1.3, these results were deemed usable.

2.5 Sampling Summary

Exhibit 2-1 summarizes the field quality control (QC) sample program and identifies the sample matrices, analytical programs, and the numbers, types, and frequencies of field QC samples collected.

Exhibit 2-1: Field Sampling Summary

Matrix	Analyte/ Analytical Group	Laboratory	Field Samples	Field Duplicates	Field Triplicates	Equipment Blanks	Field Blanks	MS/MSD (2X; 1/20)	Total # Analyzed
Surface Water (Filtered)	PCB Congeners USEPA 1668A	Pace – Minneapolis, MN	24	4	0	4	0	1	33
Surface Water (SP3™)	PCB Congeners USEPA 1668A	Eurofins – Knoxville, TN	12	0	0	3 (Trip Blanks)	0	0	15
Fish Tissue	PCB Congeners USEPA 1668A	Pace – Minneapolis, MN	55	0	0	0	0	4	61
Fish Tissue	Lipids	Pace – Green Bay, WI	55	0	0	0	0	4 (Laboratory Duplicate)	61
Composite Sediment	PCB Aroclors SW-846 8082A	Pace – Green Bay, WI	486	25	51	49	14	25	647
	TOC Lloyd Kahn	Pace – Green Bay, WI	486	25	51	49	14	25	647

Notes: Triplicate samples were collected to assess spatial variability within the transects. For each of the selected locations, two additional samples were collected from separate transects approximately 1 meter from the original sample location.

2.6 Data Management and Recordkeeping

Field staff from Arcadis and CTI used a central Microsoft SharePoint site for storage of data from field notebooks, photographs of river transect sampling locations, photographs of sediment cores, sediment sample tracking logs, and logging information for each sediment core. Field data and notes from surface water, fish tissue, and sediment sampling were recorded using a combination of field forms and logbooks. Field forms, logbooks, and sediment core collection and processing notes are included in **Appendix A**. Photographs were taken throughout the sampling processes; select photographs are also included in **Appendix A**.

Field sample IDs and sample information were recorded on COC documents. COCs were used to organize samples and ensure proper delivery to the laboratory.

Sediment core collection field data were recorded in a notebook simultaneous to core retrieval and scanned and uploaded daily to the central Microsoft SharePoint site. Data from the field notebooks was then transcribed to the master Excel sediment logging file along with the sediment core processing data. In addition to the field data, photographs of the transects were taken and stored on the SharePoint site. During the processing stage, photographs were taken of the unopened outside and opened inside view of each sediment core and stored on the SharePoint site. Each sample shipment contained a COC detailing the sample record, and copies of the COC were saved in the project files. All data entered into the central Microsoft SharePoint site were reviewed and verified in real time during field activities to confirm appropriate documentation was present and complete for each day of field activities, and all samples were collected with locations documented. Following completion of the sampling activities, the verified field data for sediment core collection and core processing was uploaded to the project database.

3.0 ANALYTICAL DATA QUALITY AND VALIDATION

Laboratory analysis of surface water, sediment, and fish tissue samples were completed in accordance with the Quality Assurance Project Plan (QAPP) (CTI and Arcadis, 2020) as summarized below:

- The LDPE membranes in SP3™ samplers were analyzed by Eurofins for 209 individual PCB congeners using USEPA Method 1668A. SiREM calculated the C_{free} results for each SP3™ sampler using the laboratory-reported concentrations for individual congeners in the LDPE membranes.
- Discrete surface water samples collected during Round 1 and Round 2 sampling events were analyzed by Pace for 209 individual PCB congeners using USEPA Method 1668A.
- Fish tissue samples were analyzed by Pace for 209 individual PCB congeners using USEPA Method 1668A and for lipid content.
- Sediment samples were analyzed by Pace for PCB Aroclors using USEPA Method 8082A and for TOC using the Lloyd Kahn method.

The assessment of data quality is summarized in Section 3.1 and use of laboratory results for data evaluation is described in Section 3.2. Laboratory reports are included in **Appendix B**.

3.1 Data Quality Assessment Summary

Following the receipt of analytical results, Stage 4 data validation and verification for all sample results were completed by Arcadis in accordance with the QAPP (CTI and Arcadis, 2020). Data validation is a standardized review process designed to evaluate the analytical quality and utility of a discrete set of laboratory results and is used to confirm that data of known and documented quality are used for the project. Data validation involves a systematic evaluation of data to ascertain its precision, accuracy, representativeness, completeness, comparability, and sensitivity. During the data validation process, laboratory qualified and unqualified data are verified against supporting documentation. Based on this evaluation, qualifiers were added, deleted, or modified by the data reviewer as documented in the data validation reports (**Appendix C**).

Data validation for SP3™, surface water, fish tissue, and sediment samples were completed in accordance with USEPA National Functional Guidelines for Organic Superfund Methods Data Review (2017), with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (1999, as appropriate) and the 2020 FSP (CTI and Arcadis, 2020).

The following items were reviewed during the data validation:

- COC completeness
- Holding times
- Laboratory control samples (LCS)/laboratory fortified blank recoveries
- Surrogate recoveries
- Internal standards

- MS, MSD recoveries, and relative percent differences (RPD)
- Field duplicate RPDs
- Method blanks, trip blanks, and field/equipment blanks
- Dual column percent differences
- Detection limit records
- Instrument calibration records
- Continuing calibration records
- Instrument tune records
- Internal standard records
- Target compound calculated results.

The usability of data was determined based on the validation findings as summarized in individual data validation reports (**Appendix C**). As stated in the data validation reports, overall system performance was acceptable. There were no major data quality issues that resulted in the qualification of the data as rejected ("R").

Data validation reports for each sample delivery group (SDG) were provided to USEPA on April 16, 2021 (SP3™ and surface water samples; Arcadis 2021) and April 12, 2022 (sediment and fish tissue samples). Level IV analytical results were provided to USEPA in the format consistent with the USEPA Region 5 electronic data deliverable (EDD) requirements. The EQuIS 4-file format EDDs were directly uploaded to the USEPA Region 5 FTP server on June 18, 2021 (surface water samples) and April 11, 2022 (sediment and fish tissue samples), followed by an email notification to the USEPA Region 5 EDD Administrator confirming the data upload. In addition to the analytical results, the EDD for sediment samples also included a description of sediment type and characteristics (e.g., color, sand, silt, clay, etc.). Following the submittal of sediment data EDD on April 11, 2022, the data validation report for one sediment sample SDG (#40231861) was revised for the qualification of the PCB Aroclor and TOC data as summarized in Section 3.1.3. The revised data validation report for this SDG is included in **Appendix C**.

Below is a summary, categorized by matrices, which describes the field and laboratory QC sample results that were used to evaluate the precision, accuracy, representativeness, completeness, comparability, and sensitivity of the analytical data. Field triplicate sediment samples were collected to assess the spatial variability within the transects and, therefore, were treated as individual samples for the data quality assessment. The analytical results for these samples were qualified based upon field and laboratory QC samples (i.e., MS/MSD and field duplicates). The specifics of data qualification can be found in the referenced SDG and report number in **Appendix C**.

3.1.1 Precision

Precision is defined as the degree of agreement between or among independent, similar, or repeated measures. Precision was evaluated based upon the QC results[3] submitted from both the field and the laboratory. For the discrete surface water and sediment samples, the RPD of MS/MSD and the field duplicate samples provided information on the precision of sampling and analytical procedures. For fish tissue samples, the RPD of MS/MSD was used to assess the precision and accuracy of sampling and analytical procedures.

Field duplicates were collected at a frequency of one per 10 field samples. The RPD between the parent sample and field duplicate results were within control limits.

SP3™ Summary

There were no precision data related issues that resulted in qualification of the SP3™ sampler results.

Surface Water Summary

PCB congener sample results associated with SDG #40215465 (Report #38958R) exhibited MS/MSD RPD greater than the control limit. This exceedance resulted in the associated data to be qualified as estimated.

Fish Tissue Summary

There were no precision data related issues that resulted in qualification of the fish tissue data.

Sediment Summary

TOC sample results associated with SDG #40230468 (Report #42810R), SDG #40230526 (Report #42822R), SDG #40231262 (Report #42984R), SDG #40231649 (Report #43142R), SDG #40232298 (Report #43467R), SDG #40232392 (Report #43473R), and SDG #40232398 (Report #43474R) exhibited MS/MSD RPD greater than the control limit. This exceedance resulted in the associated data to be qualified as estimated.

TOC sample results associated with SDG #40231642 (Report #43141R) and SDG #40231861 (Report #43205R), SDG #40230969 (Report #43207R), and SDG #40232299 (Report #43468R) exhibited field duplicate RPD greater than the control limit. This exceedance resulted in the associated data to be qualified as estimated.

PCB sample results associated with SDG #40231693 (Report #43143R) exhibited field duplicate RPD greater than the control limit. This exceedance resulted in the associated data to be qualified as estimated.

All the sediment SDGs contained at least one sample that exhibited the following: PCBs by Aroclor analysis sample results exhibited RPD greater than 40% between the primary and second dissimilar column. These

[3] The percent recovery for LCS analysis was estimated to assess the accuracy of analytical methods. The RPD of LCS/laboratory control sample standard duplicate (LCSD) was evaluated for select equipment blanks collected during the sediment sampling. The RPD of LCS/LCSD was not evaluated by the laboratory for the SP3™, surface water, fish tissue, and sediment samples because it is not required by the USEPA-approved analytical methods.

sample results were qualified based upon the RPD for dual column analysis of detected results. When the RPD exceeded 40%, the result was reported and flagged "P" by the laboratory. During validation, the sample results and the RPD were reviewed and based on this review, the appropriate validation qualifier of estimated (J) or tentative identified/estimated Aroclor (JN) was applied to the sample result. The specific criteria used to evaluate this RPD are summarized in individual data validation reports (**Appendix C**). Individual PCB Aroclor results with the RPD from dual column analysis exceeding 70% were qualified as estimated with the "JN" was qualified as estimated with "J" qualifiers.

3.1.2 Accuracy

Accuracy is the amount of agreement between a measured value and the true value. Evaluation of the percent recovery of spiked analytes in MS/MSDs, LCS/LCSDs, internal standards, and surrogates provide information on accuracy. In addition, Stage 4 validation review of initial and continuing calibration results provide information on analytical accuracy.

Criteria were met, with the exceptions summarized below:

SP3™ Summary

There were no accuracy data related issues that resulted in qualification of the SP3™ sampler results.

Surface Water Summary

PCB congener sample results associated with SDG #40218019 (Report #39547R) exhibited Initial Calibration Verification percent relative standard deviation greater than the control limit. This exceedance resulted in the associated data to be qualified as estimated.

PCB congener sample results associated with SDG #40218019 (Report #39547R) exhibited internal standard recoveries less than the lower limit but greater than 10%. This exceedance resulted in the associated data to be qualified as estimated.

PCB congener sample results associated with SDG #40218019 (Report #39547R) exhibited MS/MSD recoveries greater than the upper limit. This exceedance resulted in the associated detected data to be qualified as estimated.

Fish Tissue Summary

PCB congener sample results associated with SDG #40227354 (Report #42519R) exhibited extractable internal standard recoveries less that the low control limit and greater than 10%. This exceedance resulted in the associated detected data to be qualified as estimated.

Sediment Summary

TOC sample results associated with SDG #40230468 (Report #42810R), SDG #40230526 (Report #42822R), SDG #40230531 (Report #42823R), SDG #40230946 (Report #42851R), SDG #40230971 (Report #42852R), SDG #40231452 (Report #42985R), SDG #40231455 (Report #43139R), SDG #40230985 (Report #43208R), SDG #40231009 (Report #43209R), SDG #40232298 (Report #43467R), and SDG #40232392 (Report #43473R) exhibited MS/MSD recoveries greater than the upper limit. This exceedance resulted in the associated detected data to be qualified as estimated.

TOC sample results associated with SDG #40231260 (Report #42982R), SDG #40231469 (Report #43140R), SDG #40231642 (Report #43141R), SDG #40232299 (Report #43468R), SDG #40232401 (Report #43475R), SDG #40232457 (Report #43476R), and SDG #40232459 (Report #43477R) exhibited MS/MSD recoveries less than the lower limit. These exceedances resulted in the associated detected data to be qualified as estimated.

TOC sample results associated with SDG #40230801 (Report #42849R), SDG #40231262 (Report #42984R), SDG #40231649 (Report #43142R), SDG #40232398 (Report #43474R) exhibited MS/MSD recoveries greater than the upper limit and less than the lower limit. These exceedances resulted in the associated detected data to be qualified as estimated.

PCB sample results associated with SDG #40232457 (Report #43476) exhibited surrogate recoveries that were not reportable due to dilution of the sample. The associated detected and non-detected results were qualified as estimated.

3.1.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population and is evaluated by reviewing the QC results of blank samples and holding times. Positive detects of compounds in the associated blanks (trip blank, equipment blank, method blank) may have been introduced into the samples during collection, transit, preparation, or analysis. The representativeness of the dataset was considered acceptable after integration of qualification of estimated results.

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field sampling.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the laboratory-specific estimated detection limit. The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier ("B") of data. Sample results less than the BAL associated with the following sample locations were qualified as shown below.

- Detected sample results greater than the RL and less than the BAL were qualified as "UB" at the detected sample concentration.
- Detected sample results less than the Reporting Limit (RL) and less than the BAL were qualified as "UB" at the RL.

SP3™ Summary

PCB congener results for LDPE membrane associated with SDG #140-20980-1 (Report #39830R_Rev2) exhibited method blank and rinse blank contamination. The detected LDPE membrane sample results greater than the RL and less than the BAL were qualified as non-detect "UB", and the corresponding SiREM-calculated C_{free} results were qualified as non-detect "ND" with SiREM-applied qualifiers, if any. The detected sample results less than the RL and greater than the BAL were qualified as non-detect "UB" at the RL, and the corresponding SiREM-calculated C_{free} results were qualified as non-detect "ND" with SiREM-applied qualifiers, if any.

PCB congener results for LDPE membrane associated with SDG #140-20980-1 (Report #39830R_Rev2) exhibited ion abundance ratios, signal-to-noise values, and/or relative retention times interferences, resulting in qualification as estimated maximum possible concentration (EMPC) and were qualified as "q" by the laboratory. These "q" qualifiers for the congener EMPC were changed to validation qualifier "UX", and the corresponding SiREM-calculated C_{free} results were qualified as non-detect "ND" with SiREM-applied qualifiers, if any.

Surface Water Summary

PCB congener sample results associated with SDG #40215465 (Report #38958R) and SDG #40218019 (Report #39547R) exhibited method blank and rinse blank contamination. The detected sample results greater than the RL and less than the BAL were qualified as non-detect "UB". The detected sample concentration or detected sample results less than the RL and greater than the BAL were qualified as non-detect "UB" at the RL.

PCB congener sample results associated with SDG #40215465 (Report #38958R) and SDG #40218019 (Report #39547R) exhibited ion abundance ratios, signal-to-noise values, and/or relative retention times interferences, resulting in qualification as EMPC. The EMPC laboratory data were qualified non-detect "UX".

Field data generated during sampling activities were recorded in a field logbook and/or electronic forms. These data entries were reviewed and verified in real time during field activities.

Fish Tissue Summary

PCB congener sample results associated with SDG #40227352 (Report #42517R), SDG #40227353 (Report #42518R), and SDG #40227354 (Report #42519R) exhibited ion abundance ratios, signal-to-noise values, and/or relative retention times interferences, resulting in qualification as EMPC. The EMPC laboratory data were qualified non-detect "UX".

PCB congener sample results associated with SDG #40227353 (Report #42518R) exhibited ion abundance ratios outside of the control limits. This resulted in the qualification of the associated compounds as estimated.

Field data generated during sampling activities were recorded in a field logbook and/or electronic forms. These data entries were reviewed and verified in real time during field activities.

Sediment Samples

PCB Aroclor and TOC sample results associated with SDG #40230946 (Report #42851R) and SDG #40231861 (Report #43205R) were received at the laboratory at temperatures above the preservation criteria (6°C). These exceedances were due to delivery delays of some sample coolers to the laboratory. This preservation exceedance resulted in the qualification of the PCB Aroclor and TOC data as estimated.

Field data generated during sampling activities were recorded in a field logbook and/or electronic forms. These data entries were reviewed and verified in real time during field activities.

3.1.4 Comparability

Comparability is a qualitative expression of the confidence with which one dataset may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that datasets be comparable if they are used in conjunction with other datasets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other precision, accuracy, representativeness, completeness, comparability, and sensitivity criteria, because only if precision, accuracy, and representativeness are known can datasets be compared with confidence.

Sampling frequency requirements of 10% were met in obtaining field duplicates for discrete surface water and sediment samples. The laboratory used standard analytical methods for their analyses. The analytical results were reported in correct standard units. Sample preservation, sample integrity, and holding times were acceptable. In conclusion, the analytical results for the samples collected during the sampling event have good comparability.

3.1.5 Completeness

Two types of completeness were calculated for this sampling event: analytical, and field sampling. Results indicated as not reportable by the laboratory are not included in the completeness calculations. The following equations were used to calculate the two types of completeness:

$$\text{Percent Analytical Completeness} = (\text{Number of valid results}/\text{Number of reported results}) \times 100$$

$$\text{Percent Field Sampling Completeness} = 100 \text{ x } (\text{Number of samples collected}/\text{Number of planned samples})$$

The completeness goals were as follows:

- Analytical completeness goal was 95%.

The analytical completeness attained for the field samples was 100%. There were 29,860 results, and no results were rejected.

The field sampling completeness goal was 99.9%. One field sample collected for PCBs and TOC in SDG #40230946 (Report #42851R) could not be analyzed because the sample containers were broken when received by the laboratory. The PCB and TOC analysis for this sample was cancelled.

3.1.6 Sensitivity

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. The laboratory analyzed the samples using the most sensitive methods to meet the project data quality objectives. The detection limit of solid concentrations in sediments has been elevated due to the low precent solids in sediment samples.

3.1.7 Conclusions

The overall assessment of the field samples and QA/QC data review of the baseline sampling event dataset concluded that project requirements and completeness levels were met. Sample results that were qualified as estimated (UJ, J, JN, JL), non-detect due to QA blank (UB), and/or EMPC (UX) are usable with caution. The detected sample results qualified as estimated (J, JN, JL) were included in the data evaluation for SP3™, surface water, fish tissue, and sediment samples summarized in Sections 4 through 6. Based upon the Stage 4 data validation, all other results are considered valid and usable for all purposes.

3.2 Data Handling and Processing

This section describes data reduction and handling methods used to prepare the laboratory analytical data for detailed evaluation (e.g., field duplicates, non-detects) and various data normalization techniques.

3.2.1 Field Quality Control Samples

Field QC samples were collected during the sediment and surface water sampling including field duplicates, field triplicates, equipment blanks, trip blanks, and/or MS and MSD samples, in accordance with the 2020 FSP (CTI and Arcadis, 2020). Starting August 12, 2021, field blanks were also collected during sediment sampling per USEPA's request (USEPA, 2021). The analytical results for MS/MSD and blank samples were utilized in the data validation process as documented in the individual validation reports.

- SP3™ Sampling. Three field trip blanks were collected during the SP3™ sampler deployment event on September 24, 2020, by exposing three new samplers to air, light, and other ambient field conditions for approximately 5 minutes in accordance with the LDPE Sampling SOP (i.e., 5 minutes is the approximate maximum amount of time the SP3™ samplers are exposed to atmospheric conditions during deployment and retrieval). These trip blanks were analyzed for PCB congeners along with the retrieved field samplers and used to determine the PCB concentrations in SP3™ samplers, as described in Section 4.2.
- Discrete Surface Water Sampling. During each sampling event, one MS/MSD sample, two field duplicate samples, and two equipment blanks were collected and analyzed for PCB congeners. To evaluate the presence of analytes in the laboratory-supplied water and clean, dedicated sample

tubing, equipment blanks were collected by running laboratory-supplied deionized water through a clean pump tubing and filter for an amount of volume required to fill the sample containers.

- Sediment. Twenty-five MS/MSD samples, 25 field duplicate samples, 51 field triplicate samples, 49 equipment blanks, and 14 field blanks were analyzed for PCB Aroclors and TOC. There were 22 of the 49 equipment blanks collected by rinsing laboratory-supplied deionized water over decontaminated field equipment (i.e., metal shears used to cut the Lexan® core tubes) to verify the effectiveness of field decontamination procedures. The remaining 27 equipment blanks were collected by rinsing laboratory-supplied deionized water over the dedicated, disposable equipment used during the sediment core processing (i.e., disposable aluminium foil pan, the Lexan® core tube, and disposable tongue depressor) to confirm the cleanliness of the dedicated equipment. At USEPA's request, field blanks were collected by rinsing laboratory-supplied deionized water through a Lexan® tube over a tongue depressor into a disposable aluminium foil pan. The aluminium foil pan with water and tongue depressor was left undisturbed in the sediment core processing area for the duration of collecting one sediment sample to assess whether the sediment samples were affected by surrounding conditions during the core processing.

Field QC samples were not required for the fish tissue sampling.

3.2.2 Total PCB Concentrations

For SP3™, surface water, and fish tissue samples, the laboratory analysis was completed for 209 individual PCB congeners. The total PCB congeners were calculated by the laboratory for each sample by adding the detected results for individual congeners. All samples included detected results for one or more individual PCB congeners. As discussed in Section 3.1.3, data validation involved qualifying individual PCB congener concentrations that are lower than the values observed in the QC blanks utilizing BAL defined in the data validation reports.

The total PCB congeners for LDPE membranes in SP3™ samplers were validated as summarized in Section 3.1. Because the SP3™ sampler results were used to calculate the C_{free} results, the qualifiers applied to the SP3™ samplers were applied to the calculated C_{free} results for the individual congener result. Calculated C_{free} results were then re-calculated to remove post-validation non-detect results for individual congeners, resulting in lower total PCB congeners than the SiREM-calculated C_{free} results. These post-validation total PCB congeners were used for the data evaluation presented in Section 4.2. The non-detect C_{free} results were reported as the "ND" (Report #39830R_Rev2 in Appendix C).

The total PCB congeners for discrete surface water and fish tissue samples were re-calculated to exclude the individual congener results that were reported as detects by the laboratory but were qualified as non-detects in the data validation. For select samples, the total PCB congeners were lower than the initial laboratory reported results. These post-validation total PCB congeners were used for the data evaluation presented in Section 4.3 and 5. The non-detect results were reported as the detection limit of the individual PCB congeners.

The laboratory analysis of sediment samples was completed for seven individual PCB Aroclors (Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, and Aroclor 1254). The total

Aroclor PCBs reported in the laboratory reports for individual samples were calculated by adding the detected concentrations of individual PCB Aroclors. If analytical results for all seven PCB Aroclors were non-detect, the total Aroclor PCBs for that sample was reported as the detection limit of the individual PCB Aroclors and was flagged to indicate it as a non-detect total Aroclor PCB result. Following the data validation, total Aroclor PCBs were re-calculated by excluding the detected results for individual Aroclors that were qualified as non-detect based on data quality assessment (see Section 3.1). These post-validation total Aroclor PCBs were used for the data evaluation presented in Section 6.

For the sediment and discrete surface water samples, the average of the detected results for parent and field duplicate samples were used in the data evaluation. If the results for either the parent or field duplicate sample were non-detect, only the detected result was used. If both the parent and field duplicate sample results were non-detect, the higher of the two detection limits for both samples was used in the data evaluation. Field triplicate sediment sample results were used in the data evaluation to evaluate the spatial variability in the sampling area but were not used to estimate the surface weighted average concentrations (SWACs), as described in Section 6.2.

Based on the distribution of total PCBs upstream and downstream of the former CFC facility, particularly the increase in surface water concentrations in downstream direction between the upstream sample locations and Bowen Road bridge, and physical characteristics of the river, notably the transition from higher to lower gradient starting at West Marr Road, the Site is divided into the following five sections to present the data evaluations in Sections 4, 5, and 6:

- Upstream of the former CFC facility
- Near former CFC facility between Highway M-59 and Bowen Road
- Bowen Road to West Marr Road
- West Marr Road to Chase Lake Road
- Chase Lake Road to Steinacker Road.

4.0 WATER COLUMN DATA EVALUATION

As summarized in Section 2.1, time-averaged surface water samples using SP3™ passive samplers and field-filtered discrete surface water samples were collected at 12 locations (**Figure 2-1**). Two rounds of discrete surface water sampling were completed at each of 12 locations: one in conjunction with deployment and one in conjunction with retrieval of the SP3™ samplers. SP3™ samplers were deployed for approximately 44 to 45 days. The surface water data collected were PCB congener concentrations in surface water at a series of locations from upstream of the former CFC facility and to downstream locations. Paired with estimates of flow at each monitoring station, these data also made possible estimates of PCB load gain between surface water monitoring stations (e.g., the amount of PCBs entering the river between each monitoring station). The measurements also provide baseline data for possible future monitoring (CTI and Arcadis, 2020). The discrete surface water sample data were collected to provide baseline data for future monitoring and were also compared to historical data to assess changes over time in surface water PCB concentrations.

4.1 Field Conditions

Field data collected during sampling activities are summarized in **Tables 2-1 and 4-1**. The ordinary high water mark channel width ranged from approximately 19 to 31 ft (**Table 2-2**), with narrower channel widths (19 to 22 ft) measured at four sample locations between M-59 and the Bowen Road bridge. Water depths at the channel thalweg ranged from approximately 1.1 to 3.0 ft. Flow velocities ranged from approximately 0.25 to 1.1 ft per second (ft/s) and 0.27 to 1.2 ft/s during Round 1 and Round 2 sampling, respectively (**Table 2-2**). During the Round 1 sampling event, water depths at the eight sample locations between Bowen Road bridge and Chase Lake Road bridge (BR-04 through BR-09, MR-03, and CL-02) were lower (approximately 1.1 to 1.9 ft) than other sample locations (UP-11, UP-12, BR-10, and SR-01), with water depths ranging from 2.3 to 2.9 ft. During the Round 2 sampling event, water depths 0.1 to 0.2 ft higher than the Round 1 sampling event were recorded at all sampling locations, except at BR-04, BR-06, and CL-02. For both sampling events, the flow velocities were lowest at both upstream locations (UP-11 and UP-12), as compared to the other sampling locations at the Site (**Table 2-2**).

Field-measured pH was similar during both sampling events, ranging from 7.15 to 9.12 standard units. However, specific conductivity, turbidity, and dissolved oxygen measurements were typically higher for the Round 2 sampling event (**Table 4-1**). Specific conductivity measurements in Round 1 and Round 2 sampling events ranged from 0.44 to 0.47 milliSiemens per centimeter (mS/cm) and 0.67 to 0.75 mS/cm, respectively. Turbidity measurements in Round 1 and Round 2 sampling events ranged from 0 to 2.4 Nephelometric Turbidity Units (NTU) and 1.4 to 6.1 NTU, respectively. Dissolved oxygen measurements in Round 1 and Round 2 sampling events ranged from 7.5 to 11 milligrams per liter (mg/L) and 9.5 to 13 mg/L, respectively. Analytical results for time-averaged and discrete samples are summarized in **Tables 4-2 through 4-4** and are discussed below.

4.2 Passive Sampling Results

4.2.1 Calculation of Freely Dissolved PCB Concentrations in Surface Water

In accordance with the 2020 FSP (CTI and Arcadis, 2020), SP3™ samplers were deployed at 12 sample locations for approximately 44 to 45 days. The SP3™ samplers are passive samplers and the concentrations of PCBs on the sampling media reflect the average concentrations of dissolved PCBs that were detected during the sampling period (Burgess, 2012). The sampling media was analyzed for 209 individual PCB congeners. As described in Section 2.1, all SP3™ samplers were spiked with 10 PRCs prior to the deployment. Following sampler deployment, as the sampler absorbs native PCBs, the sampler is also releasing PRCs at similar rates. The equilibrium status of the sampler is then estimated based on the PRCs present at the start of deployment and the PRCs remaining after the sampler retrieval (Burgess, 2012).

To estimate the C_{free} in SP3™ samplers, the following steps outlined in Attachment A of **Appendix C** (SDG #140-20980-1) were followed:

Step 1:

Using these LDPE results, the elimination rate values (k_e) for the PRCs, and non-PRC congeners were estimated for each sampler using Equation 1 below (Lohmann, 2012).

Equation 1:

$$k_e^{PRC\ x} = \frac{\ln\left(\frac{C_{PE,t=0}^{PRC\ x}}{C_{PE,t=final}^{PRC\ x}}\right)}{t}$$

where:

$k_e^{PRC\ x}$ = the elimination rate value for PRC_x (in $days^{-1}$);

$C_{PE,t=0}^{PRC\ x}$ = the average concentration of the PRC_x in the LDPE at the beginning of the deployment (obtained from an average measurement of the PRC control blanks);

$C_{PE,t=final}^{PRC\ x}$ = the concentration of the PRC_x in the LDPE after the deployment (obtained from each deployed LDPE sampler); and

t = the duration of the deployment (in days).

Step 2:

To estimate k_e values for the non-PRC primary PCBs in each of the deployed samplers, a linear regression model was developed for each sampler using log transformed k_e values for all PRCs (dependent variable, from Table A2 in **Appendix B**) and the associated log-transformed PE-water partition coefficients (K_{PE}) (independent variable; Smedes et al., 2009). Note that regression models were specific to each sampler (i.e., not global to the whole deployment) because local geologic and hydrodynamic conditions vary within the Site.

Step 3:

Concentrations of non-PRC primary congeners in LDPE sampler were corrected for trace levels of those congeners identified in the trip blank samplers. Using the sampler specific k_e values, the expected amount of these trace primary PCBs present in the sampler at the end of deployment was estimated using Equation 2 below.

Equation 2:

$$C_{PE,t=final}^{PCB,trace} = \frac{C_{PE,t=0}^{PCB,trace}}{e^{k_e \times t}}$$

where:

$C_{PE,t=final}^{PCB,trace}$ = the concentration of trace PCBs remaining in the LDPE sample at the end of the deployment;

$C_{PE,t=0}^{PCB,trace}$ = the average concentration of the trace PCB in the LDPE at the beginning of the deployment (obtained from an average measurement of the trace PCBs in the PRC control blanks);

k_e = the elimination rate value predicted by the sampler-specific regression model (in days ^{1}); and

t = the duration of the deployment (in days).

$C_{PE,t=final}^{PCB,trace}$ values were then subtracted from the measured concentrations of non-PRC primary PCBs in LDPE (see Table A1 in **Appendix B**).

Step 4:

A sampling rate correction factor (CF) was calculated for each non-PRC primary PCB in each sampler. Equation 3 was used, as adapted from Lohmann (2012).

Equation 3:

$$CF = \frac{1}{1 - e^{k_e \times t}}$$

where:

k_e = the elimination rate value predicted by the sampler-specific regression model (in days ^{1}); and

t = the duration of the deployment (in days).

Step 5:

The concentration of primary analyte in the LDPE of each sampler (obtained from Table A1 in **Appendix B**) were multiplied by the CF values to calculate the steady-state concentration of primary analytes per Equation 4 below.

Equation 4:

$$C_{PE,steady\ state}^{PCB,primary} = \frac{C_{PE,t=final}^{PCB,primary}}{1 - e^{k_e \times t}}$$

where:

$C_{PE,t=final}^{PCB,primary}$ = the nonequilibrium concentration of primary PCBs measured in the LDPE sample at the end of the deployment.

Step 6:

In the final step, the steady-state concentrations are divided by K_{PE} values (Smedes et al., 2009) to obtain the concentrations of C_{free} for the primary analytes per Equation 5 below.

Equation 5:

$$C_{free} = \frac{C_{PE,t=final}^{PCB,primary}}{(1 - e^{k_e \times t})K_{PE}}$$

Additional details on the methodology for calculating the C_{free} concentrations for PCB congeners in surface water are provided in SiREM's laboratory report (**Appendix B**). C_{free} values reported by SiREM were updated to reflect congener results, where needed, based on data validation outcomes. Validated and final calculated C_{free} results are presented in **Table 4-2**.

4.2.2 Freely Dissolved PCB Concentrations and Changes Among Sampling Station Results

Calculated C_{free} results for SP3™ samplers indicated freely dissolved concentrations of total PCB congeners were detected at all sample locations and ranged from 0.0789 to 46.7 nanograms per liter (ng/L) (**Table 4-2** and **Figure 4-1**). The average and median for total PCB C_{free} results across all stations were 20.0 ng/L and 19.0 ng/L, respectively. The lowest calculated total PCB C_{free} results were for two locations upstream of M-59 (UP-12 and UP-11 between River Station [RS] -4+45 and RS 0+00) (0.0789 J and 0.145 J ng/L, respectively). In the next interval downstream between M-59 (RS 0+00) and Bowen Road bridge (RS 67+00), calculated total PCB C_{free} results for seven samples ranged from 0.134 J to 30.1 J ng/L, with an increase in concentrations of total PCB congeners of approximately 30 ng/L over a distance of approximately 6,700 ft. These seven samples included four samples adjacent to the former CFC facility (BR-10, BR-09, BR-08, and BR-07 between RS 6+80 and RS 25+90) and three samples collected downstream of the former CFC facility (BR06, BR-05, and BR-04 between RS 42+00 and RS 66+00). The median total PCB C_{free} results for these seven samples was 14.4 ng/L (**Table 4-5**). Calculated total PCB C_{free} results for samples adjacent to and downstream of the former CFC facility ranged from 0.134 J to 14.4 J ng/L (increase of 14 ng/L over 1,900 ft) and 23.5 J to 30.1 J ng/L (increase of 7 ng/L over 2,400 ft), respectively.

The data show an increase farther downstream from Bowen Road bridge (RS 67+00) to West Marr Road bridge (RS 196+50), a distance of approximately 13,000 ft, with a calculated total PCB C_{free} result of 46.7 J ng/L immediately downstream of the West Marr Road bridge (RS 198+00). Between Bowen Road bridge (RS 67+00) and West Marr Road bridge (RS 196+50), calculated total PCB C_{free} increased by approximately 17 ng/L. Calculated total PCB C_{free} results for the samples at RS 198+00 – Chase Lake Road bridge (RS 368+00) and Steinacker Road bridge (RS 425+00) – were similar, with calculated total PCB

C_{free} results of 41.1 ng/L and 40.6 ng/L, respectively. These results indicate that water column concentrations begin to decrease downstream of West Marr Road bridge (RS 196+50). This pattern is shown on **Figure 4-1**. The data are presented in **Table 4-2**.

Prior sediment removal activities at the Site consisted of removing oil-stained sediment from approximately M-59 to approximately 1,000 ft downstream of Bowen Road (Figure 3 in the 2020 FSP [CTI and Arcadis, 2020]). The calculated total PCB C_{free} results for this section of the river indicate the presence of a source contributing dissolved PCBs to the surface water. The data also indicate that contributions of dissolved PCBs were present between Bowen Road and West Marr Road.

4.2.3 PCB Congener Mass Contribution to Freely Dissolved PCB Concentrations

The most frequently detected PCB congeners in SP3™ samples included PCB-20/28, PCB-49/69, PCB-64, PCB-66, PCB-86/87/97/109/119/125, PCB-90/101/113, PCB-92, PCB-95, PCB-110/115, PCB-129/138/160/163, PCB-132, PCB-135/151, PCB-147/149, PCB-153/168, PCB-174, and PCB-187, with a frequency of detection of 100%.

Examination of the contribution to mass fraction of PCB homologue groups appears to show a shift from upstream to downstream (**Figures 4-2a through 4-2l**). The two upstream samples collected between RS -4+45 and RS 0+00 (UP-12 and UP-11), as well as the most upstream sample collected adjacent to the former CFC facility at RS 6+80 (BR-10), have the highest mass fractions of tetrachlorobiphenyl, pentachlorobiphenyl, and hexachlorobiphenyl congeners. These congeners contributed to approximately 87% to 93% of total PCB congeners at these sampling locations.

Two samples collected adjacent to the former CFC facility at RS 12+50 (BR-09) and at RS 18+00 (BR-08) have the highest mass fractions of dichlorobiphenyl congeners, followed by monochlorobiphenyl congeners. The remaining seven samples collected between RS 25+90 (BR07) and 423+40 (SR-01) had the highest mass fractions of dichlorobiphenyl congeners, followed by trichlorobiphenyl congeners. For these nine samples, monochlorobiphenyl, dichlorobiphenyl, and trichlorobiphenyl congeners contributed to approximately 76% to 94% of total PCB congeners.

Nine of 12 SP3™ samples collected between the former CFC facility (RS 12+50) and Steinacker Road (RS 425+00) indicated 2,2'-dichlorobiphenyl (PCB-4) constitutes the highest mass fraction in these samples, ranging from 18% to 32% of total PCB congeners (**Figure 4-2**). PCB-4 is a dichlorobiphenyl congener. PCB-1 (2-chlorobiphenyl) was detected as the second highest mass fractions in 6 of 12 samples collected between RS 12+50 (BR-09) and RS 66+00 (BR-04; ranging from 10% to 22% of total PCB congeners). Mono- and di-chlorobiphenyl congeners contributed approximately 42% to 77% of total PCB mass in the samples (**Figures 4-2a through 4-2l**).

As shown on **Figures 4-1 and 4-3**, the pattern of PCB-4 concentrations across the nine sampling stations between RS 12+50 (BR-09) and RS 425+00 (Steinacker Road) is consistent with the pattern of total PCB congeners for all samples, reflecting its high mass content in calculated total PCB C_{free} results. The comparison of calculated C_{free} results for individual congeners and total PCBs indicated that the distribution of individual PCB congener mass in two samples (UP-12 and UP-11) and BR-10 may be different than the remaining nine samples. Calculated C_{free} results from the three upstream-most sample locations (UP-12, UP-11, and BR-10) exhibit consistent detections in the penta- and hexachlorobiphenyl homologue groups. Examination of **Figures 4-2a through 4-2j** suggest a shift in congener mass distribution occurs starting at BR-09, where mono- and dichlorobiphenyl congeners constitute most of the PCB mass detected. This shift suggests a potential PCB source in sediment between RS 6+80 (BR-10) and RS 12+50 (BR-09).

4.3 Discrete Surface Water Samples

Concentrations of dissolved total PCB congeners for the Round 1 and Round 2 sampling events ranged from 0.00379 J to 31.9 J ng/L and from 0.0177 J to 33.9 J ng/L, respectively (**Tables 4-3 and 4-4**, and **Figure 4-1**). As summarized in **Table 4-5**, total PCB congeners were detected in all samples collected in Round 1 and Round 2 sampling events, with a median concentration of 5.29 ng/L (excluding samples collected at the upstream locations). Concentrations of total PCB congeners in surface water samples collected upstream of the M-59 bridge (UP-12 and UP11) were lower than the other stations and were similar for both sampling events (0.0177 J to 0.170 J ng/L).

For the Round 1 sampling event, seven samples (BR-04 through BR-10) collected between the M-59 bridge (RS 0+00) and Bowen Road bridge (RS 67+00) indicated increasing total PCB congener concentrations from the upstream to downstream direction (0.00379 J to 31.9 J ng/L). This increase in concentrations of total PCB congeners in discrete surface samples is consistent with the calculated total PCB C_{free} results for this stretch of the river. For the Round 1 sampling event, two samples (BR-05 at RS 58+80 and BR-04 at RS 66+00) collected upstream of the Bowen Road bridge (RS 67+00) and the sample (MR-03 at 198+00) collected at the West Marr Road bridge (RS 196+50) exhibited higher concentrations of total PCB congeners than those collected between RS 4+45 and RS 58+80, at RS 367+00 (immediately upstream of Chase Lake Road bridge), and at RS 423+40 (immediately upstream of Steinacker Road bridge).

During Round 1, the highest concentration of total PCB congeners (31.9 ng/L) was detected in sample collected immediately upstream of Bowen Road bridge (BR-04 at RS 66+00). Samples collected during Round 2 at Chase Lake Road bridge (CL-02; 23.3 J ng/L[4]) and Steinacker Road bridge (SR-01; 33.0 J ng/L) indicated higher PCB concentrations than the 10 samples collected upstream of Chase Lake Road bridge, which ranged from 0.0177 J to 13.1 J ng/L. Comparison of Round 1 and Round 2 sample results indicated variations in the pattern of total PCB congener results for sampling locations located between Bowen Road bridge (BR-04 at RS 66+00) and Chase Lake Road bridge (CL-02 at RS 367+00) (**Figure 4-1**). The highest detected concentration during Round 1 sampling was at the Bowen Road bridge (BR-04 at RS 66+00), with detections decreasing in the downstream direction. During Round 2, however, total PCB congener results increased in the downstream direction, with the highest detected concentration found at Steinacker Road.

PCB concentrations in discrete surface water samples collected from Round 1 and Round 2 did not indicate a clear pattern for samples collected at the Bowen Road bridge (BR-04 at RS 66+00) or downstream of Bowen Road bridge (**Figure 4-1**). The high RPD in measured water concentrations between the two

[4] Parent and duplicate sample results were averaged.

sampling rounds could potentially be attributed to changes in local hydrodynamic conditions, as evidenced by variations in the discharge rates estimated for Round 1 and Round 2 (**Figure 4-4**).

4.3.1 PCB Congener Mass Contribution to Total Water Column PCB Concentrations

The most frequently detected PCB congeners in Round 1 samples included PCB-132 and PCB-90/101/113, with a frequency of detection greater than 80%. For the Round 2 sampling event, the most frequently detected PCB congeners included PCB-40/41/71, with a frequency of detection greater than 80%.

Similar to the C_{free} results, the comparison of the contribution to mass fraction of PCB homologue groups appears to show a shift from upstream to downstream (**Figures 4-2a through 4-2l**). At sample locations UP-12 (RS -4+45), UP-11 (RS 0+00), and BR-10 (RS 6+80), both Round 1 and Round 2 samples indicated highest mass fractions of tetrachlorobiphenyl, pentachlorobiphenyl, and/or hexachlorobiphenyl congeners. These congeners contribute approximately 79% to 100% of total PCB congeners in samples collected during Round 1 and Round 2. The sample collected at CL-02 (RS 367+00) during Round 2 had a higher mass fraction of trichlorobiphenyl and pentachlorobiphenyl congeners than the Round 1 samples at the same location, which had a higher mass fraction of dichlorobiphenyl and trichlorobiphenyl PCB congeners; some of this difference may be attributed to water temperatures at the time of collection, which were lower during Round 2 than Round 1. At the remaining sampling stations, the distribution of PCB congeners was similar for Round 1 and Round 2 samples, with monochlorobiphenyl, dichlorobiphenyl, and trichlorobiphenyl congeners contributing approximately 61% to 100% of total PCB congeners. The distribution of PCB congeners in these samples was consistent with the PCB congener distribution in C_{free} results (**Figures 4-2a through 4-2l**).

Eight of 12 samples collected during the Round 1 sampling event indicated PCB-4 constitutes the highest mass fraction in these samples, ranging from 25% to 42% of total PCB congeners (**Figure 4-2**). For the Round 2 sampling event, 8 of 12 samples were consistent with this pattern, where PCB-4 contributed from 15% to 48% of total PCB congeners (**Figure 4-2**). PCB-1 (2-chlorobiphenyl) was detected at second highest mass fractions in 7 of 12 samples collected in each sampling event (ranging from 9% to 24% and 7% to 35% of total PCB congeners for Round 1 and Round 2 samples, respectively).

As shown on **Figures 4-1 and 4-3**, the PCB-4 concentration profile is consistent with the distribution of total water column total PCB congeners for Round 1 and Round 2 samples, except for MR-03 and CL-02. At MR-03 (RS 198+00), total PCB congeners were higher in Round 1 than in Round 2; however, PCB-4 detected in the Round 2 sample was higher than in Round 1 sample. At CL-02 (RS 367+00), total PCB congeners in Round 2 were higher than the MR-03 sample; however, PCB-4 in this sample was lower than MR-03 sample.

4.4 Total PCB Load Gain Analysis

By evaluating the load of PCB (in milligrams per day [mg/day]) carried by the river at each sampling station using measured concentrations and flow, the gain in load between sampling stations can provide an indication of which stretches of river have relatively higher and lower contributions of PCBs to the surface water. This use of the data is described in the data quality objectives outlined in the 2020 FSP (CTI and Arcadis, 2020). Load gain was calculated using the C_{free} total PCB results, which have the advantage of providing an indication of average conditions over the sampling period, whereas discrete samples may potentially be subject to short term variations present at the time of sample collection. The flow values used in the calculations were an average of the Round 1 and Round 2 flow measurements. A limitation of this approach is that the C_{free}-based load gain estimates are not based on a continuous measurement of flow with which to compute the average flow. The average of the Round 1 and Round 2 flow values are used for this purpose.

The total PCB load gain (**Table 4-6**) was calculated using initial flows estimated from field data collected during surface water sampling activities (including channel width, water depth at thalweg, and flow velocity at the mid-depth of the thalweg) and calculated C_{free} results (**Table 4-2**) using the following steps:

Step 1 – Flow Calculation at Each Station:

Flows were calculated by multiplying channel width, water depth, and mid-depth velocity at each sample location (see Equation 6). Discharge rates for SP3™ sample locations were estimated by averaging calculated flows based on Round 1 and Round 2 sampling events.

Equation 6:

$$Q_{Channel} = WDv$$

where:

$Q_{Channel}$ = discharge rate in channel (cubic feet per second [cfs]);

W = channel width (feet);

D = water depth (feet); and

v = mid-depth flow velocity (feet per second).

Flow calculations based on measured river parameters from both sampling events are presented in **Table 4-6**. Estimated discharge rates are presented on **Figure 4-4**. Two of 12 sample locations (BR-SW-07 and CL-SW-02) had higher estimated discharge rates during Round 1 than during Round 2. The remaining locations have the highest estimated discharge rates during Round 2.

The calculated average discharge rates varied across the sample locations with decreasing discharge rates in downstream directions at 8 of 12 sample locations (**Figure 4-4**). For these sample locations, a distance-weighted average discharge rate was calculated using the average discharge rates estimated for an upstream sample location and for the downstream location with an average discharge rate more than the upstream sample location (see Equation 7).

Equation 7:

$$Q_{avg} = Q_I + (RS_S - RS_I) * \left[\frac{(Q_F - Q_I)}{(RS_F - RS_I)}\right]$$

where:

Q_{avg} = average discharge rate in channel at a given sample location (cfs);

Q_I = average discharge rate at sample location immediately upstream (cfs);

Q_F = average discharge rate at sample location located downstream with discharge rate greater than Q_I (cfs);

RS_S = River stationing (feet) at a given sample location;

RS_F = River stationing (feet) at downstream sample location; and

RS_I = River stationing (feet) at upstream sample location.

Step 2 – Load Calculation:

The PCB loading at each sample location was estimated using Equation 8, provided below. PCB load results for Round 1 and Round 2 samples were based on dissolved PCB concentrations measured at each location during each respective sampling event. SP3™ PCB loads were derived by multiplying calculated C_{free} results and averaged Round 1 and Round 2 discharge rates at each sample location.

Equation 8: $ML_{PCB} = 2.45 Q_{avg} C_{PCB}$

where:

ML_{PCB} = PCB mass loading (mg/day);

2.45 = unit conversion; and

C_{PCB} = dissolved PCB concentration (ng/L).

PCB load results are presented in **Table 4-7**.

Step 3 – Load Gain Calculation:

To express the PCB load gain based on distance along the stream, the calculated load gain was divided by the distance between sampling stations, as shown in Equation 9.

Equation 9:

$$PCB\ Load\ Gain = \frac{ML_{PCB,F} - ML_{PCB,I}}{RS_F - RS_I}$$

where:

$ML_{PCB,F}$ = PCB mass loading (mg/day) at downstream sample location;

$ML_{PCB,I}$ = PCB mass loading (mg/day) at upstream sample location;

RS_F = River stationing (feet) at downstream sample location; and

RS_I = River stationing (feet) at upstream sample location.

PCB load gain results for SP3™ sampling are presented in **Table 4-7** and on **Figure 4-5**.

The results of the dissolved PCB load gain calculation based on the C_{free} results are shown on **Figure 4-5**. Sample locations associated with road crossings include a label: M-59 (RS 0+00), Bowen Road (RS 67+00), West Marr Road (RS 196+50), Chase Lake Road (RS 368+00), and Steinacker Road (RS 425+00). Distance intervals are labeled by the location IDs included in the load gain calculation. Examining the results expressed as gain per foot along the river (**Figure 4-5**) indicates that the C_{free} total PCB load gain upstream of the former CFC facility is estimated at 0.029 milligram per day per foot (mg/day-ft). From the Site-adjacent sampling station (UP-SW-11) to the first sampling station downstream of M-59 (BR-SW-10), the load gain is minimal, at approximately 0.002 mg/day-ft. Within the area that dredging was previously conducted in 1982, the load gain increases several orders of magnitude to approximately 1.18 mg/day-ft (BR-SW-10 to BR-SW-09). At the following distance interval (BR-SW-09 to BR-SW-08), located downstream from a tributary, the load gain decreases to 0.03 mg/day-ft. A sharp increase to 0.90 mg/day-ft is shown at BR-SW-08 to BR-SW-07, followed by reductions in load gain of approximately 0.3 mg/day-ft over each of the next two distance intervals (BR-SW-07 to BR-SW-06 and BR-SW-06 to BR-SW-05). Load gain continues to decrease by approximately 0.1 mg/day-ft along each of the next two intervals located upstream (BR-SW-05 to BR-SW-04) and downstream (BR-SW-04 to MR-SW-03) of Bowen Road. The load gain reaches the minimum of -0.015 mg/day-ft downstream of West Marr Road (MR-SW-03 to CL-SW-02) and remains minimal, with a load gain of 0.01 mg/day-ft at the subsequent distance interval (CL-SW-02 to SR-SW-01).

The load gain analysis suggests a source of residual dissolved PCB contributions to the water column is located adjacent to the former CFC facility, within the area previously targeted by dredging. Estimated load gain downstream from this area is somewhat variable, but generally decreases moving in the downstream direction. Examination of available data indicates there are several tributaries connecting to the Shiawassee River between M-59 and Steinacker Road. Because the estimated load gain includes the use of distance-weighted discharge rates based on discrete flow measurements from both Round 1 and Round 2 sampling events paired with time-averaged C_{free} results to calculate load gain, the use of a steady flow assumption for estimates of discharge may also provide uncertainty if unsteady flow conditions are typical at these locations.

4.5 PCB Composition Analysis

PCB composition analysis was performed to evaluate whether composition shifts in total PCB makeup in the water column occur between different reaches, which may reflect other sources of PCBs and/or different proportions of weathered PCBs contributing to the water column. The weathering of PCBs in natural environment has been observed in prior research (Sivey and Lee, 2007), with higher proportions of lower-chlorinated congeners present in deeper sediment, indicating the occurrence of PCB weathering via reductive dichlorination in the aquatic environment.

Multivariate analysis (Lê et al. 2008) including Principal Component Analysis (PCA) and cluster analysis was completed to evaluate the PCB homologue signature in SP3™ and surface water samples (**Figure 4-6**). PCA is a useful technique for reducing the dimensionality of a dataset with a large number of interrelated variables. For this evaluation, 11 samples with total PCB congener results less than 1 ng/L were excluded which included SP3™ and Round 1 and Round 2 surface water samples at three upstream-most sample locations (UP-12, UP-11, and BR-10), Round 2 surface water sample at BR-04, and Round 1 surface water sample at CL-02. Additionally, field duplicate samples were not included in this evaluation due to the difference in total PCB congeners for parent (12.7 J ng/L) and field duplicate pair for CL-SW-02 (33.9 ng/L) from Round 2. Prior to the PCA, congener results were converted to percent of total PCBs, summed by PCB homologue groups, and standardized to zero mean and unit standard deviation.

Based on the result of the PCA, the first three components were retained which indicate 83.1% of the variance (PC1 = 47.6%; PC2 = 21.5%; PC3 = 12.2%). The scree plot included on **Figure 4-6** was used to determine the number of principal components (PCs) to include in the PCA by identifying the elbow of the curve where the eigen values level off. **Figure 4-6** presents a PCA biplot depicting the first two PCs which express 69.1% of the variability. PCA scores (points) provide for interpreting relationships among samples. PCA loadings (arrows) provide for interpreting relationships among variables:

- Variables (loadings) which are close have high correlation.
- Samples (scores) which are close are similar.
- Variables on opposite side of origin have negative correlation.

PC1 separates samples with higher proportions of the higher chlorinated PCB congeners (e.g., trichlorobiphenyl and tetrachlorobiphenyl) from less chlorinated PCB congeners (e.g., monochlorobiphenyl and dichlorobiphenyl). PC2 separates samples with higher proportions of hexachlorobiphenyls and heptachlorobiphenyls, and decachlorobiphenyls.

Agglomerative hierarchical clustering analysis (HCA) was then performed on the retained PCs of the PCA using the Ward Method. Use of the PCs to support the HCA can be viewed as a “de-noising” method to separate signal and noise in the dataset. The HCA groups results into subsets (or clusters) that are more like each other than to those in other groups or clusters. Number of clusters was determined by inspection of dendrogram illustrating which clusters have been joined at each stage of the analysis and the distance between clusters at the time of joining. The data points were assigned to four distinct clusters as described below:

- Cluster 1 consists of two SP3™ samples and five surface water samples collected at five sampling locations adjacent to and downstream of the former CFC facility (between RS 12+50 [BR-09] and RS 58+80 [BR-05]). This group is characterized by less chlorinated PCB congeners:
    - Higher proportions of monochlorobiphenyl and dichlorobiphenyl congeners (sorted from the strongest); and
    - Lower proportions of trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl and hexachlorobiphenyl congeners (sorted from the weakest).
- Cluster 2 consists of four surface water samples collected adjacent to and downstream of the former CFC facility (between RS 12+50 [BR-09] and RS 42+00 [BR-06]). This group is characterized by:
    - Higher proportions of hexachlorobiphenyl, decachlorobiphenyl, and heptachlorobiphenyl congeners (sorted from the strongest).

- Cluster 3 consists of samples collected primarily from the downstream areas of the Site, which included four SP3™ samples between RS 25+90 (BR-07) and RS 66+00 (BR-04) and seven surface water samples collected between RS 58+80 (BR-05) and RS 423+40 (SR-01). This group is characterized by:
    - Higher proportions of tetrachlorobiphenyl and trichlorobiphenyl congeners (sorted from the strongest); and
    - Lower proportions of monochlorobiphenyl congeners.
- Cluster 4 includes three SP3™ samples collected downstream of West Marr Road bridge between RS 198+00 (MR-03) and RS 423+40 (SR-01). This group is characterized by:
    - Higher proportions of octachlorobiphenyl, nonachlorobiphenyl, trichlorobiphenyl, and tetrachlorobiphenyl congeners (sorted from the strongest); and
    - Lower proportions of dichlorobiphenyl and monochlorobiphenyl congeners (sorted from the weakest).

A PCA biplot was generated with PC1 and PC2 as axes and data points grouped into the above four clusters (**Figure 4-6**). The first three components of the PCA were retained which indicate 83.1% of the variance (PC1 = 47.6%; PC2 = 21.5%; PC3 = 12.2%). The deviation in the homologue groups for Cluster 4 indicates that the source of PCBs entering the water column downstream of West Marr Road bridge may differ from the other sampling locations. The PCB homologue profile plot demonstrates the shift in the PCB composition moving in the downstream direction from the former CFC facility, from less chlorinated PCB congeners (monochlorobiphenyl and dichlorobiphenyl) to higher chlorinated PCB congeners (trichlorobiphenyl, tetrachlorobiphenyl, and pentachlorobiphenyl). This could reflect a greater proportion of weathered versus un-weathered PCBs entering the water column, or potentially a difference in the PCB source material that is in the river system at this location.

5.0 FISH TISSUE DATA EVALUATION

This section summarizes the results of the 2021 fish tissue PCB sampling at five locations along the Shiawassee River: upstream of M-59 (ISM-29), ISM-M1-27, Bowen Road, West Marr Road, and Chase Lake Road (**Figure 5-1**). In accordance with the 2020 FSP (CTI and Arcadis, 2020), sampling was conducted in areas where historical fish tissue data exist to allow evaluation of changes over time and to provide baseline data for future monitoring.

During fish tissue sampling, fish community composition was evaluated at each location during a single pass of the entire sampling extent using backpack electrofishing equipment. Fish were captured and placed live in a holding net at each location and identified, counted, and measured (total length). This was done to determine the appropriate target species to collect for tissue sampling, and to inform future fish collection efforts during LTM. Fish not retained for PCB analysis were released live back to the river. The fish community data presented in **Tables 5-1 through 5-5** show that the predominant edible-size adult fish species available for tissue collection in the Shiawassee River at all locations were rock bass and white sucker. A limited number of adult edible-size sunfish, Northern pike, and common carp were also observed, but not at every location. No smallmouth bass of any size were observed during the fish tissue sampling and fish community composition evaluation.

Fish collected for the fish community survey (**Tables 5-1 through 5-5)** were evaluated to identify target and substitute species abundance for laboratory analysis based on the target size classes identified in Table 3-1 of the 2020 FSP (CTI and Arcadis, 2020). The samples selected for laboratory analysis included 25 white sucker samples exceeding 30.5 centimeters (> 12 inches), except one white sucker sample of 28.7 centimeters (approximately 11.3 inches) collected at ISM-MI-27 (**Table 5-6**). Panfish samples selected for laboratory analysis included 23 rock bass samples ranging between 15.3 and 23.0 centimeters in length (approximately 6 to 9 inches), four pumpkinseed samples ranging from 14 to 16.2 centimeters (approximately 5.5 to 6.4 inches), and three bluegill samples ranging from 15.1 to 16.8 centimeters (approximately 5.9 to 6.6 inches). Only one rock bass sample of 23.0 centimeters (> 9 inches) was observed during the community survey (and during the additional sampling effort immediately following the community survey). Therefore, the remaining 22 rock bass samples smaller than the target size of 23 centimeters (approximately 9 inches) were selected for laboratory analysis. Additionally, one pumpkinseed sample of 14 centimeters in length and one bluegill sample of 15.1 centimeters in length were collected for laboratory analysis and did not meet the target size exceeding 15.3 centimeters (> 6 inches).

Wet-weight PCB concentrations, lipid content, and lipid-normalized PCB concentrations are summarized in **Tables 5-7, 5-8, and 5-9**, respectively, for 25 white sucker and 30 panfish (including 23 rock bass, four pumpkinseed, and three bluegill) samples collected in 2021. The process of lipid normalizing is commonly used in the assessment of gradients and trends in fish PCB levels because the fat content in fish generally accounts for much of the variation in wet-weight PCB concentrations within and between species. In addition, the confidence limits around the arithmetic mean tend to become smaller when data are adjusted for lipid content. Evaluation of both wet-weight and lipid-normalized PCB fish tissue concentrations is used in evaluation of fish tissue data (Great Lakes Commission, 2003), especially when large variation in lipid content may occur temporally, such as that discussed in Santini et al., 2015.

The baseline fish samples were not collected for the purpose of adjusting fish consumption advisories, as the State of Michigan is responsible for sampling and issuance of any revisions to the advisories. The current advisories remain in place and should be followed until adjusted by the State. As a part of this evaluation, concentrations of wet-weight total PCB congeners in fish samples were compared to the fish consumption advisory for the “Do Not Eat” meal category (2.7 mg/kg; Michigan Department of Community Health, 2016) as a line of evidence indicating progress toward reducing risks to fish consumers. The advisories are established, maintained, and reviewed independently by the State of Michigan for citizen safety.

5.1 Fish Tissue Summary

PCBs were detected in each of the 25 white sucker and 30 panfish samples. Boxplots depicting total PCBs by species and location are presented on **Figure 5-1** for wet-weight PCBs and **Figure 5-2** for lipid content in 2021 fish tissue samples, and **Figure 5-3** for lipid-normalized PCBs.

Concentrations of wet-weight total PCB congeners for all sample locations ranged from 0.231 mg/kg (ISM-29) to 1.720 mg/kg (Bowen Road) in white suckers and 0.0188 mg/kg (ISM-29) to 0.851 mg/kg (West Marr Road) in panfish (**Table 5-6** and **Figure 5-1**). Excluding the samples collected at the upstream location (ISM-29), average and median wet-weight PCB concentrations for white suckers (0.781 mg/kg and 0.624 mg/kg, respectively) were higher than those for panfish (0.476 mg/kg and 0.519 mg/kg, respectively). Wet-weight PCB concentrations for white suckers were highest in fish tissue samples collected at Bowen Road (range of 1.34 mg/kg to 1.72 mg/kg and mean of 1.51 mg/kg) and lowest in fish tissue samples collected at Chase Lake Road (range of 0.298 mg/kg to 0.717 mg/kg and mean of 0.465 mg/kg) (**Figure 5-1**). Wet-weight PCB concentrations for panfish were highest at West Marr Road (range of 0.394 mg/kg to 0.851 mg/kg and mean of 0.585 mg/kg) and lowest in fish tissue samples collected at the upstream location (ISM-29, range of 0.0188 mg/kg to 0.643 mg/kg and mean of 0.175 mg/kg) (**Figure 5-1**).

Lipid content for all sample locations ranged from 0.25% (ISM-M1-27) to 1.49% (ISM-29) in white suckers and 0.11% (Chase Lake Road) to 0.78% (West Marr Road) in panfish (**Table 5-8** and **Figure 5-2**). Average and median lipid content for white suckers (0.644% and 0.530%) were higher than those for panfish (0.333% and 0.315%) (**Figure 5-2**).

Concentrations of lipid-normalized total PCB congeners for all sample locations ranged from 32.1 to 374 milligrams per kilogram lipid (mg/kg-lipid) in white suckers and 6.86 to 471 mg/kg-lipid in panfish (**Table 5-9** and **Figure 5-3**). Sampling results indicated that average and median lipid-normalized PCB concentrations (147 mg/kg and 128 mg/kg-lipid) in panfish were higher than white suckers (126 mg/kg-lipid and 107 mg/kg-lipid). Excluding the samples collected at the upstream location (ISM-29), average and median lipid-normalized PCB concentrations for panfish (170 mg/kg-lipid and 137 mg/kg-lipid, respectively) were higher than those for white suckers (137 mg/kg-lipid and 112 mg/kg-lipid, respectively). Average lipid-normalized PCB concentrations in white sucker were highest at Bowen Road (208 mg/kg-lipid), while average lipid-normalized PCB concentrations in panfish were highest at Chase Lake Road (265 mg/kg-lipid). Average lipid-normalized PCB concentrations were lowest for all species sampled upstream of the former CFC facility at ISM-29, with concentrations of 80.3 mg/kg-lipid in white sucker tissue and 53.6 mg/kg-lipid in panfish.

Correlation plots shown on **Figures 5-4 and 5-5** indicate a statistically significant ($p < 0.05$) relationship between PCB concentrations and lipid content for Site-wide white sucker tissue; however, there is no statistically significant correlation for these variables present in Site-wide panfish samples ($p = 0.72$). Additionally, there is no correlation between lipid content and fish length or weight for both white sucker ($p = 0.199$ for lipid content vs. length; $p = 0.632$ for lipid content vs. weight) and panfish species ($p = 0.554$ for lipid content vs. length; 0.694 for lipid content vs. weight), as shown on **Figures 5-4 and 5-5**.

5.2 Spatial Patterns

Multiple factors affect fish bioaccumulation of PCBs and impart variability in observed fish tissue concentrations for a given species, including fidelity of the collected fish to the sample location, availability of prey, differences in PCB concentrations in prey species, and differences in diet, habitat quality, and other factors. These other factors include the physiology, age, sex, life history, spawning, metabolic rate, lipid content, migratory and other behavioral patterns of individual fish, and these differences among species contribute to differences in results between species (Exponent, 2003). The potential influence of these factors imparts uncertainty to the evaluation of spatial and temporal variations in fish PCB concentrations.

Average wet-weight PCB congeners concentrations in white sucker fish tissue were highest at the Bowen Road sampling location immediately downstream of the former CFC facility (1.51 mg/kg) (**Figure 5-6**). At the other sampling locations upstream and downstream of the former CFC facility, average wet-weight PCB concentrations were generally similar, ranging from 0.465 mg/kg (Chase Lake Road) to 0.585 mg/kg (ISM-M1-27) (**Figure 5-6**). Average wet-weight total PCB concentrations in panfish tissue showed a gradual increase from sampling locations ISM-29 (0.175 mg/kg) through ISM-M1-27 (0.322 mg/kg), before remaining fairly stable through the Bowen Road (0.507 mg/kg), West Marr Road (0.585 mg/kg), and Chase Lake Road (0.492 mg/kg) sampling locations.

Maximum concentrations of wet-weight total PCB measured in white sucker and panfish skin-on fillet samples were below the fish consumption screening value for the "Do Not Eat" meal category (2.7 mg/kg; Michigan Department of Community Health, 2016). The data comparison results indicate the advisories are currently protective. If confirmed through future sampling by the State, the declines in fish tissue concentrations may at some point allow the advisories to be adjusted to less restrictive consumption advisories. Nevertheless, it is recommended that fish containing PCB levels exceeding 0.11 mg/kg be consumed no more than once a month (Michigan Department of Community Health, 2016). The Eat Safe Fish Guide (Michigan Department of Health and Human Services, 2023) advises against the consumption of any fish from the Site.

Lipid-normalized PCB concentrations in white sucker increased from a mean of 80.3 mg/kg-lipid at sampling location ISM-29 to 137 mg/kg-lipid at ISM-M1-27 and to 208 mg/kg-lipid at Bowen Road, followed by a decrease to 109 mg/kg-lipid at West Marr Road and 95 mg/kg-lipid at Chase Lake Road (**Figure 5-7**). Lipid-normalized mean PCB levels in panfish tissue increased from upstream to downstream with the highest results at Chase Lake Road (265 mg/kg-lipid).

Comparisons of the historical PCB dataset to the current PCB dataset are affected by the difference in the PCB analysis methods; historical data were primarily analyzed for PCB Aroclors (i.e., commercial mixtures of PCB compounds) and the current fish data were analyzed for individual PCB congeners. While the PCB Aroclor method may not provide the same level of sensitivity due to typically higher detection limits in comparison to PCB congener methods, the presence of consistently detected concentration results provide valuable information to support the evaluation of temporal patterns.

While the difference in the PCB analysis methods preclude a more rigorous statistical comparison, the 2021 PCB congener concentrations results were lower than those observed historically (pre-2017) for similar species and sampling locations (CTI, 2015).

5.3 PCB Composition Analysis

Multivariate analysis (Lê et al. 2008) using PCA and HCA was completed to evaluate the variation in composition of PCB homologue groups in the fish tissue samples (**Figure 5-8**). Similar to the water column data analysis presented in Section 4.5, this was done to provide insight as to whether the makeup of PCBs reflected in fish varies across the site. Prior to the PCA, data were converted to percent of total PCB and standardized to zero mean and unit standard deviation.

Similar composition of PCB homologue groups is observed in white sucker and panfish samples from five sample locations at the Site, with slightly different distribution of PCB homologue groups in panfish samples at an upstream sampling location ISM-29 than other sample locations. Tetrachlorobiphenyl and pentachlorobiphenyl congeners consistently exhibit the highest concentrations among homologue groups detected in white sucker samples collected at all five sample locations and in panfish samples collected at four sample locations, excluding ISM-29. Panfish samples collected at sampling location ISM-29 exhibited higher concentrations of pentachlorobiphenyl and hexachlorobiphenyl congeners. The transition of PCB composition between the sampling location ISM-29 and downstream locations is further investigated by PCA analysis of homolog percentages in fish samples from these locations.

The scree plot was used to determine the number of PCs to keep in the PCA. The elbow of the curve where the eigen values level off was used to determine the PCs retained as significant (**Figure 5-8**). Agglomerative HCA was then performed on the PCs of the PCA using the Ward Method which results in "de-noising" to separate signal and noise in the dataset. The HCA was used to group results into subsets (or clusters) that are more similar to each other than to those in other groups or clusters. The number of clusters was determined by inspection of dendrogram illustrating which clusters have been joined at each stage of the analysis and the distance between clusters at the time of joining. The optimum number of clusters may be the number present just before that large jump in distance. Based on the significant gap observed between the three branches on the cluster dendrogram, with a height exceeding 10, the data points were assigned to three distinct clusters as described below:

- Cluster 1 consists of white sucker and panfish fish tissue samples primarily collected at four sampling locations downstream of M-59 (ISM-M1-27, Bowen Road, West Marr Road, and Chase Lake Road). This group is characterized by less chlorinated PCB congeners relative to samples grouped in other clusters:
    - Higher proportions of dichlorobiphenyl, trichlorobiphenyl, monochlorobiphenyl, and tetrachlorobiphenyl congeners (sorted from the strongest); and

  - Lower proportions of pentachlorobiphenyl, hexachlorobiphenyl, nonachlorobiphenyl, heptachlorobiphenyl, octachlorobiphenyl, and decachlorobiphenyl congeners (sorted from the weakest).

- Cluster 2 consists of samples collected at sampling location ISM-29 (four white sucker and two panfish) and at downstream locations ISM-M1-27 (two white sucker and three panfish), Chase Lake Road (five panfish), and West Marr Road (one panfish) and is characterized by:
  - Higher proportions of pentachlorobiphenyl congeners; and
  - Lower proportions of dichlorobiphenyl, monochlorobiphenyl, and trichlorobiphenyl congeners (sorted from the weakest).

- Cluster 3 consists of one white sucker and four panfish samples collected at sampling location ISM-29 and is characterized by:
  - Higher proportions of hexachlorobiphenyl, heptachlorobiphenyl, octachlorobiphenyl, nonachlorobiphenyl, and decachlorobiphenyl congeners (sorted from the strongest); and
  - Lower proportions of tetrachlorobiphenyl, trichlorobiphenyl, dichlorobiphenyl, and monochlorobiphenyl congeners (sorted from the weakest).

A PCA biplot was generated with PC1 and PC2 as axes and data points grouped into the above three clusters (**Figure 5-8**). The first two components of PCA indicate 89.9% of the variance (PC1 = 71.4%; PC2 = 18.5%). The first PC, which describes most of the variance, separates samples with higher proportions of more chlorinated PCB congeners (hexachlorobiphenyl, heptachlorobiphenyl, octachlorobiphenyl, nonachlorobiphenyl, and decachlorobiphenyl) from less chlorinated PCB congeners (tetrachlorobiphenyl, trichlorobiphenyl, dichlorobiphenyl, and monochlorobiphenyl). Samples collected at ISM-29 primarily plot positively along PC1, while downstream locations plot negatively. The resemblance in percentages of PCB homologue groups in Cluster 1 indicates that the PCBs in these locations may originate from a common and consistent source. The deviation in the homologue groups for Clusters 2 and 3 indicates that the source of PCBs that fish caught upstream of M-59 at ISM-29 are exposed to, may differ from the source of PCBs that fish are exposed to in the sampling locations downstream of M-59. M-59 is the upstream boundary of the Site (see Section 1).

6.0 SEDIMENT DATA EVALUATION

As summarized in Section 2.3, composite sediment samples were collected in 2021 from the 0- to 2-inch surface and 2- to 6-inch subsurface intervals at 239 transects located between M-59 and Steinacker Road and at four transects located in background areas upstream of M-59 (**Figures 2-3a through 2-3f**). The primary intent of the sediment sampling was to evaluate changes in surface sediment PCB concentrations in comparison to historical sampling results and to establish a baseline in anticipation of future sampling events. Samples were additionally analyzed for TOC to evaluate PCB concentrations on a carbon basis, as PCBs display preferential partitioning into organic matter. Because PCBs are primarily associated with organic matter in sediments, gradients in concentrations may be more readily observed when data are TOC-adjusted than when examined solely on a dry-weight basis. TOC-adjustment of sediment PCB concentrations is a technique that has been commonly applied for various purposes (e.g., USEPA 2001a; Ohio Environmental Protection Agency, 2010; Washington State Department of Ecology, 1992, 1993). The bioavailability and mobility of PCBs in sediment are closely linked to porewater concentrations, which can be effectively related to TOC-adjusted concentrations through organic carbon-water partitioning coefficients. These correlations enhance the capacity of TOC-adjusted PCB concentrations to provide valuable insights into the sources and distribution of PCBs and support future MNR evaluations. Analytical results for sediment samples are presented in **Table 6-1**, and a statistical summary of sediment sample results is presented in **Table 6-2**.

Total PCBs concentrations for surface and subsurface sediment samples were used to estimate the SWACs to support the spatial evaluation of PCB concentration in sediment at the Site, excluding the upstream sample locations.[5] SWACs were also used to reduce effects of bias in averaging datasets with different spatial densities. For the purposes of this Report, the SWAC was calculated for each of the five sections of the river identified in Section 3.2.2.[6]

The SWAC in each river section was calculated using Equation 10 below:

Equation 10:

$$C_{SWAC} = \frac{\sum_{t=1}^{N} C_t \times A_t}{\sum_{t=1}^{N} A_t}$$

where:

C_{SWAC} = River section SWAC;

C_t = Transect-specific concentration;

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[5] One out of four upstream samples indicated detected PCB results and therefore, SWAC was not estimated for the upstream area due to lack of sufficient detected results to estimate the mean concentration.

[6] Although the SWAC discussion in Section 6 is based on the five sections of the river identified based on PCB distributions and bridge crossings, as explained in Section 3.2.2, **Figures 6-5 through 6-7** include a summary table presenting SWAC by each river mile.

A_t = Transect-specific Theissen polygon area;

N = Number of transects in river section; and

t = Select transect in river section.

The sum of the product of the transect-specific concentration (C_t) and Theissen polygon area (A_t) within each river reach ($\sum_{t=1}^{N} C_t \times A_t$) was estimated by calculating the river section mean of the products and multiplying by the number of transects in the river section.[7] The individual transects in each river section and the areas between the transects (transect-specific Theissen polygons) are presented on **Figures 6-1a through 6-1f**.

The length-weighted sediment concentration per transect was estimated using the total Aroclor PCBs results for the 0- to 2-inch and 2- to 6-inch sediment samples collected at the given transect, and then the length-weighted SWAC per section was calculated using the above Equation 10. Analytical results for sediment samples are presented on **Figures 6-2a, 6-2b, 6-3a, 6-3b, 6-4a, and 6-4b** by constituent and sampling depth. Sediment SWACs are presented on **Figures 6-5 through 6-7**.

6.1 Statistical Evaluation

Surface and subsurface sediment samples were collected from 0 to 2 inches below ground surface and from 2 to 6 inches below ground surface, respectively. In background areas upstream of the former CFC facility, total PCBs were detected in 12.5% (one of eight) of sediment samples, with a single detected result of 0.206 mg/kg (**Table 6-2**). In contrast, total PCBs were detected in 99.0% (473 of 478) of all other sediment samples located between M-59 and Steinacker Road, with concentrations ranging from non-detect to a maximum of 22 mg/kg. The frequency of PCB detections in surface and subsurface sediment samples was similar; PCBs were detected in surface samples (0 to 2 inches) and subsurface samples (2 to 6 inches) at a frequency of 99.2% (237 of 239) and 98.7% (236 of 239), respectively.

Surface sediment sample concentrations ranged from non-detect to 3.13 mg/kg at Transect T-201 between Bowen Road and West Marr Road (**Figures 6-1b and 6-2a**). The mean PCB concentration in all surface sediment samples was 0.464 mg/kg, with a standard deviation of 0.355 mg/kg and median of 0.388 mg/kg. Subsurface sample concentrations ranged from non-detect to 22 mg/kg at Transect T233 between M-59 and Bowen Road (**Figures 6-1a and 6-2b**). The mean PCB concentration for all subsurface sediment samples was 0.682 mg/kg, with a standard deviation of 1.49 mg/kg and median of 0.479 mg/kg.

TOC concentrations in surface sediment samples, excluding background, ranged from 1,240 mg/kg to 73,700 mg/kg at Transect T-033 between West Marr Road and Chase Lake Road (**Figure 6-4a**). Mean TOC concentrations in site-wide surface sediment samples were 16,200 mg/kg, with a standard deviation of 14,300 mg/kg and median of 10,900 mg/kg. TOC concentrations in Site-wide subsurface sediment samples ranged from 798 mg/kg to 65,100 mg/kg at Transect T-038 between West Marr Road and Chase

[7] Arithmetic mean estimated for river section datasets with no non-detect results. The Kaplan-Meier mean estimated for river section datasets with non-detect results.

Lake Road (**Figure 6-4b**). The mean TOC concentration for all Site-wide subsurface samples was 16,800 mg/kg, with a standard deviation of 13,400 mg/kg and median of 12,700 mg/kg.

Sediment TOC-adjusted PCB levels were highest in the M-59 to Bowen Road section, with a maximum concentration of 4,490 milligrams per kilogram of organic carbon (mg/kg-OC) detected in subsurface samples. The minimum detected TOC-adjusted PCB concentration for all samples was 2.06 mg/kg-OC, collected from subsurface sediment between Bowen Road and West Marr Road. Mean TOC-adjusted PCB concentrations were 54.9 mg/kg-OC in surface samples and 84.4 mg/kg-OC in subsurface samples, with corresponding standard deviations of 75.5 mg/kg-OC (surface) and 307 mg/kg-OC (subsurface). Median PCB concentrations were 32.3 mg/kg-OC in surface sediment samples and 37.1 mg/kg-OC in subsurface sediment samples.

6.2 Spatial Patterns in Total PCBs and TOC-Normalized Total PCBs

Total PCB concentrations in the 0- to 2-inch sediment surface interval showed a notable increase downstream of the M-59 bridge (**Figure 6-2a**). Concentrations of total PCBs appear to increase moving downstream of the M-59 bridge, peaking at Transect T-201 (3.13 mg/kg) downstream of the Bowen Road bridge, before declining to fairly steady levels toward the West Marr Road bridge (**Figure 6-2a**). Measured concentrations of total PCBs at transect locations in the section between the M-59 and Bowen Road bridges and between the Bowen Road and West Marr Road bridge were not statistically significantly different.[8] Concentrations of total PCBs increase moving farther downstream of the West Marr Road bridge to Chase Lake Road. Between Chase Lake Road and Steinacker Road, the maximum total PCB concentration in surface sediment (i.e., 1.27 mg/kg at T-022) was lower than the maximum total PCB concentration measured between West Marr Road bridge to Chase Lake Road (i.e., 3.07 mg/kg at T-102); however, the distribution of total PCB concentrations were not statistically significantly different (**Figure 6-2a**). Measured total PCBs concentrations at transects between the West Marr Road bridge to Chase Lake Road and Chase Lake Road and Steinacker Road, respectively, were statistically significantly different than the population of results measured in the two sections downstream of the M-59 bridge (**Figure 6-2a**).

Total PCB concentrations in the 2- to 6-inch subsurface sediment interval generally follow the same spatial pattern (**Figure 6-2b**) shown in surface samples, though PCB concentrations were generally higher in

[8] Hypothesis testing was used to explore similarities or differences between dataset distributions in sediment PCB, TOC, and TOC-adjusted concentrations. Data distributions without non-detect results were tested using non-parametric tests of stochastic dominance (i.e., Wilcoxon-Mann-Whitney test). Tests, such as the Wilcoxon-Mann-Whitney test, indicate that at least one sample population stochastically dominates (i.e., greater than) another, or when applied as a two-sided test, assesses whether the population distributions being tested are equal or not (Kruskal and Wallis, 1952; Mann and Whitney, 1947; Conover, 1999; Sprent and Smeeton, 2000). If datasets contained non-detects, data distributions were tested using methods for censored data (e.g., generalized Wilcoxon test; Helsel, 2012). The generalized Wilcoxon test, as formulated by Peto and Peto, can be used to evaluate differences between the survival distributions of two or more groups of independent censored observations (Peto and Peto, 1972). For data comparisons with more than two individual populations, the Benjamini-Hochberg adjustment was used to minimize the false discovery rate (Benjamini and Hochberg, 1995).

subsurface samples. Consistent with the surface sediment, total PCB concentrations in the sections between the M-59 bridge and Bowen Road bridge and between the Bowen Road and West Marr Road bridge were not statistically significantly different (**Figure 6-2b**). Likewise, the distributions of total PCB concentrations were not statistically significantly different between the West Marr Road bridge to Chase Lake Road and Chase Lake Road to Steinacker Road (**Figure 6-2b**). Total PCB concentrations between Bowen Road and the West Marr Road bridge were statistically significantly different than the two downstream sections, with the distribution of concentrations within this section generally lower (**Figure 6-2b**).

The spatial and temporal distribution of PCBs in sediments can be affected by interactions between PCBs and grain size and organic carbon. PCBs, like other hydrophobic organic compounds, have a high affinity to organic matter and fine-grained particulates (e.g., silt and clay). Therefore, sediment PCB results were normalized to organic carbon to help to reduce variability and allow for a more meaningful assessment of spatial and temporal patterns in PCB concentrations. **Figures 6-3a and 6-3b** depict the TOC-adjusted PCB concentrations by transect in the surface and subsurface intervals, respectively. When PCB concentrations were normalized to TOC, a clear declining trend in TOC-adjusted PCB concentrations was observed in both the 0- to 2-inch and 2- to 6-inch intervals (**Figures 6-3a and 6-3b**). Statistically significant differences can be observed between each of the sections, with notably lower TOC-adjusted PCB concentrations decreasing with increasing distance downstream of the former CFC facility (**Figures 6-3a and 6-3b**).

The spatial pattern in the TOC-adjusted PCB results can be attributed to the distribution of organic carbon in sediments (**Figures 6-4a and 6-4b**). An example of this is observed downstream of the West Marr Road Bridge at RS 24+500, where an increase in both organic carbon content and the total PCB concentration in the surface sediment was observed (**Figure 6-4a and Figure 6-2a**, respectively). This change aligns with the transition from higher gradient to lower gradient (Figure 4 in 2020 FSP [CTI and Arcadis, 2020]) which would likely result in accumulation of finer grained sediment with higher organic content. As was observed in the TOC-adjusted PCB concentrations, statistically significant differences are observed between each of the sections, with concentrations of organic carbon in sediments showing an increasing trend moving downstream through the Site (**Figures 6-4a and 6-4b**).

The pattern in total PCB, TOC-adjusted PCB, and TOC are exemplified by SWACs in both the 0- to 2-inch and length-weighted 0- to 6-inch sampling intervals (**Figures 6-5, 6-6, and 6-7**, respectively). The surface and subsurface sampling intervals were length-weighted to provide a singular representative result for comparison to the historical 0- to 6-inch subsurface sampling interval. Consistent with the distribution of total PCB results, the total PCB SWACs in surface sediments were similar between the M-59 bridge and Bowen Road bridge (0.367 mg/kg) and between the Bowen Road bridge and West Marr Road bridge (0.372 mg/kg) (**Figure 6-5**). Likewise, total PCB SWACs were similar between West Marr Road bridge and Chase Lake Road (0.551 mg/kg) and between Chase Lake Road and Steinacker Road (0.537 mg/kg) (**Figure 6-5**). In the length-weighted 0- to 6-inch interval, the total PCB SWAC is notably higher between the M-59 bridge and Bowen Road bridge (1.05 mg/kg), which can be attributed to the maximum total PCB concentration measured in the 2- to 6-inch subsurface interval at the T-233 transect location (22 mg/kg). Consistent with the spatial pattern in TOC-adjusted PCB and TOC concentrations, TOC-adjusted PCB

SWACs decrease moving downstream from the former CFC facility, while TOC SWACs increase moving downstream from the former CFC facility (**Figures 6-6 and 6-7**).

The total PCB SWAC for the historical 0- to 6-inch samples collected using the incremental sampling methodology (ISM) during the 2013 Conceptual Site Model Sample Event (CTI, 2015) ranged from 0.490 to 3.96 mg/kg (CTI, 2015). Additionally, the total PCB SWAC for composite sediment samples (0 to 6 inches) collected from River Mile 1 during this same event was 1.02 mg/kg (CTI, 2015). The length-weighted comparison of baseline sediment samples to the 2013 samples indicated a decrease in total PCB SWACs for River Miles 2 through 8 (**Figure 6-5**), whereas the total PCB SWAC in River Mile 1 for the 2013 composite samples (1.02 mg/kg; CTI, 2015) was similar to the total PCB SWAC for baseline sediment samples (1.05 mg/kg).

6.2.1 Sediment Triplicate Sample Results

Triplicate samples were collected at 13 sampling locations to assess spatial variability within the transects. For each of the selected locations, two additional samples were collected from separate transects approximately 1 meter from the original sample location. Total PCB concentrations for triplicate samples are presented in **Table 6-3** and on **Figure 6-8.** The triplicate sampling results did not demonstrate a clear relationship between triplicate variability and spatial distribution; TOC variability in surface sediment generally increases as distance from the parent transect increases (**Table 6-3**). The RPDs observed in the parent and associated triplicate samples primarily reflect heterogeneity in sediment distribution. A higher RPD was observed at Triplicate #2, when compared to Triplicate #1, at 10 of 13 transect locations. However, there is no clear relationship noted among subsurface TOC or surface and subsurface PCB, with approximately half of the sediment locations showing increased variability with increased distance from the parent transect sample result. Relative variability amongst total PCB results was assessed using a coefficient of variation in the 0- to 2-inch surface and 2- to 6-inch subsurface sample intervals at each triplicate sample location. The highest coefficients of variation for both the 0- to 2-inch and 2- to 6-inch intervals (95.6 and 71.8, respectively) occurred at T-221, located just downstream of the former CFC facility. Coefficients of variation fluctuated widely throughout the sediment, ranging from 1.69 to 95.6 with a median of 18.2 in the 0- to 2-inch surface interval, and ranging from 2.75 to 71.8 with a median of 17.65 in the 2- to 6-inch subsurface interval.

As depicted on **Figure 6-8**, heterogeneity on the scale of the triplicate samples is significantly less pronounced than the differences in concentrations observed longitudinally in parent samples collected along the river. Thus, triplicate samples are unlikely to have significant impacts on the SWAC estimates and were not included in SWAC calculations.

7.0 NEXT STEPS

The baseline sampling data presented in this Report establish a useful baseline measurement of PCB concentrations at the Site in surface water, fish, and sediment. This baseline dataset supplements existing data in biotic and abiotic matrices and will be used to develop the LTMP for the Site. The LTMP will outline anticipated future sampling and monitoring efforts needed to collect data that is comparable to the baseline dataset for use in evaluating long-term time trends in PCB exposure concentrations in Site media. The baseline sampling data will also be used to update the conceptual site model, which will be summarized in the MNR Report currently in preparation. Additionally, an assessment of various lines of evidence for recovery based on comparison of the historical and baseline sampling will be presented, within the limits and uncertainties of the data. Conclusions from the evaluation of the observed changes over time in PCB exposure concentrations in Site media will be described in the MNR Report.

8.0 REFERENCES

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TABLES

Table 2-1
Summary of Precipitation Data
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Date	Daily Precipitation (inches)
9/1/2020	1.51
9/2/2020	0.01
9/3/2020	0
9/4/2020	0
9/5/2020	0
9/6/2020	0
9/7/2020	0.1
9/8/2020	1.93
9/9/2020	0.17
9/10/2020	0
9/11/2020	0
9/12/2020	0
9/13/2020	0.37
9/14/2020	0
9/15/2020	0
9/16/2020	0.01
9/17/2020	0
9/18/2020	0
9/19/2020	0
9/20/2020	0
9/21/2020	0
9/22/2020	0
9/23/2020	0
9/24/2020	0
9/25/2020	0
9/26/2020	0
9/27/2020	0
9/28/2020	0.39
9/29/2020	0.03
9/30/2020	0.58
10/1/2020	0.4
10/2/2020	0
10/3/2020	0
10/4/2020	0.08
10/5/2020	0
10/6/2020	0
10/7/2020	0
10/8/2020	0
10/9/2020	0
10/10/2020	0
10/11/2020	0
10/12/2020	0.35
10/13/2020	0
10/14/2020	0
10/15/2020	0
10/16/2020	0
10/17/2020	0
10/18/2020	0.28
10/19/2020	0.11
10/20/2020	0.17
10/21/2020	0.23
10/22/2020	2.11
10/23/2020	0.3
10/24/2020	0
10/25/2020	0
10/26/2020	0
10/27/2020	0.07
10/28/2020	0
10/29/2020	0
10/30/2020	0
10/31/2020	0
11/1/2020	0.14
11/2/2020	0
11/3/2020	0
11/4/2020	0
11/5/2020	0
11/6/2020	0
11/7/2020	0
11/8/2020	0

Notes:

1. Precipitation data recorded at Howell Livingston County Airport, (Station ID: WBAN:04887).
2. Round 1 and 2 sampling dates are highlighted.

Reference:

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Table 2-2
Surface Water Sample Location Summary
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample Location[1]	River Stationing (feet)	Easting[2]	Northing[2]	Channel Width (feet)	Round 1 Sampling Event in September 2020 (SP3™ Sampler Deployment)		Round 2 Sampling Event in November 2020 (SP3™ Sampler Retrieval)	
					Water Depth (feet)	Flow Velocity at Mid-Depth (feet/second)	Water Depth (feet)	Flow Velocity at Mid-Depth (feet/second)
UP-12	-4+45	13231483.74	408792.40	30	2.3	0.35	2.2	0.40
UP-11	-2+90	13231530.50	408935.17	25	2.9	0.25	3.0	0.27
BR-10	6+80	13231473.91	409666.93	22	2.5	0.58	2.5	0.67
BR-09	12+50	13231335.56	410152.61	30	1.7	0.74	1.8	0.78
BR-08	18+00	13231193.58	410647.17	31	1.1	0.63	1.2	1.1
BR-07	25+90	13231185.56	411373.34	27	1.2	1.1	1.3	0.74
BR-06	42+00	13231606.10	412659.02	19	1.2	0.81	2.6	0.83
BR-05	58+80	13231089.95	413754.61	19	1.9	0.77	1.9	1.2
BR-04	66+00	13230809.21	414317.71	20	1.9	0.72	2.4	2.00
MR-03	198+00	13228533.00	425778.56	29	1.6	0.53	1.8	0.49
CL-02	367+00	13226762.40	440698.90	28	1.6	0.60	2.2	0.39
SR-01	423+40	13226286.83	445662.27	29	2.5	0.61	2.4	0.78

Footnotes:

1. Locations are listed from the upstream to downstream direction.

2. Coordinates are provided in Michigan State Plane Coordinate South Zone, North American Datum of 1983, U.S. Survey Feet.

Table 2-3
Summary of SP3™ Sampler Deployment and Retrieval
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID[1]	SP3™ Deployment		SP3™ Retrieval		Deployment Duration (days)
	Date	Time	Date	Time	
UP-SP3-12	9/24/2020	10:25 AM	11/8/2020	1:40 PM	45
UP-SP3-11	9/24/2020	11:00 AM	11/8/2020	1:19 PM	45
BR-SP3-10	9/24/2020	1:25 PM	11/8/2020	11:21 AM	45
BR-SP3-09	9/24/2020	1:35 PM	11/8/2020	10:47 AM	45
BR-SP3-08	9/24/2020	1:55 PM	11/8/2020	9:56 AM	45
BR-SP3-07	9/24/2020	2:05 PM	11/8/2020	9:18 AM	45
BR-SP3-06	9/24/2020	2:30 PM	11/7/2020	4:54 PM	44
BR-SP3-05	9/24/2020	3:00 PM	11/7/2020	4:04 PM	44
BR-SP3-04	9/24/2020	3:15 PM	11/7/2020	2:56 PM	44
MR-SP3-03	9/24/2020	3:30 PM	11/7/2020	1:55 PM	44
CL-SP3-02	9/24/2020	4:00 PM	11/7/2020	12:48 PM	44
SR-SP3-01	9/24/2020	4:10 PM	11/7/2020	11:09 AM	44
UP-SP3-FB-11-01	9/24/2020	10:45 AM	9/24/2020	10:50 AM	--[2]
UP-SP3-FB-11-02	9/24/2020	10:45 AM	9/24/2020	10:50 AM	
UP-SP3-FB-11-03	9/24/2020	10:45 AM	9/24/2020	10:50 AM	

Footnotes:

1. Locations are listed from the upstream to downstream direction.

2. Three trip blanks were collected during SP3™ sampler deployment by exposing SP3™ sampler to air, light, and other ambient field conditions for approximately five minutes.

Table 4-1
Summary of Water Quality Parameter Measurements
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample ID[1]	River Stationing (feet)	Sample Date	Sample Time	Temperature (°C)	pH (S.U.)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	QA/QC Sample[2]
Round 1 Sampling Event (SP3™ Sampler Deployment)									
UP-SW-12_13.8	-4+45	9/24/2020	10:05 AM	14.88	7.26	0.47	0	7.94	
UP-SW-11_17.4	-2+90	9/24/2020	9:04 AM	14.95	7.19	0.47	0	7.53	
BR-SW-10_15	6+80	9/23/2020	5:04 PM	17.48	8.21	0.45	0	10.3	
BR-SW-09_10.2	12+50	9/23/2020	4:16 PM	17.08	8.86	0.45	0	11.0	
BR-SW-08_6.6	18+00	9/23/2020	2:33 PM	15.73	8.60	0.46	0	11.0	
BR-SW-07_7.2	25+90	9/23/2020	1:20 PM	15.05	8.33	0.46	0	10.1	
BR-SW-06_7.2	42+00	9/23/2020	9:15 AM	13.57	7.15	0.46	0	8.49	Field Duplicate
BR-SW-05_11.4	58+80	9/22/2020	6:22 PM	15.67	8.04	0.45	0	9.97	
BR-SW-04_11.4	66+00	9/22/2020	4:55 PM	15.61	8.49	0.45	0.30	9.93	
MR-SW-03_9.6	198+00	9/22/2020	3:21 PM	15.91	9.12	0.44	0	11.7	Field Duplicate
CL-SW-02_9.6	367+00	9/22/2020	11:44 AM	13.14	8.79	0.44	1.0	10.9	MS/MSD
SR-SW-01_15	423+40	9/22/2020	10:31 AM	11.86	7.27	0.45	2.4	8.75	
Round 2 Sampling Event (SP3™ Sampler Retrieval)									
UP-SW-12_13.2	-4+45	11/8/2020	1:48 PM	11.10	8.2	0.74	1.9	11.6	
UP-SW-11_18	-2+90	11/8/2020	1:06 PM	10.80	8.1	0.73	2.0	11.4	
BR-SW-10_15	6+80	11/8/2020	11:11 AM	9.50	8.02	0.72	2.1	10.2	
BR-SW-09_10.8	12+50	11/8/2020	10:29 AM	9.40	8.00	0.72	2.1	10.3	Field Duplicate
BR-SW-08_7.2	18+00	11/8/2020	9:44 AM	9.20	7.92	0.71	2.3	10.1	
BR-SW-07_7.8	25+90	11/8/2020	9:05 AM	9.20	7.50	0.71	2.2	9.52	
BR-SW-06_15.6	42+00	11/7/2020	4:42 PM	12.00	8.18	0.75	2.1	11.4	
BR-SW-05_11.4	58+80	11/7/2020	3:53 PM	12.10	8.23	0.75	1.6	12.0	
BR-SW-04_14.4	66+00	11/7/2020	2:47 PM	12.00	8.20	0.75	1.6	12.0	
MR-SW-03_10.8	198+00	11/7/2020	1:42 PM	12.10	8.34	0.72	1.4	13.2	
CL-SW-02_13.2	367+00	11/7/2020	12:25 PM	11.50	8.22	0.71	3.3	13.4	Field Duplicate
SR-SW-01_14.4	423+40	11/7/2020	10:36 AM	9.10	7.89	0.67	6.1	9.70	MS/MSD

Footnote:

1. Field parameter measurements were recorded for unfiltered sample by lowering the water quality meter directly in the river at the sample location.
2. In addition to field duplicate and MS/MSD samples, two equipment rinsate blanks were collected during both sampling events.

Acronyms and Abbreviations:

°C = degree Celsius
mg/L = milligrams per liter
mS/cm = milliSiemens per centimeter
MS/MSD = matrix spike and matrix spike duplicate
NTU = Nephelometric Turbidity Units
QA/QC = quality assurance/quality control
S.U. = standard unit

Table 4-2

Calculated C_{free} Results for SP3™ Samplers

2020-2021 Baseline Sampling Data Report

Shiawassee River Superfund Site, Howell, Michigan

SP3™ Sampler Location ID	CAS Number	Units	UP-SP3-12	UP-SP3-11	BR-SP3-10	BR-SP3-09	BR-SP3-08	BR-SP3-07	BR-SP3-06	BR-SP3-05	BR-SP3-04	MR-SP3-03	CL-SP3-02	SR-SP3-01
PCB-1	2051-60-7	ng/L	ND	ND	ND	1.60	1.70	2.30	3.20	3.00	3.20	3.00	2.50	2.70
PCB-2	2051-61-8	ng/L	ND	ND	ND	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-3	2051-62-9	ng/L	ND	ND	ND	0.150	0.140	0.170	0.230	0.240	0.240	0.170	0.180	0.210
PCB-4	13029-08-8	ng/L	ND	ND	ND	2.00	2.50	3.80	6.10	6.30	6.90	11.0	7.60	7.60
PCB-5	16605-91-7	ng/L	ND	ND	ND	ND	ND	ND JX	ND	ND	ND JX	ND JX	ND	ND JX
PCB-6	25569-80-6	ng/L	ND	ND	ND	0.220	ND X	0.430	0.470	0.540	0.540	0.670	0.690	0.760
PCB-7	33284-50-3	ng/L	ND	ND	ND	ND X	ND X	ND X	0.170	0.220	0.220	0.290	0.250	0.250
PCB-8	34883-43-7	ng/L	ND	ND	ND	0.760	0.760	1.30	1.90	2.70	2.70	3.10	2.70	2.70
PCB-9	34883-39-1	ng/L	ND	ND	ND	ND X	ND X	0.0650	ND X	0.0900	ND X	ND X	0.130	0.140
PCB-10	33146-45-1	ng/L	ND	ND	ND	0.100	ND X	0.180	0.280	0.350	0.330	0.540	0.350	0.350
PCB-11	2050-67-1	ng/L	ND	ND B	ND	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-12/13	12-13	ng/L	ND	ND	ND	0.0410	ND X	0.0970	0.150	0.180	0.180	0.220	0.190	0.180
PCB-15	2050-68-2	ng/L	ND	ND	ND	0.330	0.380	0.770	1.20	1.80	1.80	3.10	2.50	2.40
PCB-16	38444-78-9	ng/L	ND	ND	ND	0.0280	0.0170	0.0570	0.0740	0.0930	0.0870	0.150	0.160	0.160
PCB-17	37680-66-3	ng/L	ND JX	0.00370 J	ND JX	0.210	0.260	0.720	1.20	1.50	1.60	2.70	2.40	2.10
PCB-18/30	18-30	ng/L	ND B	ND B	ND B	0.160	0.110	0.310	0.400	0.390	0.400	0.790	0.930	0.980
PCB-19	38444-73-4	ng/L	ND	ND	ND	ND X	0.190	0.330	0.720	0.940	0.980	1.80	1.20	1.20
PCB-20/28	20-28	ng/L	0.00520 J	0.00800 J	0.00980 J	0.250	0.180	0.580	1.40	2.00	2.10	3.80	3.60	3.60
PCB-21/33	21-33	ng/L	ND JX	0.00200 J	ND JX	0.00930 J	ND JX	0.0280	ND X	0.0570	0.0510	0.100	0.0990	0.140
PCB-22	38444-85-8	ng/L	ND JX	ND JX	0.00150 J	0.0620	0.0380	0.120	0.230	0.270	0.280	0.490	0.480	0.490
PCB-23	55720-44-0	ng/L	ND	ND	ND	ND	ND	ND	0.00150 J	ND JX	ND JX	ND JX	ND JX	ND JX
PCB-24	55702-45-9	ng/L	ND	ND	ND	0.00490 J	ND JX	ND JX	ND JX	0.0150 J	0.0220	ND X	0.0280	ND X
PCB-25	55712-37-3	ng/L	0.000540 J	0.000800 J	ND JX	0.0830	0.0620	0.260	0.430	0.510	0.520	0.870	0.780	0.820
PCB-26/29	26-29	ng/L	ND JX	ND JX	ND JX	0.0780	0.0570	0.230	0.320	0.340	0.370	0.670	0.730	0.720
PCB-27	38444-76-7	ng/L	ND	ND	ND	0.0400	ND X	0.120	0.250	0.350	0.370	0.620	0.490	0.460
PCB-31	16606-02-3	ng/L	ND JX	0.00430 J	0.00490 J	0.200	0.170	0.640	0.910	1.00	1.10	2.00	2.10	2.20
PCB-32	38444-77-8	ng/L	ND B	ND B	ND B	0.150	0.150	0.350	0.720	1.10	1.10	1.40	1.10	1.10
PCB-34	37680-68-5	ng/L	ND	ND	ND	0.00300 J	0.00280 J	0.0110	0.0200	0.0240	0.0270	0.0510	0.0450	0.0430
PCB-35	37680-69-6	ng/L	ND	ND	ND	ND	0.000320 J	ND JX	0.00160 J	0.00270 J	0.00270 J	ND JX	0.00480 J	0.00420 J
PCB-37	38444-90-5	ng/L	ND JX	ND JX	ND JX	0.00500	0.00560	0.0140	0.0340	0.0560	0.0620	0.150	0.200	0.190
PCB-38	53555-66-1	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-39	38444-88-1	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	ND XB	ND B	ND B	ND B	ND B	ND B
PCB-40/41/71	40-41-71	ng/L	ND JX	0.00190 J	ND JX	0.0360	0.0290	0.0990	0.180	0.240	0.270	0.450	0.470	0.460
PCB-42	36559-22-5	ng/L	ND	0.00160 J	0.00170 J	0.0270	0.0190	0.0620	0.120	0.150	0.160	0.300	0.310	0.290
PCB-43/73	43-73	ng/L	ND	ND	ND	ND B	ND B	ND B	0.0280	0.0360	0.0420	ND B	0.0760	0.0550
PCB-44/47/65	44-57-65	ng/L	ND B	ND B	ND B	ND B	ND B	0.240	0.460	0.680	0.760	1.30	1.20	1.10
PCB-45/51	45-51	ng/L	ND	ND B	ND	ND B	ND B	0.0710	0.130	0.160	0.180	0.310	0.260	0.260
PCB-46	41464-47-5	ng/L	ND	ND	ND	0.00650	ND JX	0.0150	0.0260	0.0260	0.0310	0.0560	0.0490	0.0480
PCB-48	70362-47-9	ng/L	ND	ND JX	0.00100 J	0.00730	0.00560	0.0170	0.0420	0.0580	0.0660	0.110	0.120	0.110
PCB-49/69	49-69	ng/L	0.00320 J	0.00490 J	0.00540 J	0.0750	0.0590	0.190	0.340	0.460	0.490	0.920	1.00	1.00
PCB-50/53	50-53	ng/L	ND	ND B	ND	ND B	ND B	ND B	0.0960	0.110	0.120	0.250	0.240	0.230
PCB-52	35693-99-3	ng/L	0.00710	0.0110	ND B	0.0870	0.0690	0.220	0.390	0.490	0.540	1.00	1.20	1.10
PCB-54	15968-05-5	ng/L	ND	ND	ND	ND B	ND B	ND B	ND B	ND B	0.00500 J	0.00780 J	0.00590 J	0.00570 J
PCB-55	74338-24-2	ng/L	ND	ND	ND JX	ND JX	ND JX	0.00190 J	0.00620	0.00960	0.0110	0.0190	0.0240	0.0190
PCB-56	41464-43-1	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	0.0590	0.0910	0.100	0.180	0.220	0.190
PCB-57	70424-67-8	ng/L	ND	ND	ND	ND JX	0.000480 J	0.00120 J	0.00390	0.00610	0.00670	0.0130	0.0130	0.0130

Table 4-2
Calculated C_{free} Results for SP3™ Samplers
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

SP3™ Sampler Location ID	CAS Number	Units	UP-SP3-12	UP-SP3-11	BR-SP3-10	BR-SP3-09	BR-SP3-08	BR-SP3-07	BR-SP3-06	BR-SP3-05	BR-SP3-04	MR-SP3-03	CL-SP3-02	SR-SP3-01
PCB-58	41464-49-7	ng/L	ND	ND	ND	ND JX	ND	ND	0.00180 J	0.00210 J	0.00260	0.00490	ND X	ND X
PCB-59/62/75	59-62-75	ng/L	ND	0.000750 J	0.000640 J	0.00950 J	0.00760 J	0.0240	0.0550	0.0800	0.0910	0.150	0.160	0.150
PCB-60	33025-41-1	ng/L	ND JX	ND JX	ND JX	0.00670	0.00650	0.0140	0.0400	0.0710	0.0790	0.140	0.140	0.130
PCB-61/70/74/76	61-70-74-76	ng/L	ND JX	0.00650 J	0.0110	0.0530	0.0430	0.110	0.270	0.460	0.480	0.860	0.940	0.890
PCB-63	74472-34-7	ng/L	ND	ND	ND JX	0.00390	0.00320	0.00810	0.0200	0.0370	0.0390	0.0680	0.0710	0.0720
PCB-64	52663-58-8	ng/L	0.00180 J	0.00260 J	0.00340 J	0.0410	0.0320	0.0990	0.200	0.270	0.300	0.550	0.630	0.570
PCB-66	32598-10-0	ng/L	0.00250	0.00400	0.00660	0.0330	0.0280	0.0660	0.170	0.300	0.330	0.560	0.650	0.610
PCB-67	73575-53-8	ng/L	ND	ND	ND	0.00170 J	0.00140 J	0.00350	0.00920	0.0150	0.0170	0.0300	0.0290	0.0280
PCB-68	73575-52-7	ng/L	ND B	ND B	ND	ND B	ND B	ND XB	ND B	0.00860	0.00920	0.0160	0.0140	0.0150
PCB-72	41464-42-0	ng/L	ND	ND	ND	0.000830 J	0.000800 J	0.00320	0.00640	0.0100	0.0110	0.0200	0.0180	0.0200
PCB-77	32598-13-3	ng/L	ND	ND	0.000370 J	0.00120 J	ND JX	0.00260	0.00750	0.0140	0.0160	0.0310	0.0330	0.0300
PCB-79	41464-48-6	ng/L	ND	ND	ND	ND JX	ND	ND	0.000680 J	0.00120 J	0.00120 J	0.00270 J	0.00250 J	ND JX
PCB-80	33284-52-5	ng/L	ND B	ND XB	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND XB	ND XB
PCB-81	70362-50-4	ng/L	ND B	ND	ND	ND	ND B	ND	ND B	ND B	ND B	ND B	ND B	ND B
PCB-82	52663-62-4	ng/L	ND JX	ND JX	ND JX	0.00200	ND X	0.00390	0.00790	0.0130	0.0140	0.0310	0.0320	0.0310
PCB-84	52663-60-2	ng/L	ND JX	0.00390	ND X	0.00610	0.00520	0.0150	0.0250	0.0320	0.0350	0.0720	0.0800	0.0700
PCB-85/116/117	85-116-117	ng/L	0.00100 J	ND JX	0.00200 J	0.00360	0.00380	0.00770	0.0170	0.0310	0.0320	0.0660	0.0730	0.0700
PCB-83/99	83-99	ng/L	0.00500	0.00690	ND X	0.0130	0.0120	0.0210	0.0450	0.0900	0.0850	0.180	0.190	0.200
PCB-86/87/97/109/119/125	868797109119125	ng/L	0.00380 J	0.00620 J	0.00580 J	0.0100	0.0100	0.0200	0.0380	0.0650	0.0650	0.140	0.150	0.150
PCB-88/91	88-91	ng/L	ND JX	ND JX	ND JX	0.00530	0.00490	0.0130	0.0240	0.0400	0.0420	0.0770	0.0870	0.0820
PCB-89	73575-57-2	ng/L	ND B	ND	ND	ND B	ND B	ND B	0.00250	0.00380	0.00400	0.00770	0.00820	0.00700
PCB-90/101/113	90-101-113	ng/L	0.00940	0.0130	0.0140	0.0190	0.0180	0.0310	0.0560	0.0970	0.0920	0.190	0.210	0.200
PCB-92	52663-61-3	ng/L	0.00290	0.00490	0.00360	0.00470	0.00520	0.00890	0.0150	0.0220	0.0220	0.0510	0.0550	0.0550
PCB-93/100	93-100	ng/L	ND B	ND	ND B	ND B	ND B	ND B	ND B	0.00630	ND XB	0.0120	ND XB	ND X
PCB-94	73575-55-0	ng/L	ND	ND	ND	ND JX	ND JX	0.000660 J	0.00160 J	0.00270	0.00320	0.00530	0.00610	0.00570
PCB-95	38379-99-6	ng/L	0.00950	0.0130	0.0120	0.0190	0.0190	0.0400	0.0700	0.0920	0.100	0.200	0.230	0.200
PCB-96	73575-54-9	ng/L	ND	ND	ND	ND	ND	0.00140 J	ND X	ND X	ND X	0.00540	ND X	0.00470
PCB-98/102	98-102	ng/L	ND JX	ND	ND JX	0.00140 J	0.00130 J	0.00440	0.00850	0.0130	0.0140	0.0280	0.0280	0.0280
PCB-103	60145-21-3	ng/L	ND JX	ND	0.000300 J	0.000270 J	ND JX	0.000820 J	0.00170 J	0.00270	ND X	0.00470	0.00560	0.00540
PCB-105	32598-14-4	ng/L	0.000610 J	0.000950 J	0.00120	ND X	ND X	0.00460	0.00960	0.0210	0.0200	0.0490	0.0490	0.0530
PCB-106	70424-69-0	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-107	70424-68-9	ng/L	ND JX	ND JX	0.000550 J	0.000890	0.000760	0.00160	0.00290	0.00640	0.00600	0.0140	0.0140	0.0150
PCB-108/124	108-124	ng/L	ND JX	0.000230 J	ND JX	ND JX	0.000280 J	0.000450 J	0.00100 J	0.00200	0.00190	0.00440 J	0.00450	0.00480
PCB-110/115	110-115	ng/L	0.00830	0.0120	0.0120	0.0200	0.0180	0.0400	0.0700	0.110	0.120	0.240	0.270	0.260
PCB-111	39635-32-0	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-112	74472-36-9	ng/L	ND JX	ND JX	0.000180 J	0.000240 J	ND JX	ND JX	ND JX	0.00160	0.00150	0.00360	0.00330	0.00350
PCB-114	74472-37-0	ng/L	ND B	ND B	ND B	ND B	ND B	0.000440 J	0.00100	0.00240	0.00200	ND B	0.00490	0.00570
PCB-118	31508-00-6	ng/L	ND B	0.00380	0.00480	0.00780	0.00760	0.0130	0.0270	0.0530	0.0520	0.120	0.120	0.130
PCB-120	68194-12-7	ng/L	ND	ND	ND	ND	ND	ND	ND JX	ND JX	0.000330 J	ND JX	0.000760 J	ND
PCB-122	76842-07-4	ng/L	ND JX	ND JX	ND JX	ND JX	0.000120 J	ND JX	0.000550 J	ND X	0.00100	ND X	0.00280	0.00300
PCB-123	65510-44-3	ng/L	ND JX	0.000120 J	0.0000940 J	ND JX	0.000190 J	0.000320 J	0.000890 J	0.00160	ND X	0.00370	0.00350	0.00460
PCB-126	57465-28-8	ng/L	ND	ND	ND	ND	ND	ND JX	0.0000460 J	0.000120 J	0.000120 J	ND JX	ND JX	ND JX
PCB-127	39635-33-1	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-128/166	128-166	ng/L	0.000370 J	0.000640 J	0.000620 J	0.000500 J	0.000450 J	ND JX	ND JX	0.00120	0.00110	0.00370 J	0.00340	0.00420
PCB-129/138/160/163	129-138-160-163	ng/L	0.00340	0.00470	0.00560	0.00480	0.00480	0.00610	0.00690	0.00920	0.00820	0.0270	0.0250	0.0300
PCB-130	52663-66-8	ng/L	0.000240 J	0.000440 J	0.000380 J	0.000320 J	0.000340 J	0.000400 J	0.000420 J	0.000710	0.000710	ND X	0.00200	0.00270

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SP3™ Sampler Location ID	CAS Number	Units	UP-SP3-12	UP-SP3-11	BR-SP3-10	BR-SP3-09	BR-SP3-08	BR-SP3-07	BR-SP3-06	BR-SP3-05	BR-SP3-04	MR-SP3-03	CL-SP3-02	SR-SP3-01
PCB-131	61798-70-7	ng/L	ND	ND	0.0000980 J	ND JX	ND JX	ND JX	ND JX	0.000180 J	ND JX	ND JX	ND JX	ND JX
PCB-132	38380-05-1	ng/L	0.00150	0.00220	0.00220	0.00200	0.00210	0.00260	0.00320	0.00420	0.00410	0.0120	0.0120	0.0130
PCB-133	35694-04-3	ng/L	ND	ND JX	ND JX	0.000110 J	ND JX	ND JX	0.000120 J	0.000190 J	0.000160 J	0.000720 J	0.000570 J	0.000770 J
PCB-134/143	134-143	ng/L	ND JX	ND JX	0.000450 J	ND JX	0.000440 J	ND JX	0.000710 J	0.000990 J	0.000880 J	0.00230 J	0.00250 J	0.00300 J
PCB-135/151	135-151	ng/L	0.00200	0.00330	0.00310	0.00270	0.00290	0.00370	0.00400	0.00500	0.00440	0.0130	0.0120	0.0140
PCB-136	38411-22-2	ng/L	0.000580	0.00110	ND X	0.000620	0.000730	ND X	0.00120	0.00140	0.00140	0.00420	0.00390	0.00430
PCB-137	35694-06-5	ng/L	ND JX	ND JX	0.000260 J	0.000220 J	ND JX	0.000250 J	0.000320 J	0.000540	0.000450	0.00180 J	0.00150	ND X
PCB-139/140	139-140	ng/L	ND JX	0.000160 J	ND JX	0.000150 J	ND JX	ND JX	0.000180 J	0.000330 J	0.000310 J	ND JX	0.000750 J	0.000960 J
PCB-141	52712-04-6	ng/L	0.000590	ND X	0.00110	0.000850	0.000960	ND X	0.00120	0.00160	0.00150	0.00450	0.00390	0.00490
PCB-144	68194-14-9	ng/L	0.000170 J	ND JX	0.000250 J	0.000230 J	ND JX	ND JX	ND JX	ND JX	ND JX	ND JX	0.00110 J	0.00130 J
PCB-145	74472-40-5	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-146	51908-16-8	ng/L	ND X	0.000810	0.00110	0.000820	ND X	ND X	0.00110	0.00170	0.00170	0.00510	0.00420	0.00550
PCB-147/149	147-149	ng/L	0.00450	0.00650	0.00720	0.00660	0.00660	0.00870	0.00930	0.0120	0.0110	0.0310	0.0300	0.0320
PCB-148	74472-41-6	ng/L	ND	ND	ND	ND	ND	ND	ND B	ND B	ND B	ND B	ND B	ND B
PCB-150	68194-08-1	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-152	68194-09-2	ng/L	ND B	ND B	ND B	ND	0.000640	ND B	ND	ND B	ND	ND	ND	ND X
PCB-153/168	153-168	ng/L	0.00290	0.00440	0.00530	0.00430	0.00430	0.00500	0.00550	0.00760	0.00650	0.0210	0.0190	0.0230
PCB-154	60145-22-4	ng/L	ND B	ND XB	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-156/157	156-157	ng/L	ND JX	0.000240 J	0.000230 J	0.000150 J	0.000170 J	ND JX	ND JX	0.000480 J	ND JX	0.00160 J	0.00150 J	ND JX
PCB-158	74472-42-7	ng/L	ND JX	ND JX	0.000500	0.000430	0.000400	0.000540	0.000660	0.000950	0.000850	ND X	0.00240	0.00320
PCB-159	39635-35-3	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-161	74472-43-8	ng/L	ND B	ND B	ND XB	ND B	ND XB	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-162	39635-34-2	ng/L	ND	ND	ND	ND	ND	ND	ND	0.0000270 J	ND JX	ND	0.0000930 J	0.000150 J
PCB-164	74472-45-0	ng/L	0.000190 J	0.000540	ND JX	0.000350 J	0.000310 J	ND JX	0.000450 J	0.000570	0.000600	0.00170 J	0.00160	ND X
PCB-165	74472-46-1	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B
PCB-167	52663-72-6	ng/L	0.0000530 J	ND JX	0.000120 J	ND JX	0.000110 J	ND JX	ND JX	0.000230 J	0.000200 J	0.000800 J	0.000560 J	0.000870 J
PCB-169	32774-16-6	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-170	35065-30-6	ng/L	0.000160 J	0.000310	0.000360	ND X	0.000190	0.000350	0.000310	0.000360	0.000300	0.00210 L	0.00140	0.00210 L
PCB-171/173	171-173	ng/L	0.0000830 J	ND JX	ND JX	ND JX	0.000100 J	ND JX	0.000150 J	0.000170 J	0.000140 J	0.000640 J	ND JX	0.000760 J
PCB-172	52663-74-8	ng/L	ND	ND JX	ND	0.0000570 J	0.0000480 J	ND JX	ND	ND JX	ND JX	ND L	0.000330 J	0.000450 JL
PCB-174	38411-25-5	ng/L	0.000280	0.000580	0.000520	0.000380	0.000400	0.000520	0.000520	0.000570	0.000510	0.00280	0.00180	0.00290
PCB-175	40186-70-7	ng/L	ND	ND JX	ND	ND	ND	ND	ND	ND	ND	ND	ND JX	ND
PCB-176	52663-65-7	ng/L	ND	ND X	ND JX	ND JX	0.0000620 J	ND JX	ND	0.0000850 J	ND	ND JXL	ND	ND L
PCB-177	52663-70-4	ng/L	0.000130 J	0.000320	0.000250 J	0.000200	0.000240	0.000280 J	0.000300	ND X	ND X	0.00150 J	ND JX	ND X
PCB-178	52663-67-9	ng/L	0.0000830 J	ND JX	ND JX	0.000110 J	ND JX	ND JX	ND JX	0.000140 J	0.000150 J	ND JX	0.000630 J	ND JX
PCB-179	52663-64-6	ng/L	0.000140 J	0.000260	0.000240	ND JX	ND JX	ND JX	0.000220 J	0.000260	0.000210	0.00120 JL	0.00100 J	0.00150 L
PCB-180/193	180-193	ng/L	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND XB	ND BL	ND B	ND XBL
PCB-181	74472-47-2	ng/L	ND	ND B	ND	ND	ND	ND B	ND B	ND	ND B	ND	ND B	ND B
PCB-182	60145-23-5	ng/L	ND	ND B	ND	ND B	ND B	ND B	ND	ND B	ND B	ND B	ND B	ND
PCB-183/185	183-185	ng/L	0.000190 J	0.000400 J	ND JX	0.000280 J	0.000310 J	0.000360 J	0.000360 J	0.000450 J	0.000370 J	0.00180 J	0.00130 J	0.00200 J
PCB-186	74472-49-4	ng/L	ND	ND	ND	ND	ND	0.0000590 J	ND	ND	ND	ND JXL	ND	ND L
PCB-187	52663-68-0	ng/L	0.000410	0.000740	0.000770	0.000580	0.000650	0.000760	0.000770	0.000930	0.000750	0.00410	0.00290	0.00430
PCB-188	74487-85-7	ng/L	ND B	ND B	ND	ND	ND	ND B	ND B	ND B	ND B	ND L	ND B	ND BL
PCB-189	39635-31-9	ng/L	ND JX	ND	ND	ND	ND	ND	ND	ND JX	ND	ND JXL	ND L	ND L
PCB-190	41411-64-7	ng/L	0.0000440 J	0.0000680 J	ND	0.0000430 J	0.0000440 J	ND	0.0000680 J	0.0000710 J	0.0000660 J	0.000470 JL	ND JX	ND JXL
PCB-191	74472-50-7	ng/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND L	ND	ND L

Table 4-2
Calculated C_{free} Results for SP3™ Samplers
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

SP3™ Sampler Location ID	CAS Number	Units	UP-SP3-12	UP-SP3-11	BR-SP3-10	BR-SP3-09	BR-SP3-08	BR-SP3-07	BR-SP3-06	BR-SP3-05	BR-SP3-04	MR-SP3-03	CL-SP3-02	SR-SP3-01
PCB-194	35694-08-7	ng/L	ND JX	ND JX	0.0000470 J	0.0000210 J	ND JX	0.0000360 J	0.0000450 J	0.0000440 J	ND JX	ND JXL	ND JXL	ND JXL
PCB-195	52663-78-2	ng/L	ND JX	ND	0.0000210 J	ND JX	0.0000140 J	ND JX	ND JX	0.0000270 J	0.0000190 J	ND JXL	ND JXL	ND JXL
PCB-196	42740-50-1	ng/L	ND	ND JX	ND JX	ND JX	ND JX	ND JX	0.0000230 J	0.0000310 J	ND JX	0.000400 JL	ND JXL	ND JXL
PCB-197	33091-17-7	ng/L	ND XB	ND B	ND XB	ND B	ND XB	ND B	ND B	ND B	ND B	ND BL	ND BL	ND BL
PCB-198/199	198-199	ng/L	ND	0.000110 J	ND JX	0.0000530 J	ND X	0.0000640 J	ND JX	ND JX	0.0000720 J	0.000650 JL	0.000490 JL	0.00100 JL
PCB-200	52663-73-7	ng/L	ND B	ND XB	ND XB	ND B	ND B	ND B	ND B	ND	ND	ND L	ND BL	ND L
PCB-201	40186-71-8	ng/L	ND	ND	ND JX	ND	ND	ND	0.00000860 J	ND JX	0.00000900 J	ND JXL	ND JXL	ND L
PCB-202	2136-99-4	ng/L	ND	ND	ND	ND	ND	0.0000230 J	ND JX	0.0000180 J	ND JX	0.000170 JL	ND JXL	ND L
PCB-203	52663-76-0	ng/L	ND	ND JX	ND JX	ND JX	ND JX	ND JX	0.0000430 J	0.0000440 J	ND JX	0.000530 JL	0.000300 JL	0.000580 JL
PCB-205	74472-53-0	ng/L	ND	ND	ND JX	ND	ND	0.0000120 J	0.00000810 J	ND JX	ND JX	ND JXL	ND JXL	ND JXL
PCB-206	40186-72-9	ng/L	ND	ND JX	ND	ND	ND	ND	ND JX	0.0000100 J	0.00000640 J	ND JXL	0.000110 JL	0.000190 JL
PCB-207	52663-79-3	ng/L	ND B	ND	ND B	ND B	ND B	ND B	ND B	ND B	ND B	ND BL	ND BL	ND BL
PCB-208	52663-77-1	ng/L	ND B	ND	ND	ND B	ND B	ND B	ND B	ND B	ND B	ND BL	ND BL	ND BL
PCB-209	ARC-209	ng/L	ND B	ND BL	ND BL	ND B	ND B	ND BL	ND BL	ND B	ND B	ND BL	ND BL	ND BL
Total PCBs as Congeners	--	**ng/L**	**0.0789 J**	**0.145 J**	**0.134 J**	**7.01 J**	**7.16 J**	**14.4 J**	**23.5 J**	**28.6 J**	**30.1 J**	**46.7 J**	**41.1 J**	**40.6 J**

Notes:
1. Stage 4 validation was completed for the analytical results summarized in this table.
2. Qualifiers included for non-detect results are based on SiREM's lab report and Stage 4 validation.
3. Non-detects are not included in the total PCB congeners.

Qualifiers:
B - The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
L - Percent to steady state less than 10%.
X - Data may only be used for screening purposes (nondefinitive data) if the quality assurance/quality control (QA/QC) deviation warrants the qualification of the data beyond estimation, but not rejection of the data.

Acronyms and Abbreviations:
CAS = Chemical Abstracts Service registry
ND = The compound was analyzed for but not detected.
ng/L = nanograms per liter
PCB = polychlorinated biphenyl

Table 4-3
Analytical Results for Round 1 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	9/24/2020	9/24/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020
PCB-1	2051-60-7	ng/L	0.00828 J	< 0.0208 U	< 0.0209 U	0.581	0.726	0.661	1.10 [1.19]	1.98	3.50	2.06 [1.63]	< 0.0620 UB	0.324
PCB-2	2051-61-8	ng/L	< 0.0232 U	< 0.0233 U	< 0.0234 U	< 0.0234 U	< 0.0238 U	< 0.0236 U	< 0.0237 UB [< 0.0235 UB]	< 0.0234 UB	< 0.0301 UB	< 0.0257 UB [< 0.0230 UB]	< 0.0237 U	< 0.0238 U
PCB-3	2051-62-9	ng/L	< 0.0240 U	< 0.0241 U	< 0.0242 U	< 0.127 UB	< 0.127 UB	< 0.133 UB	< 0.196 UB [< 0.226 UB]	0.294	0.444	0.392 [0.379]	< 0.0245 UB	< 0.0719 UB
PCB-4	13029-08-8	ng/L	0.0169 J	< 0.0295 UXJ	< 0.0297 UB	0.999	1.27	1.15	2.41 [2.52]	5.37	9.85	6.45 [5.18]	< 0.212 UB	1.03
PCB-5	16605-91-7	ng/L	< 0.0402 UX	< 0.0404 U	< 0.0405 U	< 0.0405 U	< 0.0412 U	< 0.0408 U	< 0.0410 U [< 0.0408 U]	< 0.0406 U	< 0.0408 U	< 0.0415 U [< 0.0404 U]	< 0.0410 U	< 0.0412 U
PCB-6	25569-80-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0769 UX	0.0981	0.0914	0.215 [0.209]	0.366	0.668	0.377 [0.328]	< 0.0260 UB	< 0.101 UB
PCB-7	33284-50-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 UXJ	< 0.0210 UXJ	0.0437 [< 0.0411 UX]	0.106	0.203	0.144 [0.121]	< 0.0211 U	< 0.0259 UB
PCB-8	34883-43-7	ng/L	< 0.0377 U	< 0.0379 UXJ	< 0.0380 U	< 0.244 UB	< 0.263 UB	< 0.262 UB	0.625 [0.584]	1.43	2.58	1.94 [1.64]	< 0.144 UB	< 0.385 UB
PCB-9	34883-39-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 UXJ	< 0.0210 UXJ	0.0420 [< 0.0375 UX]	< 0.0590 UB	0.0990	< 0.0689 UB [< 0.0607 UB]	< 0.0211 U	< 0.0212 UB
PCB-10	33146-45-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0273	0.0382	0.0328	0.0632 [0.0662]	0.136	0.287	0.160 [0.116]	< 0.0211 U	0.0247
PCB-11	2050-67-1	ng/L	< 0.330 U	< 0.331 U	< 0.333 U	< 0.333 U	< 0.338 U	< 0.335 U	0.203 J [< 0.334 U]	< 0.333 U	< 0.335 U	< 0.340 U [< 0.332 U]	< 0.336 U	< 0.338 U
PCB-12/13	12-13	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 UXJ	0.0276 J	0.0212 J	< 0.0741 UX [< 0.0802 UX]	0.142	0.231	0.152 [0.153]	< 0.0423 U	< 0.0425 UXJ
PCB-14	34883-41-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-15	2050-68-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0985	0.113	0.142	0.378 [0.345]	0.768	1.47	1.16 [1.06]	< 0.0821 UB	0.273
PCB-16	38444-78-9	ng/L	< 0.0338 U	< 0.0340 U	< 0.0341 U	< 0.0237 UB	< 0.0268 UB	< 0.0268 UB	< 0.0638 UB [< 0.0481 UB]	< 0.0764 UB	< 0.127 UB	< 0.0798 UB [< 0.0820 UB]	< 0.0345 UB	< 0.0347 UB
PCB-17	37680-66-3	ng/L	< 0.0207 UB	< 0.0208 UB	< 0.0209 UB	< 0.0747 UB	< 0.0950 UB	0.109	0.354 [0.327]	0.799	1.36	0.973 [0.852]	< 0.0723 UB	< 0.199 UB
PCB-18/30	18-30	ng/L	< 0.0601 U	< 0.0603 U	< 0.0606 U	< 0.0971 UB	< 0.0870 UB	< 0.107 UB	0.216 [< 0.190 UB]	< 0.270 UB	0.447	< 0.298 UB [< 0.281 UB]	< 0.0561 UB	< 0.137 UB
PCB-19	38444-73-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0882	0.124	0.126	0.324 [0.335]	0.847	1.57	1.11 [0.945]	< 0.0439 UB	0.170
PCB-20/28	20-28	ng/L	< 0.0704 U	< 0.0707 U	< 0.0710 U	0.0949	0.0807	0.0995	0.359 [0.287]	0.758	1.31	0.862 [0.821]	< 0.123 UB	0.353
PCB-21/33	21-33	ng/L	< 0.0642 U	< 0.0645 U	< 0.0648 U	< 0.0648 U	< 0.0659 U	< 0.0652 U	0.0386 J [< 0.0651 U]	< 0.0648 UB	< 0.0652 UB	< 0.0662 U [< 0.0460 UB]	< 0.0655 U	< 0.0658 U
PCB-22	38444-85-8	ng/L	< 0.0476 U	< 0.0478 U	< 0.0481 U	0.0332 J	0.0287 J	0.0339 J	0.0897 [0.0755]	0.130	0.227	0.163 [0.164]	0.0355 J	0.0845
PCB-23	55720-44-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-24	55702-45-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [0.00476 J]	0.00760 J	< 0.0210 UXJ	0.00921 J [< 0.0208 UXJ]	< 0.0211 U	< 0.0212 U
PCB-25	55712-37-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0305	0.0277	0.0342	0.120 [0.106]	0.232	0.386	0.282 [0.258]	< 0.0335 UB	0.111
PCB-26/29	26-29	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	0.0314 J	0.0337 J	0.0388 J	0.130 [0.103]	0.197	0.340	0.268 [0.247]	< 0.0423 UB	0.114
PCB-27	38444-76-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0184 J	0.0240	0.0282	0.0912 [0.0894]	0.246	0.440	0.306 [0.275]	< 0.0211 UB	0.0602
PCB-31	16606-02-3	ng/L	< 0.0770 U	< 0.0774 U	< 0.0777 U	0.0741 J	0.0814	0.0961	0.290 [0.223]	0.427	0.703	0.542 [0.52]	< 0.0842 UB	< 0.256 UB
PCB-32	38444-77-8	ng/L	0.0104 J	< 0.0208 U	< 0.0209 U	0.0641	0.0644	0.0750	0.238 [0.215]	0.593	1.06	0.754 [0.686]	< 0.0460 UB	0.156
PCB-34	37680-68-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 UXJ]	0.0124 J	0.0230	0.0168 J [0.0162 J]	< 0.0211 U	0.00633 J
PCB-35	37680-69-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00480 J	0.00594 J [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-36	38444-87-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-37	38444-90-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 UB	< 0.0213 UB	< 0.0210 UB	< 0.0213 UB [< 0.0210 UB]	< 0.0323 UB	0.0580	0.0468 [0.0475]	< 0.0211 UXB	< 0.0348 UB
PCB-38	53555-66-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-39	38444-88-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00483 J	0.00480 J [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-40/41/71	40-41-71	ng/L	< 0.0621 UB	< 0.0624 UB	< 0.0627 U	< 0.0627 UB	< 0.0638 UB	< 0.0631 UB	0.106 [0.0922]	0.159	0.293	0.233 [0.225]	< 0.0634 UB	0.101
PCB-42	36559-22-5	ng/L	< 0.0286 U	< 0.0287 U	< 0.0288 U	0.0212 J	0.0162 J	0.0205 J	0.0538 [0.0476]	0.0823	0.155	0.119 [0.115]	0.0272 J	0.0575
PCB-43/73	43-73	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	0.0226 J	0.0386 J	0.0270 J [0.0223 J]	< 0.0423 U	< 0.0425 U
PCB-44/47/65	44-57-65	ng/L	< 0.0621 UB	< 0.0624 UB	< 0.0627 UB	< 0.0833 UB	< 0.0669 UB	< 0.0867 UB	0.225 [< 0.187 UB]	< 0.338 UB	0.600	0.442 [0.424]	< 0.0956 UB	< 0.185 UB
PCB-45/51	45-51	ng/L	< 0.0621 U	< 0.0624 U	< 0.0627 U	< 0.0627 U	< 0.0638 U	< 0.0631 U	0.0696 [0.0600 J]	0.111	0.193	0.135 [0.123]	< 0.0634 U	0.0407 J
PCB-46	41464-47-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.00687 J	0.00622 J	0.00698 J	0.0143 J [0.0133 J]	0.0245	0.0419	0.0307 [0.0295]	0.00527 J	0.0101 J
PCB-48	70362-47-9	ng/L	< 0.0870 U	< 0.0874 U	< 0.0877 U	< 0.0877 U	< 0.0893 U	< 0.0884 U	< 0.0888 U [< 0.0882 U]	< 0.0878 U	0.0524 J	< 0.0898 U [< 0.0875 U]	< 0.0888 U	< 0.0892 U
PCB-49/69	49-69	ng/L	< 0.0414 UB	< 0.0416 UB	< 0.0418 UB	< 0.0491 UB	< 0.0425 UB	< 0.0492 UB	0.124 [0.110]	0.207	0.359	0.289 [0.283]	< 0.0561 UB	0.140
PCB-50/53	50-53	ng/L	< 0.0497 U	< 0.0499 U	< 0.0501 U	< 0.0501 U	< 0.0510 U	< 0.0505 U	0.0477 J [0.0420 J]	0.0886	0.152	0.120 [0.114]	< 0.0507 U	0.0390 J
PCB-52	35693-99-3	ng/L	< 0.0911 U	< 0.0915 U	< 0.0919 U	0.0773 J	0.0642 J	0.0872 J	0.203 [0.164]	0.285	0.492	0.404 [0.388]	< 0.100 UB	< 0.193 UB
PCB-54	15968-05-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	0.00869 J	0.0156 J	0.0110 J [0.0107 J]	< 0.0211 UJ	< 0.0212 U
PCB-55	74338-24-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 UXJ	< 0.0214 U [< 0.0208 UXJ]	< 0.0211 U	< 0.0212 U
PCB-56	41464-43-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 UB	< 0.0213 UB	< 0.0210 UB	0.0385 [< 0.0327 UB]	0.0585	0.115	0.0861 [0.086]	< 0.0251 UB	0.0588
PCB-57	70424-67-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	0.00323 J	0.00604 J	0.00522 J [< 0.00519 UXJA]	< 0.0211 U	< 0.0212 U

Table 4-3
Analytical Results for Round 1 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	9/24/2020	9/24/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020
PCB-58	41464-49-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-59/62/75	59-62-75	ng/L	< 0.0621 U	< 0.0624 U	< 0.0627 U	0.00678 J	0.00581 J	0.00746 J	0.0224 J [0.0178 J]	0.0375 J	0.0666	0.0504 J [0.0476 J]	0.0102 J	0.0254 J
PCB-60	33025-41-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.00535 J	0.00639 J	0.00882 J	< 0.0212 UXJ [0.0159 J]	0.0316	0.0637	0.0430 [0.0443]	< 0.0211 UXJ	0.0289
PCB-61/70/74/76	61-70-74-76	ng/L	< 0.0828 U	< 0.0832 U	< 0.0836 U	< 0.0836 UB	< 0.0850 UB	< 0.0842 UB	0.135 [< 0.100 UB]	0.207	0.380	0.277 [0.289]	< 0.0845 UB	0.185
PCB-63	74472-34-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	0.00936 J [0.00715 J]	0.0168 J	0.0281	0.0198 J [< 0.0179 UXJA]	0.00421 J	0.0108 J
PCB-64	52663-58-8	ng/L	< 0.0207 UB	< 0.0208 UB	< 0.0209 UB	< 0.0294 UB	< 0.0230 UB	< 0.0327 UB	0.0841 [0.0769]	0.143	0.247	0.207 [0.19]	< 0.0437 UB	0.0972
PCB-66	32598-10-0	ng/L	< 0.0314 U	< 0.0315 U	< 0.0316 U	0.0215 J	0.0233 J	0.0293 J	0.0797 [0.0645]	0.126	0.237	0.167 [0.176]	< 0.0450 UB	0.121
PCB-67	73575-53-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	0.00504 J [0.00387 J]	0.00766 J	0.0156 J	< 0.0214 UXJ [0.0133 J]	0.00461 J	0.00767 J
PCB-68	73575-52-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00987 J	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-72	41464-42-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00782 J	0.00622 J [0.00566 J]	< 0.0211 U	< 0.0212 U
PCB-77	32598-13-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.00237 UXJA	< 0.0210 U	< 0.00633 UXJA [0.00627 JA]	0.0109 JA	0.0211 A	0.0154 J [0.0151 JA]	0.00465 JA	0.0121 JA
PCB-78	70362-49-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 AU]	< 0.0211 U	< 0.0212 U
PCB-79	41464-48-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 AU]	< 0.0211 U	< 0.0212 U
PCB-80	33284-52-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-81	70362-50-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 AU]	< 0.0211 U	< 0.0212 U
PCB-82	52663-62-4	ng/L	0.00307 J	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 UXJ	0.00405 J	0.0113 J [< 0.0210 UXJ]	0.0116 J	< 0.0210 UXJ	0.0189 J [0.0204 J]	< 0.0211 UXJ	0.0137 J
PCB-83	60145-20-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	0.00301 J	0.00686 J [0.00509 J]	0.00765 J	0.0127 J	< 0.0214 UXJ [0.0108 J]	< 0.0211 U	0.00905 J
PCB-84	52663-60-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	0.0106 J	0.00883 J	0.0124 J	0.0240 [0.0183 J]	0.0321	0.0521	0.0452 [0.045]	0.0142 J	0.0249
PCB-85/116/117	85-116-117	ng/L	< 0.0621 U	< 0.0624 U	< 0.0627 U	< 0.0627 U	< 0.0638 U	< 0.0631 U	0.0139 J [0.0116 J]	0.0183 J	0.0336 J	0.0283 J [0.0285 J]	0.00933 J	0.0211 J
PCB-86/87/97/108/119/125	868797108119125	ng/L	< 0.124 U	< 0.125 U	< 0.125 U	0.0176 J	0.0176 J	0.0218 J	0.0434 J [0.0337 J]	0.0523 J	0.0890 J	0.0819 J [0.0824 J]	0.0293 J	0.0565 J
PCB-88/91	88-91	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	0.0171 J [0.0144 J]	0.0256 J	0.0396 J	0.0323 J [0.0341 J]	< 0.0423 U	0.0216 J
PCB-89	73575-57-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00527 J	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-90/101/113	90-101-113	ng/L	0.0213 J	< 0.0624 U	< 0.0627 U	0.0254 J	0.0237 J	0.0304 J	0.0561 J [0.0455 J]	0.0657	0.110	0.0858 [0.0878]	0.0335 J	0.0603 J
PCB-92	52663-61-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	0.0146 J [< 0.0210 UXJ]	0.0175 J	0.0276	0.0216 [0.023]	0.00875 J	0.0142 J
PCB-93/98/100/102	9398100102	ng/L	< 0.0828 U	< 0.0832 U	< 0.0836 U	< 0.0836 U	< 0.0850 U	< 0.0842 U	< 0.0846 U [< 0.0840 U]	< 0.0836 U	< 0.0842 U	< 0.0855 U [< 0.0833 U]	< 0.0845 U	< 0.0849 U
PCB-94	73575-55-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-95	38379-99-6	ng/L	< 0.0501 U	< 0.0503 U	< 0.0506 U	0.0277 J	< 0.0514 U	0.0307 J	0.0582 [0.0470 J]	0.0795	0.126	0.0973 [0.0997]	0.0286 J	0.0601
PCB-96	73575-54-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-99	38380-01-7	ng/L	0.0101 J	0.00730 J	< 0.0209 U	0.0119 J	0.0119 J	0.0139 J	0.0291 [0.0219]	0.0387	0.0653	0.0501 [0.0509]	< 0.0211 UB	< 0.0358 UB
PCB-103	60145-21-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-104	56558-16-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 UJ	< 0.0212 U
PCB-105	32598-14-4	ng/L	0.00550 J	< 0.0208 U	< 0.0209 U	< 0.0209 U	0.00570 J	0.00630 J	0.0154 J [0.0123 J]	0.0226	0.0381	0.0309 [0.0332]	0.0117 J	0.0265
PCB-106	70424-69-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-107/124	107-124	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-109	74472-35-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	0.00460 J	0.00798 J	< 0.0214 UXJ [0.00637 J]	< 0.0211 U	0.00663 J
PCB-110/115	110-115	ng/L	< 0.0414 UB	< 0.0416 UB	< 0.0418 U	< 0.0418 UB	< 0.0425 UB	< 0.0421 UB	0.0774 [< 0.0602 UB]	0.0959	0.160	0.138 [0.138]	< 0.0480 UB	0.108
PCB-111	39635-32-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-112	74472-36-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-114	74472-37-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 AU [< 0.0210 U]	< 0.0209 U	0.00312 J	0.00290 J [< 0.0208 AU]	< 0.0211 U	0.00259 J
PCB-118	31508-00-6	ng/L	0.0124 J	0.0121 J	< 0.0209 U	0.0164 J	0.0156 J	0.0166 J	0.0384 [0.0276]	< 0.0474 UB	0.0835	0.0650 [0.0692]	< 0.0278 UB	0.0604
PCB-120	68194-12-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-121	56558-18-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-122	76842-07-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-123	65510-44-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-126	57465-28-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 AU]	< 0.0211 U	< 0.0212 U
PCB-127	39635-33-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-128/166	128-166	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-129/138/163	129-138-163	ng/L	0.0348 J	< 0.0624 UXJ	< 0.0627 U	0.0277 J	0.0253 J	0.0277 J	0.0419 J [0.0322 J]	0.0339 J	0.0473 J	0.0355 J [0.0379 J]	< 0.0634 U	< 0.0637 UXJ

Table 4-3
Analytical Results for Round 1 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	9/24/2020	9/24/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020
PCB-130	52663-66-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-131	61798-70-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-132	38380-05-1	ng/L	0.0107 J	0.00767 J	< 0.0209 U	0.00804 J	0.00868 J	0.00915 J	0.0151 J [0.0106 J]	0.0124 J	0.0170 J	0.0127 J [0.0130 J]	< 0.0211 U	0.0111 J
PCB-133	35694-04-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-134/143	134-143	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-135/151	135-151	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	0.0167 J	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-136	38411-22-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	0.00714 J	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-137	35694-06-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-139/140	139-140	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-141	52712-04-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	0.00755 J [< 0.0210 U]	< 0.0209 U	0.00817 J	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-142	41411-61-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-144	68194-14-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-145	74472-40-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-146	51908-16-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-147/149	147-149	ng/L	< 0.0497 U	< 0.0499 U	< 0.0501 U	< 0.0501 U	< 0.0510 U	< 0.0505 U	0.0346 J [< 0.0504 U]	0.0276 J	0.0370 J	< 0.0513 U [0.0318 J]	< 0.0507 U	< 0.0510 U
PCB-148	74472-41-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-150	68194-08-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-152	68194-09-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-153/168	153-168	ng/L	0.0257 J	< 0.0462 U	< 0.0464 U	< 0.0464 U	< 0.0472 U	< 0.0467 U	0.0340 J [0.0241 J]	0.0236 J	0.0336 J	< 0.0474 U [0.0238 J]	< 0.0469 U	< 0.0471 U
PCB-154	60145-22-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-155	33979-03-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 UJ	< 0.0212 U
PCB-156/157	156-157	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	0.00633 J [< 0.0420 U]	< 0.0418 U	0.00660 J	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-158	74472-42-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-159	39635-35-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-160	41411-62-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-161	74472-43-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-162	39635-34-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-164	74472-45-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-165	74472-46-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-167	52663-72-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-169	32774-16-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-170	35065-30-6	ng/L	< 0.0211 U	< 0.0212 U	< 0.0213 U	< 0.0213 U	< 0.0217 U	< 0.0215 U	< 0.0216 U [< 0.0214 U]	< 0.0213 U	< 0.0215 U	< 0.0218 U [< 0.0212 U]	< 0.0216 U	< 0.0217 U
PCB-171/173	171-173	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-172	52663-74-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-174	38411-25-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-175	40186-70-7	ng/L	< 0.0377 U	< 0.0379 U	< 0.0380 U	< 0.0380 U	< 0.0387 U	< 0.0383 U	< 0.0385 U [< 0.0382 U]	< 0.0380 U	< 0.0383 U	< 0.0389 U [< 0.0379 U]	< 0.0385 U	< 0.0386 U
PCB-176	52663-65-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-177	52663-70-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-178	52663-67-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-179	52663-64-6	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-180/193	180-193	ng/L	< 0.0456 U	< 0.0458 U	< 0.0460 U	< 0.0460 U	< 0.0468 U	< 0.0463 U	< 0.0465 U [< 0.0462 U]	< 0.0460 U	< 0.0463 U	< 0.0470 U [< 0.0458 U]	< 0.0465 U	< 0.0467 U
PCB-181	74472-47-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-182	60145-23-5	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-183/185	183-185	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-184	74472-48-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-186	74472-49-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-187	52663-68-0	ng/L	0.0108 J	0.00873 J	0.00379 J	< 0.0209 UXJ	0.00640 J	0.00717 J	< 0.0212 UXJ [< 0.0210 UXJ]	0.00737 J	0.0106 J	0.00646 J [0.00779 J]	< 0.0211 UXJ	0.00587 J
PCB-188	74487-85-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U

Table 4-3
Analytical Results for Round 1 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	9/24/2020	9/24/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020	9/22/2020
PCB-189	39635-31-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 AU [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 AU
PCB-190	41411-64-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-191	74472-50-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-192	74472-51-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-194	35694-08-7	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-195	52663-78-2	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-196	42740-50-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-197/200	197-200	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-198/199	198-199	ng/L	< 0.0414 U	< 0.0416 U	< 0.0418 U	< 0.0418 U	< 0.0425 U	< 0.0421 U	< 0.0423 U [< 0.0420 U]	< 0.0418 U	< 0.0421 U	< 0.0427 U [< 0.0417 U]	< 0.0423 U	< 0.0425 U
PCB-201	40186-71-8	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-202	2136-99-4	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-203	52663-76-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-204	74472-52-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-205	74472-53-0	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-206	40186-72-9	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-207	52663-79-3	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-208	52663-77-1	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	< 0.0213 U	< 0.0210 U	< 0.0212 U [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
PCB-209	ARC-209	ng/L	< 0.0207 U	< 0.0208 U	< 0.0209 U	< 0.0209 U	0.00627 J	< 0.0210 U	0.00814 J [< 0.0210 U]	< 0.0209 U	< 0.0210 U	< 0.0214 U [< 0.0208 U]	< 0.0211 U	< 0.0212 U
Total PCB Congeners	**--**	**ng/L**	**0.170 J**	**0.0358 J**	**0.00379 J**	**2.42 J**	**2.99 J**	**3.08 J**	**9.10 J [7.71 J]**	**17.1 J**	**31.9 J**	**21.6 J [18.9 J]**	**0.227 J**	**4.14 J**

Notes:
1. Surface water samples were field-filtered using 0.45-micron filter prior to the laboratory analysis.
2. Stage 4 validation was completed for the analytical results summarized in this table.
3. Non-detects are not included in the total PCB congeners.
4. Duplicate sample results are included in brackets.

Qualifiers:
A - Concentrations (levels) determined using the signal-to-noise response.
B - The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U - The compound was analyzed for but not detected. The associated value is the compound limit of detection.
UB - The compound considered non-detect at the listed value due to associated blank contamination.
UJ - The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
X - Data may only be used for screening purposes (nondefinitive data) if the quality assurance/quality control (QA/QC) deviation warrants the qualification of the data beyond estimation, but not rejection of the data.

Acronyms and Abbreviations:
CAS = Chemical Abstracts Service registry
ng/L = nanograms per liter
PCB = polychlorinated biphenyl

Table 4-4
Analytical Results for Round 2 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020
PCB-1	2051-60-7	ng/L	< 0.0210 UB	< 0.0210 UB	< 0.0211 UB	1.81 [2.25]	1.45	1.42	2.48	3.42	0.0697 B	1.32	0.983 J [2.15 J]	1.86 J
PCB-2	2051-61-8	ng/L	< 0.0235 U	< 0.0235 U	< 0.0236 U	0.0121 J [< 0.0235 U]	< 0.0233 U	0.0146 J	< 0.0238 UXJ	0.0172 J	< 0.0237 U	< 0.0238 U	< 0.0234 UJ [< 0.0238 UXJ]	< 0.0228 UXJ
PCB-3	2051-62-9	ng/L	< 0.0244 U	< 0.0243 U	< 0.0244 U	0.232 [0.287]	0.163	0.185	0.340	0.358	< 0.0245 UXJ	0.193	0.145 J [1.09 J]	0.225
PCB-4	13029-08-8	ng/L	< 0.0298 U	< 0.0298 U	< 0.0299 U	2.52 [3.29]	1.97	2.05	4.43	6.28	< 0.164 UB	3.67	3.23 [3.83 J]	8.55 J
PCB-5	16605-91-7	ng/L	< 0.0408 U	< 0.0407 U	< 0.0409 U	< 0.0401 U [< 0.0407 U]	< 0.0403 U	< 0.0410 U	< 0.0412 U	< 0.0404 U	< 0.0410 U	< 0.0412 U	< 0.0405 U [< 0.0413 UBJ]	< 0.0395 U
PCB-6	25569-80-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.0762 [0.0829]	0.0463	0.0757	0.208	0.182	0.0149 J	0.240	0.215 [< 0.0213 UXJ]	0.553
PCB-7	33284-50-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 UXJ [0.0163 J]	< 0.0208 UXJ	0.0154 J	0.0639	0.0548	< 0.0212 U	0.0890	0.0689 [0.343 J]	0.154
PCB-8	34883-43-7	ng/L	< 0.0383 U	< 0.0382 U	< 0.0383 U	0.286 [0.328]	0.190	0.251	0.693	0.727	0.0812	1.06	0.843 [< 0.0388 UXJ]	1.81
PCB-9	34883-39-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 UB [< 0.0210 UB]	< 0.0208 UB	< 0.0211 UB	0.0496	< 0.0391 UB	< 0.0212 U	0.0484	< 0.0450 UB [< 0.0213 UX]	0.123
PCB-10	33146-45-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.0540 [0.0618]	0.0448	0.0442	0.0960	0.127	< 0.0212 U	0.0658	0.0627 [0.142]	0.150
PCB-11	2050-67-1	ng/L	< 0.335 U	< 0.334 U	< 0.335 U	< 0.329 U [< 0.334 U]	< 0.331 UB	< 0.336 U	< 0.338 U	< 0.331 U	< 0.337 U	< 0.338 U	< 0.332 U [< 0.377 UB]	< 0.324 U
PCB-12/13	12-13	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 UXJ]	< 0.0415 U	< 0.0423 UXJ	0.0562	0.0367 J	< 0.0423 U	0.0918	0.0961 [0.660]	0.245
PCB-14	34883-41-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-15	2050-68-2	ng/L	< 0.0210 UJ	< 0.0210 UJ	< 0.0211 UJ	0.0620 J [0.0737 J]	< 0.0208 UBJ	0.0609 J	0.258 J	0.173	0.0395	0.594	0.657 [0.968 J]	1.64 J
PCB-16	38444-78-9	ng/L	< 0.0343 U	< 0.0343 U	< 0.0344 U	< 0.0338 U [< 0.0343 U]	< 0.0339 U	< 0.0345 U	0.0391	0.0400	< 0.0346 U	0.0603	0.0684 [0.101]	0.189
PCB-17	37680-66-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.0591 [0.0591]	0.0444	0.0647	0.266	0.239	0.0361	0.515	0.498 [0.627]	1.27
PCB-18/30	18-30	ng/L	< 0.0610 U	< 0.0608 U	< 0.0611 U	0.0466 J [0.0473 J]	0.0321 J	0.0450 J	0.125	0.105	< 0.0614 U	0.175	0.213 [0.393]	0.624
PCB-19	38444-73-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.153 [0.187]	0.117	0.135	0.471	0.675	< 0.0380 UB	0.661	0.572 [0.759]	1.51 J
PCB-20/28	20-28	ng/L	< 0.0715 U	< 0.0713 U	< 0.0716 U	< 0.0704 U [< 0.0714 U]	< 0.0706 U	< 0.0718 U	0.135	0.100	0.0512 J	0.560	0.670 [0.842]	1.93
PCB-21/33	21-33	ng/L	< 0.0652 U	< 0.0650 U	< 0.0653 U	< 0.0642 U [< 0.0651 U]	< 0.0644 U	< 0.0655 U	< 0.0658 U	< 0.0645 U	< 0.0656 U	< 0.0658 U	< 0.0647 U [0.162]	0.0792
PCB-22	38444-85-8	ng/L	< 0.0483 U	< 0.0482 U	< 0.0484 U	< 0.0476 U [< 0.0483 U]	< 0.0478 U	< 0.0486 U	0.0402 J	0.0242 J	< 0.0487 U	0.109	0.137 [0.188]	0.383
PCB-23	55720-44-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0352]	< 0.0204 U
PCB-24	55702-45-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00580 J	< 0.0208 U	< 0.0212 U	< 0.0212 UXJ	0.00812 J [0.0362]	0.0129 J
PCB-25	55712-37-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 UXJ [< 0.0210 UXJ]	0.00519 J	0.00759 J	0.0558	0.0310	0.0130 J	0.167	0.193 [0.280]	0.546
PCB-26/29	26-29	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	0.0113 J [0.0114 J]	< 0.0415 U	0.0112 J	0.0591	0.0356 J	0.0141 J	0.145	0.201 [0.340]	0.607
PCB-27	38444-76-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.0165 J [0.0161 J]	0.0112 J	0.0181 J	0.0827	0.0899	0.0110 J	0.169	0.160 [0.191]	0.376
PCB-31	16606-02-3	ng/L	< 0.0782 U	< 0.0780 U	< 0.0783 U	< 0.0770 U [< 0.0781 U]	< 0.0772 U	< 0.0786 U	0.119	0.0755 J	< 0.0787 U	0.347	0.459 [0.676]	1.38
PCB-32	38444-77-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	0.0405 [0.0440]	0.0284	0.0397	0.196	0.182	0.0291	0.390	0.355 [0.405]	0.825
PCB-34	37680-68-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00995 J	0.00927 J [0.0444]	0.0240
PCB-35	37680-69-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.150]	0.00770 J
PCB-36	38444-87-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0603]	< 0.0204 U
PCB-37	38444-90-5	ng/L	< 0.0210 U	< 0.0210 U	0.00425 J	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00755 J	< 0.0208 U	0.00444 J	0.0363	0.0564 [0.182 J]	0.157
PCB-38	53555-66-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0455]	< 0.0204 U
PCB-39	38444-88-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	0.00711 J
PCB-40/41/71	40-41-71	ng/L	< 0.0631 U	< 0.0629 U	0.00778 J	0.00876 J [0.00814 J]	0.00808 J	0.00834 J	0.0451 J	0.0224 J	0.0194 J	0.143	0.170 [0.309]	0.452
PCB-42	36559-22-5	ng/L	< 0.0290 U	< 0.0289 U	< 0.0291 U	< 0.0286 U [< 0.0290 U]	< 0.0287 U	< 0.0292 U	0.0203 J	< 0.0287 U	< 0.0292 U	0.0754	0.0932 [0.163]	0.259
PCB-43/73	43-73	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	0.0260 J [0.0566]	0.0488
PCB-44/47/65	44-57-65	ng/L	< 0.0631 UB	< 0.0629 UB	< 0.0632 UB	< 0.0621 UB [< 0.0630 UB]	< 0.0623 UB	< 0.0634 UB	< 0.0941 UB	< 0.0624 UB	< 0.0635 UB	0.290	0.322 [0.767]	0.838
PCB-45/51	45-51	ng/L	< 0.0631 U	< 0.0629 U	< 0.0632 U	< 0.0621 U [< 0.0630 U]	< 0.0623 U	< 0.0634 U	0.0400 J	0.0312 J	< 0.0635 U	0.0920	0.0902 [0.350]	0.238
PCB-46	41464-47-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00909 J	0.00593 J	< 0.0212 U	0.0203 J	0.0217 [0.0468]	0.0555
PCB-48	70362-47-9	ng/L	< 0.0883 U	< 0.0881 U	< 0.0885 U	< 0.0869 U [< 0.0882 U]	< 0.0872 U	< 0.0887 U	< 0.0891 U	< 0.0874 U	< 0.0889 U	< 0.0892 U	< 0.0877 U [0.0839 J]	0.0672 J
PCB-49/69	49-69	ng/L	< 0.0420 UB	< 0.0420 UB	< 0.0421 UB	< 0.0414 UB [< 0.0420 UB]	< 0.0415 UB	< 0.0423 UB	0.0515	< 0.0416 UB	< 0.0423 UB	0.200	0.251 [0.451]	0.693
PCB-50/53	50-53	ng/L	< 0.0504 U	< 0.0503 U	< 0.0505 U	< 0.0497 U [< 0.0504 U]	< 0.0498 U	< 0.0507 U	0.0309 J	< 0.0499 U	< 0.0508 U	0.0818	0.0899 [0.152]	0.235
PCB-52	35693-99-3	ng/L	< 0.0925 U	< 0.0923 U	< 0.0927 U	< 0.0911 U [< 0.0924 U]	< 0.0914 U	< 0.0930 U	0.0811 J	0.0575 J	< 0.0931 U	0.285	0.348 [0.437]	0.964
PCB-54	15968-05-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0317 J]	0.0180 J
PCB-55	74338-24-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00705 J	0.00616 J [0.0373]	0.0158 J
PCB-56	41464-43-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.0146 J	< 0.0208 U	0.0116 J	0.0612	0.0793 [0.164]	0.212
PCB-57	70424-67-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00327 J	< 0.0209 UXJ [0.0651]	< 0.0204 UXJ
PCB-58	41464-49-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-59/62/75	59-62-75	ng/L	< 0.0631 U	< 0.0629 U	< 0.0632 U	< 0.0621 U [< 0.0630 U]	< 0.0623 U	< 0.0634 U	0.00999 J	< 0.0624 U	< 0.0635 U	0.0348 J	0.0391 J [0.169]	0.110

Table 4-4
Analytical Results for Round 2 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020
PCB-60	33025-41-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00732 J	< 0.0208 U	0.00507 J	0.0327	0.0380 [0.103]	0.111
PCB-61/70/74/76	61-70-74-76	ng/L	< 0.0841 U	< 0.0839 U	< 0.0842 U	< 0.0828 U [< 0.0840 U]	< 0.0831 U	< 0.0845 U	0.0480 J	0.0229 J	0.0364 J	0.221	0.262 [0.351]	0.752
PCB-63	74472-34-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00367 J	< 0.0208 U	< 0.0212 U	0.0147 J	0.0178 J [< 0.0213 UX]	0.0508
PCB-64	52663-58-8	ng/L	< 0.0210 U	< 0.0210 UB	< 0.0211 UB	< 0.0207 UB [< 0.0210 UB]	< 0.0208 UB	< 0.0211 UB	0.0342	< 0.0208 UB	< 0.0212 UB	0.133	0.160 [0.265]	0.476
PCB-66	32598-10-0	ng/L	< 0.0318 U	< 0.0318 U	< 0.0319 U	< 0.0313 U [< 0.0318 U]	< 0.0314 U	< 0.0320 U	0.0265 J	< 0.0315 U	0.0215 J	0.133	0.167 [0.320]	0.485
PCB-67	73575-53-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00819 J	0.00989 J [< 0.0213 UX]	0.0242
PCB-68	73575-52-7	ng/L	0.0185 J	0.0177 J	0.0175 J	0.0153 J [0.0164 J]	0.0144 J	0.0162 J	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0744]	0.0135 J
PCB-72	41464-42-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	0.00469 J [< 0.0213 UX]	0.0137 J
PCB-77	32598-13-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00450 J	< 0.0208 U	< 0.0212 UXJ	0.0121 J	0.0145 J [0.118]	0.0414
PCB-78	70362-49-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0628]	< 0.0204 U
PCB-79	41464-48-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0756]	< 0.0204 U
PCB-80	33284-52-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0232]	< 0.0204 U
PCB-81	70362-50-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0614]	< 0.0204 U
PCB-82	52663-62-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 UXJ	< 0.0208 U	0.00377 J	0.0119 J	0.0144 J [< 0.0213 UXJ]	0.0302
PCB-83	60145-20-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	0.00278 J	0.00262 J	< 0.0208 U	< 0.0212 U	0.00706 J	0.00850 J [0.0477 J]	0.0198 J
PCB-84	52663-60-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00979 J	< 0.0208 U	0.00827 J	0.0300	0.0329 J [0.0806 J]	0.0802
PCB-85/116/117	85-116-117	ng/L	< 0.0631 U	< 0.0629 U	< 0.0632 U	< 0.0621 U [< 0.0630 U]	< 0.0623 U	< 0.0634 U	< 0.0636 U	< 0.0624 U	< 0.0635 U	0.0181 J	0.0208 J [0.142 J]	0.0532 J
PCB-86/87/97/108/119/125	868797108119125	ng/L	< 0.126 U	< 0.126 U	< 0.126 U	< 0.124 U [< 0.126 U]	< 0.125 U	< 0.127 U	0.0193 J	< 0.125 U	< 0.127 U	0.0484 J	0.0593 J [0.399 J]	0.138
PCB-88/91	88-91	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	0.0228 J	0.0237 J [0.0654 J]	0.0653
PCB-89	73575-57-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UXJ]	0.00760 J
PCB-90/101/113	90-101-113	ng/L	< 0.0631 U	< 0.0629 U	< 0.0632 U	< 0.0621 U [< 0.0630 U]	< 0.0623 U	< 0.0634 U	0.0199 J	< 0.0624 U	< 0.0635 U	0.0580 J	0.0656 J [0.252 J]	0.153
PCB-92	52663-61-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.0156 J	0.0184 J [0.0962 J]	0.0463
PCB-93/98/100/102	9398100102	ng/L	< 0.0841 U	< 0.0839 U	< 0.0842 U	< 0.0828 U [< 0.0840 U]	< 0.0831 U	< 0.0845 U	< 0.0849 U	< 0.0832 U	< 0.0846 U	< 0.0850 U	< 0.0835 U [0.168]	0.0333 J
PCB-94	73575-55-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0293]	< 0.0204 U
PCB-95	38379-99-6	ng/L	< 0.0509 U	< 0.0508 U	< 0.0510 U	< 0.0501 U [< 0.0508 U]	< 0.0503 U	< 0.0511 U	< 0.0513 U	< 0.0503 U	< 0.0512 U	0.0661	0.0752 J [0.132 J]	0.178
PCB-96	73575-54-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0228]	< 0.0204 U
PCB-99	38380-01-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	0.00720 J	0.00945 J	< 0.0208 U	0.00942 J	0.0353	0.0400 J [0.260 J]	0.105
PCB-103	60145-21-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0505]	< 0.0204 U
PCB-104	56558-16-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-105	32598-14-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00749 J	< 0.0208 U	0.00768 J	0.0248	0.0278 J [0.144 J]	0.0755
PCB-106	70424-69-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0640]	< 0.0204 U
PCB-107/124	107-124	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 U [0.120]	0.00580 J
PCB-109	74472-35-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00546 J	0.00563 J [0.104 J]	0.0142 J
PCB-110/115	110-115	ng/L	< 0.0420 U	< 0.0420 U	0.0167 J	< 0.0414 U [0.0145 J]	< 0.0415 U	< 0.0423 U	0.0239 J	< 0.0416 U	0.0231 J	0.0827	0.103 J [0.232 J]	0.246
PCB-111	39635-32-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0566]	< 0.0204 U
PCB-112	74472-36-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0130 J]	< 0.0204 U
PCB-114	74472-37-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 UJ	< 0.0212 UJ	< 0.0212 UJ	0.00230 J [< 0.0213 UXJ]	0.00645 J
PCB-118	31508-00-6	ng/L	< 0.0210 U	< 0.0210 U	0.00964 J	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.0137 J	< 0.0208 U	0.0154 J	0.0482	0.0585 J [0.214 J]	0.143
PCB-120	68194-12-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0798 J]	< 0.0204 U
PCB-121	56558-18-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-122	76842-07-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0591]	< 0.0204 U
PCB-123	65510-44-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0671 J]	0.00443 J
PCB-126	57465-28-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	0.00377 J	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.116 J]	< 0.0204 U
PCB-127	39635-33-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0392]	< 0.0204 U
PCB-128/166	128-166	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 U [0.109]	< 0.0407 U
PCB-129/138/163	129-138-163	ng/L	< 0.0631 U	< 0.0629 U	< 0.0632 U	< 0.0621 U [< 0.0630 U]	< 0.0623 U	< 0.0634 U	< 0.0636 U	< 0.0624 U	< 0.0635 U	0.0241 J	0.0270 J [0.287 J]	0.0543 J
PCB-130	52663-66-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.124 J]	< 0.0204 U
PCB-131	61798-70-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0919 J]	< 0.0204 U
PCB-132	38380-05-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	0.00829 J	< 0.0209 UXJ [< 0.0213 UX]	0.0191 J
PCB-133	35694-04-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0475]	< 0.0204 U

Table 4-4
Analytical Results for Round 2 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	CAS Number	Units	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/08/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020	11/07/2020
PCB-134/143	134-143	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 U [< 0.0426 UX]	< 0.0407 U
PCB-135/151	135-151	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.172 J]	0.0161 J
PCB-136	38411-22-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0487 J]	< 0.0204 U
PCB-137	35694-06-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.134 J]	< 0.0204 U
PCB-139/140	139-140	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.256 J]	< 0.0407 U
PCB-141	52712-04-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.106 J]	0.00860 J
PCB-142	41411-61-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0409]	< 0.0204 U
PCB-144	68194-14-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.136 J]	< 0.0204 U
PCB-145	74472-40-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0369]	< 0.0204 U
PCB-146	51908-16-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.235]	0.00844 J
PCB-147/149	147-149	ng/L	< 0.0504 U	< 0.0503 U	< 0.0505 U	< 0.0497 U [< 0.0504 U]	< 0.0498 U	< 0.0507 U	< 0.0509 U	< 0.0499 U	< 0.0508 U	< 0.0510 U	< 0.0501 U [0.146]	0.0378 J
PCB-148	74472-41-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0535]	< 0.0204 U
PCB-150	68194-08-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0563]	< 0.0204 U
PCB-152	68194-09-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0185 J]	< 0.0204 U
PCB-153/168	153-168	ng/L	< 0.0467 U	< 0.0466 U	< 0.0468 U	< 0.0459 U [< 0.0466 U]	< 0.0461 U	< 0.0469 U	< 0.0471 U	< 0.0462 U	< 0.0470 U	< 0.0471 U	< 0.0463 U [0.147 J]	0.0361 J
PCB-154	60145-22-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-155	33979-03-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0322]	< 0.0204 U
PCB-156/157	156-157	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	0.00707 J	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.376 J]	0.00708 J
PCB-158	74472-42-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.147 J]	< 0.0204 U
PCB-159	39635-35-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-160	41411-62-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-161	74472-43-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0581]	< 0.0204 U
PCB-162	39635-34-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-164	74472-45-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-165	74472-46-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-167	52663-72-6	ng/L	< 0.0210 UJ	< 0.0210 UJ	< 0.0211 UJ	< 0.0207 UJ [< 0.0210 UJ]	< 0.0208 UJ	< 0.0211 UJ	< 0.0212 UJ	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.149 J]	< 0.0204 U
PCB-169	32774-16-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0576]	< 0.0204 U
PCB-170	35065-30-6	ng/L	< 0.0214 U	< 0.0214 U	< 0.0215 U	< 0.0211 U [< 0.0214 U]	< 0.0212 U	< 0.0216 U	< 0.0216 U	< 0.0212 U	< 0.0216 U	< 0.0217 U	< 0.0213 UJ [0.160 J]	< 0.0208 U
PCB-171/173	171-173	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.308 J]	< 0.0407 U
PCB-172	52663-74-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.200 J]	< 0.0204 U
PCB-174	38411-25-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0979 J]	< 0.0204 U
PCB-175	40186-70-7	ng/L	< 0.0383 U	< 0.0382 U	< 0.0383 U	< 0.0377 U [< 0.0382 U]	< 0.0378 U	< 0.0385 U	< 0.0386 U	< 0.0379 U	< 0.0385 U	< 0.0387 U	< 0.0380 UJ [0.213 J]	< 0.0371 U
PCB-176	52663-65-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.175 J]	< 0.0204 U
PCB-177	52663-70-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-178	52663-67-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.112 J]	< 0.0204 U
PCB-179	52663-64-6	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0730]	< 0.0204 U
PCB-180/193	180-193	ng/L	< 0.0462 U	< 0.0461 U	< 0.0463 U	< 0.0455 U [< 0.0462 U]	< 0.0457 U	< 0.0465 U	< 0.0467 U	< 0.0458 U	< 0.0465 U	< 0.0467 U	< 0.0459 UJ [0.275 J]	< 0.0448 U
PCB-181	74472-47-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0980 J]	< 0.0204 U
PCB-182	60145-23-5	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0892 J]	< 0.0204 U
PCB-183/185	183-185	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.304 J]	< 0.0407 U
PCB-184	74472-48-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.112 J]	< 0.0204 U
PCB-186	74472-49-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0477]	< 0.0204 U
PCB-187	52663-68-0	ng/L	< 0.0210 U	< 0.0210 U	0.00387 J	0.00295 J [0.00295 J]	< 0.0208 U	0.00465 J	0.00398 J	< 0.0208 U	0.00329 J	0.00502 J	0.00406 J [0.135 J]	0.00872 J
PCB-188	74487-85-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0841 J]	< 0.0204 U
PCB-189	39635-31-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 UXJ	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [< 0.0213 UX]	< 0.0204 U
PCB-190	41411-64-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.119 J]	< 0.0204 U
PCB-191	74472-50-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.121 J]	< 0.0204 U
PCB-192	74472-51-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 U [0.0379]	< 0.0204 U
PCB-194	35694-08-7	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.178 J]	< 0.0204 U
PCB-195	52663-78-2	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.168 J]	< 0.0204 U

Table 4-4
Analytical Results for Round 2 Discrete Surface Water Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Discrete Surface Water Sample Location ID			UP-SW-12	UP-SW-11	BR-SW-10	BR-SW-09	BR-SW-08	BR-SW-07	BR-SW-06	BR-SW-05	BR-SW-04	MR-SW-03	CL-SW-02	SR-SW-01
Sample Date	**CAS Number**	**Units**	**11/08/2020**	**11/08/2020**	**11/08/2020**	**11/08/2020**	**11/08/2020**	**11/08/2020**	**11/07/2020**	**11/07/2020**	**11/07/2020**	**11/07/2020**	**11/07/2020**	**11/07/2020**
PCB-196	42740-50-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.394 J]	< 0.0204 U
PCB-197/200	197-200	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.414 J]	< 0.0407 U
PCB-198/199	198-199	ng/L	< 0.0420 U	< 0.0420 U	< 0.0421 U	< 0.0414 U [< 0.0420 U]	< 0.0415 U	< 0.0423 U	< 0.0424 U	< 0.0416 U	< 0.0423 U	< 0.0425 U	< 0.0418 UJ [0.349 J]	< 0.0407 U
PCB-201	40186-71-8	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.221 J]	< 0.0204 U
PCB-202	2136-99-4	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.0657 J]	< 0.0204 U
PCB-203	52663-76-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.208 J]	< 0.0204 U
PCB-204	74472-52-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.125 J]	< 0.0204 U
PCB-205	74472-53-0	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.172 J]	< 0.0204 U
PCB-206	40186-72-9	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.696 J]	< 0.0204 U
PCB-207	52663-79-3	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.825 J]	< 0.0204 U
PCB-208	52663-77-1	ng/L	< 0.0210 U	< 0.0210 U	< 0.0211 U	< 0.0207 U [< 0.0210 U]	< 0.0208 U	< 0.0211 U	< 0.0212 U	< 0.0208 U	< 0.0212 U	< 0.0212 U	< 0.0209 UJ [0.422 J]	< 0.0204 U
PCB-209	ARC-209	ng/L	< 0.0210 UB	< 0.0246 UB	< 0.0211 UB	< 0.0207 UB [< 0.0210 UB]	< 0.0208 UB	< 0.0276 UB	< 0.0212 UB	< 0.0208 UB	< 0.0212 UB	< 0.0213 UB	< 0.0209 UBJ [1.30 J]	< 0.0204 UB
Total PCB Congeners	**--**	**ng/L**	**0.0185 J**	**0.0177 J**	**0.0597 J**	**5.41 J [6.80 J]**	**4.12 J**	**4.48 J**	**10.8 J**	**13.1 J**	**0.529 J**	**13.1 J**	**12.7 J [33.9 J]**	**33.0 J**

Notes:

1. Surface water samples were field-filtered using 0.45-micron filter prior to the laboratory analysis.
2. Stage 4 validation was completed for the analytical results summarized in this table.
3. Non-detects are not included in the total PCB congeners.
4. Duplicate sample results are included in brackets.

Qualifiers:

B - The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U - The compound was analyzed for but not detected. The associated value is the compound limit of detection.
UB - The compound considered non-detect at the listed value due to associated blank contamination.
UJ - The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
X - Data may only be used for screening purposes (nondefinitive data) if the quality assurance/quality control (QA/QC) deviation warrants the qualification of the data beyond estimation, but not rejection of the data.

Acronyms and Abbreviations:

CAS = Chemical Abstracts Service registry
ng/L = nanograms per liter
PCB = polychlorinated biphenyl

Table 4-5
Statistical Summary for Surface Water Sample Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Location ID	Frequency of Detection	Total PCB Congeners (ng/L)									
		Minimum	Maximum	Mean	Standard Deviation	10%-tile	25%-tile	50%-tile	75%-tile	90%-tile	95%-tile
SP3™ Sampling											
Site-wide (excluding background)	10/10 (100%)	0.134	46.7	23.9	16.2	6.33	8.97	26.1	38.0	41.6	44.2
Upstream of Site	2/2 (100%)	0.0789	0.145	--	--	--	--	--	--	--	--
Highway M-59 to Bowen Road	7/7 (100%)	0.134	30.1	15.8	11.7	4.26	7.09	14.4	26.1	29.2	29.7
West Marr Road	1/1 (100%)	46.7	46.7	--	--	--	--	--	--	--	--
Chase Lake Road	1/1 (100%)	41.1	41.1	--	--	--	--	--	--	--	--
Steinecker Road	1/1 (100%)	40.6	40.6	--	--	--	--	--	--	--	--
Surface Water Grab Sampling											
Site-wide (excluding background)	20/20 (100%)	0.00379	33.0	9.95	10.3	0.210	2.85	5.29	14.1	24.1	31.9
Upstream of Site	4/4 (100%)	0.0177	0.170	0.0605	0.0735	0.0179	0.0183	0.0272	0.0693	0.130	0.150
Highway M-59 to Bowen Road	14/14 (100%)	0.00379	31.9	7.51	8.67	0.201	2.57	4.30	10.2	15.9	22.3
West Marr Road	2/2 (100%)	13.1	20.3	--	--	--	--	--	--	--	--
Chase Lake Road	2/2 (100%)	0.227	23.3	--	--	--	--	--	--	--	--
Steinecker Road	2/2 (100%)	4.14	33	--	--	--	--	--	--	--	--

Notes:
1. Summary statistics not reported for datasets with small sample size (n<4) and/or low frequency of detection (≤50%).
2. Kaplan-Meier mean and standard deviation reported for datasets with non-detect results.
3. Arithmetic mean and standard deviation reported for datasets with no non-detect results
4. Non-detects included at the detection limit in percentile estimation.

Acronyms and Abbreviations:
ng/L = nanograms per liter
PCB = polychlorinated biphenyl

Table 4-6
Estimation of River Discharge Rates
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Location ID	River Station	Channel Width (ft)	Round 1 Surface Water Grab Sampling Event in September 2020[1] (SP3™ Sampler Deployment)			Round 2 Surface Water Grab Sampling Event in November 2020[1] (SP3™ Sampler Retrieval)			Average Discharge Rate[2] (cfs)	SP3™ Sampling
			Water Depth at Thalweg (ft)	Flow Velocity at Mid-Depth (ft/s)	Discharge Rate (cfs)	Water Depth at Thalweg (ft)	Flow Velocity at Mid-Depth (ft/s)	Discharge Rate (cfs)		Discharge Rate for Load Gain Estimate[3] (cfs)
UP-SW-12	-4+45	30	2.3	0.35	23.75	2.2	0.40	25.77	24.76	24.76
UP-SW-11	-2+90	25	2.9	0.25	17.76	3.0	0.27	19.92	18.84	25.98
BR-SW-10	6+80	22	2.5	0.58	31.32	2.5	0.67	35.91	33.62	33.62
BR-SW-09	12+50	30	1.7	0.74	37.74	1.8	0.78	42.23	39.98	39.98
BR-SW-08	18+00	31	1.1	0.63	21.62	1.2	1.1	39.91	30.77	40.10
BR-SW-07	25+90	27	1.2	1.1	33.65	1.3	0.74	25.59	29.62	40.26
BR-SW-06	42+00	19	1.2	0.81	17.79	2.6	0.83	41.02	29.41	40.58
BR-SW-05	58+80	19	1.9	0.77	27.50	1.9	1.2	42.22	34.86	40.92
BR-SW-04	66+00	20	1.9	0.72	27.63	2.4	0.95	46.06	36.84	41.07
MR-SW-03	198+00	29	1.6	0.53	24.93	1.8	0.49	25.67	25.30	43.74
CL-SW-02	367+00	28	1.6	0.60	26.78	2.2	0.39	23.88	25.33	47.16
SR-SW-01	423+40	29	2.5	0.61	43.46	2.4	0.78	53.15	48.30	48.30

Notes:

1. Flows were calculated by multiplying channel width, water depth, and mid-depth velocity at each location.
2. Average discharge rates were estimated by averaging calculated flows based on Round 1 and 2 sampling events.
3. If the average discharge rate at a given sample location was less than the upstream sample location then the distance-weighated discharge rate was calculated for that particular sample location using the average rate for the sample location immediately upstream and downstream sample location with an average discharge rate higher than that at the upstream location.

Acronyms and Abbreviations:

cfs = cubic feet per second

ft = feet

ft/s = feet per second

Table 4-7
Total PCB Load Gain Analysis
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Location ID	River Station	Channel Width (ft)	SP3™ Sampling			
			Discharge Rate for Load Gain Estimate[1] (cfs)	Total PCB Concentrations[2,3] (ng/L)	PCB Load (mg/day)	PCB Load Gain (mg/day-ft)
UP-SW-12	-4+45	30	24.76	0.079	4.8	--
UP-SW-11	-2+90	25	25.98	0.145	9.2	0.029
BR-SW-10	6+80	22	33.62	0.134	11	0.002
BR-SW-09	12+50	30	39.98	7.01	686	1.18
BR-SW-08	18+00	31	40.10	7.16	703	0.03
BR-SW-07	25+90	27	40.26	14.4	1417	0.90
BR-SW-06	42+00	19	40.58	23.5	2337	0.57
BR-SW-05	58+80	19	40.92	28.6	2865	0.31
BR-SW-04	66+00	20	41.07	30.1	3025	0.22
MR-SW-03	198+00	29	43.74	46.7	4996	0.15
CL-SW-02	367+00	28	47.16	41.1	4740	-0.015
SR-SW-01	423+40	29	48.30	40.6	4804	0.01

Notes:
1. Discharge rates were estimated using the average calculated flows based on Round 1 and 2 sampling events or the distance-weighted average discharge rates calculated as described in Table 4-6.
2. Non-detects are not included in the total PCB congeners.
3. Parent and duplicate results were averaged.

Acronyms and Abbreviations:
cfs = cubic feet per second
ft = feet
ft/s = feet per second
mg/day = milligrams per day
mg/day-ft = milligrams per day per foot
ng/L = nanograms per liter
PCB = polychlorinated biphenyl

Table 5-1
2021 Shiawassee River Fish Community Survey - ISM-29, May 19, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

	Fish Species																
Size (cm)	**Northern Pike** *Esox lucius*	**Rock Bass** *Ambloplites rupestris*	**Bluegill** *Lepomis macrochirus*	**Pumpkinseed** *Lepomis gibbosus*	**Green Sunfish** *Lepomis cyanellus*	**White Sucker** *Catostomus commersonii*	**Northern Hogsucker** *Hypentelium nigricans*	**Brown Bullhead** *Ameiurus nebulosus*	**Tadpole Madtom** *Noturus gyrinus*	**Round Goby** *Neogobius melanostomus*	**Greenside Darter** *Etheostoma blennioides*	**Blackside Darter** *Percina Maculata*	**Common Shiner** *Luxilus cornutus*	**Bluntnose Minnow** *Pimephales notatus*	**Creek Chub** *Semotilus atromaculatus*	**River Chub** *Nocomis micropogon*	**Hornyhead Chub** *Nocomis biguttatus*
2.5-5.1		1								1							
5.1-7.6			1	3	4					8	1	1	1		2		
7.6-10.2		2	4	6	2					7		2	26	1	3	3	
10.2-12.7		2	7	11	5			1	1	4			37		2	9	
12.7-15.2				4	1	2							6			4	5
15.2-17.8		2	2										7		4		2
17.8-20.3		1						1	1				6		1		
20.3-22.9													1				
22.9-25.4		2													1		
25.4-27.9						11											
27.9-30.5						12											
30.5-33.0						5	1										
33.0-35.6						2											
35.6-38.1						1											
38.1-40.6																	
40.6-43.2																	
43.2-45.7																	
45.7-48.3																	
48.3-50.8																	
> 50.8	2																
Count	2	10	14	24	12	33	1	2	2	20	1	3	84	1	13	16	7
Total	245																
Species	17																

Table 5-1
2021 Shiawassee River Fish Community Survey - ISM-29, May 19, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Reach Length:
800 ft

Coordinates:
Upstream 42.618907, -83.965546
Downstream 42.621035, -83.964826

Time Surveyed:
1600 hrs
Backpack Electrofisher #1 2293 sec
Backpack Electrofisher #2 1996 sec

Notes:
cm = centimeters
ft = feet
hrs = hours
sec = seconds
N. pike (> 50.8) = 50.8 cm, 55.9 cm

Table 5-2

2021 Shiawassee River Fish Community Survey - ISM-M1-27, May 19, 2021

2020-2021 Baseline Sampling Data Report

Shiawassee River Superfund Site, Howell, Michigan

Size (cm)	Fish Species												
	Rock Bass *Ambloplites rupestris*	**Pumpkinseed** *Lepomis gibbosus*	**Green Sunfish** *Lepomis cyanellus*	**White Sucker** *Catostomus commersonii*	**Stonecat Madtom** *Noturus flavus*	**Round Goby** *Neogobius melanostomus*	**Johnny Darter** *Etheostoma nigrum*	**Blackside Darter** *Percina Maculata*	**Common Shiner** *Luxilus cornutus*	**Creek Chub** *Semotilus atromaculatus*	**River Chub** *Nocomis micropogon*	**Hornyhead Chub** *Nocomis biguttatus*	**Central Mudminnow** *Umbra limi*
2.5-5.1		1	2			2			1	4	7		
5.1-7.6		2	14		1	6	1	1	7	18	9		
7.6-10.2		5	9			6			26	19	12	1	1
10.2-12.7		13	3			4			18	12	8	1	
12.7-15.2	1	5	3						3	5	4	4	
15.2-17.8	2	1	1		1				6	2	1	3	
17.8-20.3	2								7	1			
20.3-22.9				3						1			
22.9-25.4				1									
25.4-27.9				2									
27.9-30.5				2									
30.5-33.0				2									
33.0-35.6				2									
35.6-38.1													
38.1-40.6													
40.6-43.2													
43.2-45.7													
45.7-48.3													
48.3-50.8													
> 50.8													
Count	5	27	32	12	2	18	1	1	68	62	41	9	1
Total	279												
Species	13												

Table 5-2
2021 Shiawassee River Fish Community Survey - ISM-M1-27, May 19, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Reach Length:
800 ft

Coordinates:
Upstream 42.625439, -83.965577
Downstream 42.627578, -83.966057

Time Surveyed:
1300 hrs
Backpack Electrofisher #1 1828 sec
Backpack Electrofisher #2 1894 sec

Notes:
cm = centimeters
ft = feet
hrs = hours
sec = seconds

Table 5-3

2021 Shiawassee River Fish Community Survey - Bowen Road, May 18, 2021

2020-2021 Baseline Sampling Data Report

Shiawassee River Superfund Site, Howell, Michigan

	Fish Species															
Size (cm)	**Northern Pike** *Esox lucius*	**Rock Bass** *Ambloplites rupestris*	**Bluegill** *Lepomis macrochirus*	**Pumpkinseed** *Lepomis gibbosus*	**Green Sunfish** *Lepomis cyanellus*	**White Sucker** *Catostomus commersonii*	**Round Goby** *Neogobius melanostomus*	**Johnny Darter** *Etheostoma nigrum*	**Blackside Darter** *Percina Maculata*	**Common Shiner** *Luxilus cornutus*	**Bluntnose Minnow** *Pimephales notatus*	**Creek Chub** *Semotilus atromaculatus*	**River Chub** *Nocomis micropogon*	**Hornyhead Chub** *Nocomis biguttatus*	**Central Stoneroller** *Campostoma anomalum*	**Central Mudminnow** *Umbra limi*
2.5-5.1		1	4		3		3			17		2	3			
5.1-7.6			8	1	11		21	1	1	11	4	9	1		1	8
7.6-10.2			16	6	2		7		2	39		7	5			
10.2-12.7		1	5	3	1	5	6			30		5	2			
12.7-15.2		1	3	3		1				10		1		1		
15.2-17.8		1	1	1		1				3		1				
17.8-20.3		2				1				6						
20.3-22.9		1				1										
22.9-25.4																
25.4-27.9						9										
27.9-30.5	1					4										
30.5-33.0						14										
33.0-35.6						4										
35.6-38.1						3										
38.1-40.6						3										
40.6-43.2																
43.2-45.7																
45.7-48.3																
48.3-50.8																
> 50.8	3															
Count	4	7	37	14	17	46	37	1	3	116	4	25	11	1	1	8
Total	332															
Species	16															

Table 5-3
2021 Shiawassee River Fish Community Survey - Bowen Road, May 18, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Reach Length:
800 ft

Coordinates:
Upstream 42.635464, -83.966704
Downstream 42.637424, -83.968027

Time Surveyed:
1000 hrs
Backpack Electrofisher #1 2775 sec
Backpack Electrofisher #2 2738 sec

Notes:
cm = centimeters
ft = feet
hrs = hours
sec = seconds
N. pike (> 50.8) = 50.8 cm, 53.3 cm, 53.3 cm

Table 5-4

2021 Shiawassee River Fish Community Survey - West Marr Road, May 18, 2021

2020-2021 Baseline Sampling Data Report

Shiawassee River Superfund Site, Howell, Michigan

	Fish Species																		
Size (cm)	**Northern Pike** *Esox lucius*	**Rock Bass** *Ambloplites rupestris*	**Bluegill** *Lepomis macrochirus*	**Pumpkinseed** *Lepomis gibbosus*	**Green Sunfish** *Lepomis cyanellus*	**White Sucker** *Catostomus commersonii*	**Yellow Bullhead** *Ameiurus natalis*	**Tadpole Madtom** *Noturus gyrinus*	**Stonecat Madtom** *Noturus flavus*	**Round Goby** *Neogobius melanostomus*	**Greenside Darter** *Etheostoma blennioides*	**Johnny Darter** *Etheostoma nigrum*	**Blackside Darter** *Percina Maculata*	**Common Shiner** *Luxilus cornutus*	**Bluntnose Minnow** *Pimephales notatus*	**Creek Chub** *Semotilus atromaculatus*	**River Chub** *Nocomis micropogon*	**Hornyhead Chub** *Nocomis biguttatus*	**Central Mudminnow** *Umbra limi*
2.5-5.1					5										1	1			
5.1-7.6		4	1	1	8					11	2	2	2	4					
7.6-10.2		6		2	13			1		28				3		1	1	1	1
10.2-12.7		8	4	2	3		2		1	1				1					1
12.7-15.2		4	1				3										2	1	
15.2-17.8		4		1	1		2												
17.8-20.3		5																	
20.3-22.9							1												
22.9-25.4																			
25.4-27.9																			
27.9-30.5																			
30.5-33.0						1													
33.0-35.6						2													
35.6-38.1						1													
38.1-40.6						2													
40.6-43.2																			
43.2-45.7	1					1													
45.7-48.3																			
48.3-50.8						1													
> 50.8	2																		
Count	3	31	6	6	30	8	8	1	1	40	2	2	2	8	1	2	3	2	2
Total	158																		
Species	19																		

Table 5-4
2021 Shiawassee River Fish Community Survey - West Marr Road, May 18, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Reach Length:
800 ft

Coordinates:
Upstream 42.666320, -83.974867
Downstream 42.668406, -83.975089

Time Surveyed:
1600 hrs
Backpack Electrofisher #1 2200 sec
Backpack Electrofisher #2 2004 sec

Notes:
cm = centimeters
ft = feet
hrs = hours
sec = seconds
N. pike (> 50.8) = 53.3 cm, 55.9 cm

Table 5-5

2021 Shiawassee River Fish Community Survey - Chase Lake Road, May 19, 2021

2020-2021 Baseline Sampling Data Report

Shiawassee River Superfund Site, Howell, Michigan

Size (cm)	Fish Species																
	Northern Pike *Esox lucius*	**Rock Bass** *Ambloplites rupestris*	**Bluegill** *Lepomis macrochirus*	**Pumpkinseed** *Lepomis gibbosus*	**Green Sunfish** *Lepomis cyanellus*	**White Sucker** *Catostomus commersonii*	**Yellow Bullhead** *Ameiurus natalis*	**Common Carp** *Cyprinus carpio*	**Tadpole Madtom** *Noturus gyrinus*	**Round Goby** *Neogobius melanostomus*	**Johnny Darter** *Etheostoma nigrum*	**Common Shiner** *Luxilus cornutus*	**Spotfin Shiner** *Cyprinella spiloptera*	**Bluntnose Minnow** *Pimephales notatus*	**Fathead Minnow** *Pimephales promelas*	**River Chub** *Nocomis micropogon*	**Hornyhead Chub** *Nocomis biguttatus*
2.5-5.1		1								2						1	
5.1-7.6		1	1		1				2	9	1	1			1		
7.6-10.2		5		1	1				1			1	1	3		1	
10.2-12.7		20	1	1	1		1		9			3		2		1	4
12.7-15.2		4			2		1										1
15.2-17.8		4															
17.8-20.3		5															
20.3-22.9																	
22.9-25.4																	
25.4-27.9																	
27.9-30.5																	
30.5-33.0						1											
33.0-35.6																	
35.6-38.1						1											
38.1-40.6						3											
40.6-43.2	1					2											
43.2-45.7	2					7											
45.7-48.3	1					1											
48.3-50.8	1																
> 50.8	4							9									
Count	9	40	2	2	5	15	2	9	12	11	1	5	1	5	1	3	5
Total	128																
Species	17																

Table 5-5
2021 Shiawassee River Fish Community Survey - Chase Lake Road, May 19, 2021
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Reach Length:
800 ft

Coordinates:
Upstream 42.708554, -83.980802
Downstream 42.709377, -83.983556

Time Surveyed:
0930 hrs
Backpack Electrofisher #1 2138 sec
Backpack Electrofisher #2 2247 sec

Notes:
cm = centimeters
ft = feet
hrs = hours
sec = seconds
N. pike (> 50.8) = 50.8 cm, 66.0 cm, 68.6 cm, 78.7 cm
C. carp (> 50.8) = 50.8 to 76.2 cm range

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	BR-FF-01	BR-FF-02	BR-FF-03	BR-FF-04	BR-FF-05	BR-FF-06	BR-FF-07	BR-FF-08	BR-FF-09	BR-FF-10
		Location:	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF
		Species:	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Pumpkinseed	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	20.4	19.7	18.3	16.1	16.1	15.9	30.9	37.7	37.2	33.3
		Weight (g):	205	195	157.7	87	80.4	91.6	346.1	629.1	538.7	425.3
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352001	40227352002	40227352003	40227352004	40227352005	40227352006	40227352007	40227352008	40227352009	40227352010
PCB Congeners	**CAS Number**	**Units**										
PCB-1	2051-60-7	ng/kg	2200	2600	1910	1650	2590	3930	8000	6540	4600	5400
PCB-2	2051-61-8	ng/kg	24.0	23.4	19.8 J	17.1 J	25.5	36.5	53.0	47.6	40.0	28.2
PCB-3	2051-62-9	ng/kg	550	595	470	385	625	962	968	913	704	609
PCB-4	13029-08-8	ng/kg	9940	11200	8250	8830	7210	9390	37500	29900	23600	26300
PCB-5	16605-91-7	ng/kg	2.91 U	13.7 J	8.19 J	10.1 J	16.8 J	18.2 J	81.4	66.4	48.6	45.2
PCB-6	25569-80-6	ng/kg	1450	1930	1470	1700	2310	2720	6040	5200	3910	3980
PCB-7	33284-50-3	ng/kg	145	222	140	121	625	541	1240	1180	666	809
PCB-8	34883-43-7	ng/kg	5400	7230	5140	6290	12500	12800	27000	23400	17600	16900
PCB-9	34883-39-1	ng/kg	169	272	191	187	326	379	876	861	608	621
PCB-10	33146-45-1	ng/kg	358	452	314	324	282	398	1460	1230	914	1060
PCB-11	2050-67-1	ng/kg	94.0 U	91.2 U	104 J	96.3 U	96.0 U	93.1 U	101 J	96.8 J	109 J	108 J
PCB-12/13	12-13	ng/kg	150	158	120	118	216	235	389	341	254	266
PCB-14	34883-41-5	ng/kg	3.16 U	3.07 U	3.23 U	3.24 U	3.23 U	3.13 U	3.11 U	3.18 U	3.27 U	3.24 U
PCB-15	2050-68-2	ng/kg	2680	3380	1950	1390	1550	2410	5680	4430	4770	3590
PCB-16	38444-78-9	ng/kg	283	436	264	324	253	263	1600	1220	1320	1110
PCB-17	37680-66-3	ng/kg	6320	10800	4430	7640	8000	4500	36800	28500	23800	26100
PCB-18/30	18-30	ng/kg	1920	2830	1430	2630	1440	1410	6580	4760	3830	4380
PCB-19	38444-73-4	ng/kg	2350	2720	1890	2400	819	914	13300	9880	9710	9250
PCB-20/28	20-28	ng/kg	23300	39300	24300	36500	27900	45500	95800	86000	122000	97900
PCB-21/33	21-33	ng/kg	153	317	144	212	331	291	1200	1030	997	1180
PCB-22	38444-85-8	ng/kg	2470	4400	2780	4720	4690	5450	11300	10500	14500	8450
PCB-23	55720-44-0	ng/kg	6.49 J	22.6 J	7.39 J	13.2 J	22.1 J	24.1	53.8	38.2	32.0	38.2
PCB-24	55702-45-9	ng/kg	35.9	71.6	37.4	39.7	31.6	30.0	214	188	161	141
PCB-25	55712-37-3	ng/kg	3240	5700	2670	6440	5550	8040	13100	12200	12300	8510
PCB-26/29	26-29	ng/kg	4250	7900	3260	8050	4990	8810	13000	12600	13100	12000
PCB-27	38444-76-7	ng/kg	1390	2370	1040	1830	1660	1680	7190	5300	4550	5160
PCB-31	16606-02-3	ng/kg	4150	7240	4090	7820	14100	21000	38900	41400	50400	29000
PCB-32	38444-77-8	ng/kg	6780	10500	4610	8940	9080	10200	34600	27600	34700	28200
PCB-34	37680-68-5	ng/kg	338	676	267	555	211	337	1060	753	927	918
PCB-35	37680-69-6	ng/kg	3.09 U	3.00 U	3.15 U	3.16 U	3.15 U	3.06 U	4.40 J	4.56 J	3.23 J	3.74 UX
PCB-36	38444-87-0	ng/kg	2.31 U	2.24 U	2.36 U	2.37 U	2.36 U	2.29 U	2.27 U	2.32 U	2.39 U	2.37 U
PCB-37	38444-90-5	ng/kg	494	867	798	653	449	717	1290	1070	1800	884
PCB-38	53555-66-1	ng/kg	18.3 J	27.9	17.2 J	31.9	9.35 J	23.2 J	50.3	41.4	70.7	48.5
PCB-39	38444-88-1	ng/kg	12.5 J	41.4	27.1	8.87 UX	65.0	41.3	119	84.9	142	161
PCB-40/41/71	40-41-71	ng/kg	5730	10200	5360	9690	6470	8830	29400	25600	33000	35200
PCB-42	36559-22-5	ng/kg	6160	8780	6390	9410	5110	6170	27400	23300	36400	32700
PCB-43/73	43-73	ng/kg	558	1210	582	1120	601	1040	2740	1480	1360	1550
PCB-44/47/65	44-57-65	ng/kg	34100	50300	40800	47000	22600	44700	118000	97500	147000	148000
PCB-45/51	45-51	ng/kg	1830	2900	1570	2770	1350	1240	11300	7550	11100	10900
PCB-46	41464-47-5	ng/kg	146	235	133	201	108	113	1560	1130	1630	1560
PCB-48	70362-47-9	ng/kg	1160	1860	1140	1830	1610	1420	7230	5120	6180	8200
PCB-49/69	49-69	ng/kg	25600	42000	27600	39100	19200	36400	88700	77000	129000	110000
PCB-50/53	50-53	ng/kg	1830	3270	1610	3040	1350	1460	8510	5580	7100	7360
PCB-52	35693-99-3	ng/kg	27900	48900	28600	44700	18800	33700	92700	63100	41400	58800

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	BR-FF-01	BR-FF-02	BR-FF-03	BR-FF-04	BR-FF-05	BR-FF-06	BR-FF-07	BR-FF-08	BR-FF-09	BR-FF-10
		Location:	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF
		Species:	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Pumpkinseed	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	20.4	19.7	18.3	16.1	16.1	15.9	30.9	37.7	37.2	33.3
		Weight (g):	205	195	157.7	87	80.4	91.6	346.1	629.1	538.7	425.3
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352001	40227352002	40227352003	40227352004	40227352005	40227352006	40227352007	40227352008	40227352009	40227352010
PCB Congeners	**CAS Number**	**Units**										
PCB-54	15968-05-5	ng/kg	26.4 J	29.7 J	24.4 J	27.1 J	19.0 J	20.5 J	246	184	189	212
PCB-55	74338-24-2	ng/kg	137	227	304	295	278	398	906	779	790	794
PCB-56	41464-43-1	ng/kg	4720	6980	6810	8300	5170	7530	19300	19400	26100	21100
PCB-57	70424-67-8	ng/kg	312	507	393	549	301	584	1080	1090	1360	1220
PCB-58	41464-49-7	ng/kg	168	235	191	226	99.5	195	537	488	679	677
PCB-59/62/75	59-62-75	ng/kg	3420	5270	3840	4980	2420	4360	11100	8580	14200	13000
PCB-60	33025-41-1	ng/kg	5620	7850	10200	8650	5120	10600	16900	16900	24700	24800
PCB-61/70/74/76	61-70-74-76	ng/kg	23900	35800	44000	39200	26700	54000	111000	115000	164000	160000
PCB-63	74472-34-7	ng/kg	2720	4150	4000	4120	2050	3990	9870	10200	13500	14300
PCB-64	52663-58-8	ng/kg	12600	18900	13500	22800	11300	13100	47000	43300	77000	58500
PCB-66	32598-10-0	ng/kg	26000	36800	50900	37200	20200	51600	79700	77800	122000	119000
PCB-67	73575-53-8	ng/kg	713	953	1040	1110	785	1450	1610	1560	1600	1240
PCB-68	73575-52-7	ng/kg	614	964	760	774	375	864	2000	1840	2570	2920
PCB-72	41464-42-0	ng/kg	799	1220	829	1130	584	1410	2230	1800	2840	3390
PCB-77	32598-13-3	ng/kg	1190	1860	2280	1930	1110	2110	3140	2640	3880	3230
PCB-78	70362-49-1	ng/kg	2.48 U	2.41 U	2.54 U	2.54 U	2.54 U	2.46 U	2.44 U	2.50 U	2.56 U	2.54 U
PCB-79	41464-48-6	ng/kg	119	164	170	162	109	160	477	519	646	729
PCB-80	33284-52-5	ng/kg	2.08 U	2.02 U	2.13 U	2.13 U	2.13 U	2.06 U	2.04 U	2.09 U	2.15 U	2.13 U
PCB-81	70362-50-4	ng/kg	110	139	209	138	65.9	118	290	297	384	428
PCB-82	52663-62-4	ng/kg	1400	2080	2040	2170	1080	1090	5710	6720	7680	9380
PCB-83	60145-20-2	ng/kg	1130	1670	1380	1630	317	439	3000	2950	3220	4220
PCB-84	52663-60-2	ng/kg	2190	3180	2570	3540	811	849	6410	4580	7150	7540
PCB-85/116/117	85-116-117	ng/kg	5580	7940	8770	7360	3880	7990	15800	20600	23500	26400
PCB-86/87/97/108/119/125	868797108119125	ng/kg	9210	13200	13700	12100	6040	12500	30700	32600	43000	50100
PCB-88/91	88-91	ng/kg	3310	5050	4310	5190	1660	3050	11100	9690	15000	15800
PCB-89	73575-57-2	ng/kg	20.6 J	43.4 J	29.9 J	43.3 J	98.9	82.7	684	596	896	972
PCB-90/101/113	90-101-113	ng/kg	14200	22100	20500	19000	8640	20000	45300	44600	53100	64900
PCB-92	52663-61-3	ng/kg	3360	5020	4350	4630	1990	5070	9130	7910	9740	11100
PCB-93/98/100/102	9398100102	ng/kg	795	1340	1000	1330	791	1180	3720	2910	3880	4840
PCB-94	73575-55-0	ng/kg	45.9 J	98.1	49.7	92.9	68.2	69.5	421	250	262	399
PCB-95	38379-99-6	ng/kg	8170	12500	9670	12600	3320	7600	19100	12000	18900	19800
PCB-96	73575-54-9	ng/kg	45.8 J	93.5	49.1	75.3	27.9 J	26.7 J	366	229	423	407
PCB-99	38380-01-7	ng/kg	11800	18200	20600	15600	7770	17300	37100	44900	50900	57700
PCB-103	60145-21-3	ng/kg	235	375	302	324	124	296	566	452	656	738
PCB-104	56558-16-8	ng/kg	1.11 U	1.08 U	1.14 U	1.14 U	2.77 J	1.77 UX	8.72 J	5.41 J	8.16 J	10.2 J
PCB-105	32598-14-4	ng/kg	6350	8820	11700	8700	4630	9550	15700	15800	23400	28000
PCB-106	70424-69-0	ng/kg	2.19 U	18.8 J	20.1 J	34.9 J	28.4 J	51.6	60.4	68.3	76.5	78.5
PCB-107/124	107-124	ng/kg	249	420	372	390	325	695	1190	1260	1420	1610
PCB-109	74472-35-8	ng/kg	1370	1870	2170	2070	1030	1890	3830	5350	5760	6940
PCB-110/115	110-115	ng/kg	14700	22200	19600	23000	10200	17200	40400	36400	60000	66400
PCB-111	39635-32-0	ng/kg	16.5 J	28.1 J	27.9 J	29.6 J	11.4 J	21.7 J	55.0	71.1	74.2	89.6
PCB-112	74472-36-9	ng/kg	156	209	2.72 U	129	144	210	601	336	532	436
PCB-114	74472-37-0	ng/kg	681	951	1230	899	426	842	1760	2500	2630	3340
PCB-118	31508-00-6	ng/kg	14800	21700	27500	19800	10100	19200	42600	54900	60500	73200

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	BR-FF-01	BR-FF-02	BR-FF-03	BR-FF-04	BR-FF-05	BR-FF-06	BR-FF-07	BR-FF-08	BR-FF-09	BR-FF-10
		Location:	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF
		Species:	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Pumpkinseed	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	20.4	19.7	18.3	16.1	16.1	15.9	30.9	37.7	37.2	33.3
		Weight (g):	205	195	157.7	87	80.4	91.6	346.1	629.1	538.7	425.3
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352001	40227352002	40227352003	40227352004	40227352005	40227352006	40227352007	40227352008	40227352009	40227352010
PCB Congeners	**CAS Number**	**Units**										
PCB-120	68194-12-7	ng/kg	82.5	125	132	101	55.7	102	266	356	339	424
PCB-121	56558-18-0	ng/kg	6.15 J	10.7 J	8.21 J	7.54 J	3.36 UX	9.14 J	18.4 J	20.8 J	21.8 J	28.0 J
PCB-122	76842-07-4	ng/kg	141	230	247	187	143	269	438	563	662	673
PCB-123	65510-44-3	ng/kg	424	613	819	598	310	700	1240	1270	1660	2190
PCB-126	57465-28-8	ng/kg	41.5 J	55.5	71.6	52.6	22.8 J	47.0 J	66.6	67.8	109	109
PCB-127	39635-33-1	ng/kg	12.9 J	16.6 J	19.6 J	15.1 J	6.37 J	11.5 J	29.5 J	46.3 J	42.8 J	59.0
PCB-128/166	128-166	ng/kg	716	951	1150	906	502	853	1810	2890	2910	3570
PCB-129/138/163	129-138-163	ng/kg	4830	6850	7750	6260	3680	6420	14400	23100	22600	27200
PCB-130	52663-66-8	ng/kg	404	588	610	551	275	451	966	1550	1420	1930
PCB-131	61798-70-7	ng/kg	52.7	57.0	84.2	61.0	35.9 J	24.2 J	151	169	198	261
PCB-132	38380-05-1	ng/kg	1090	1500	1620	1610	524	1040	2980	2740	4030	5050
PCB-133	35694-04-3	ng/kg	130	183	189	206	85.7	159	311	433	433	575
PCB-134/143	134-143	ng/kg	262	370	363	337	143	260	568	554	632	893
PCB-135/151	135-151	ng/kg	1270	1800	1630	1680	709	1730	2530	2250	3020	3720
PCB-136	38411-22-2	ng/kg	337	476	437	469	175	244	665	466	747	874
PCB-137	35694-06-5	ng/kg	361	529	669	444	200	358	922	1420	1240	1880
PCB-139/140	139-140	ng/kg	133	182	204	179	91.1 J	171	337	549	540	685
PCB-141	52712-04-6	ng/kg	720	1050	1040	951	425	877	1720	1790	1880	3060
PCB-142	41411-61-4	ng/kg	2.37 U	2.30 U	2.42 U	2.43 U	2.42 U	2.35 U	8.98 J	5.09 UX	5.23 J	5.70 J
PCB-144	68194-14-9	ng/kg	180	265	263	235	90.2	222	429	483	533	743
PCB-145	74472-40-5	ng/kg	2.96 U	2.87 U	3.03 U	3.04 U	3.03 U	2.93 U	9.40 J	7.46 J	11.3 J	13.2 J
PCB-146	51908-16-8	ng/kg	1040	1430	1500	1420	738	1370	2510	3850	3520	4730
PCB-147/149	147-149	ng/kg	3800	5020	4880	4860	2360	4240	7600	7120	9040	13000
PCB-148	74472-41-6	ng/kg	12.3 J	18.8 J	19.6 J	16.8 J	7.97 J	20.8 J	36.3 J	40.3 J	44.9 J	60.2
PCB-150	68194-08-1	ng/kg	7.91 J	13.1 J	11.8 J	12.6 J	4.46 J	3.85 J	19.8 J	14.1 UX	23.5 J	30.9 J
PCB-152	68194-09-2	ng/kg	5.00 J	7.76 J	6.82 J	9.03 J	3.79 J	7.43 J	18.8 J	13.6 J	23.1 J	24.5 J
PCB-153/168	153-168	ng/kg	4060	5890	6340	5530	2890	4960	10900	17600	16000	21400
PCB-154	60145-22-4	ng/kg	100	152	149	126	58.8	135	257	279	309	440
PCB-155	33979-03-2	ng/kg	1.61 U	1.73 J	1.65 U	1.65 U	1.65 U	1.60 U	3.65 UX	4.32 J	3.93 UX	5.44 J
PCB-156/157	156-157	ng/kg	690	953	1130	970	446	774	1650	2410	2370	3210
PCB-158	74472-42-7	ng/kg	353	503	563	439	252	409	1160	2110	1880	2310
PCB-159	39635-35-3	ng/kg	13.4 J	4.89 J	3.06 J	4.89 J	6.90 J	12.3 J	24.1 J	15.8 J	20.1 J	44.6 J
PCB-160	41411-62-5	ng/kg	2.01 U	1.95 U	2.06 U	2.06 U	2.06 U	1.99 U	1.98 U	12.0 UX	15.6 J	2.06 U
PCB-161	74472-43-8	ng/kg	2.97 U	2.88 U	3.04 U	3.05 U	3.04 U	2.94 U	2.92 U	2.99 U	3.07 U	4.42 UX
PCB-162	39635-34-2	ng/kg	25.0 J	33.2 J	34.2 J	37.0 J	17.7 J	29.3 J	68.2	103	85.0	124
PCB-164	74472-45-0	ng/kg	275	366	351	329	170	377	527	437	641	929
PCB-165	74472-46-1	ng/kg	5.47 UX	9.43 J	9.63 J	11.4 J	4.59 J	9.92 J	15.7 J	24.4 J	26.2 J	31.3 J
PCB-167	52663-72-6	ng/kg	250	353	390	300	166	292	651	1100	951	1250
PCB-169	32774-16-6	ng/kg	3.90 U	4.77 UX	3.99 U	4.00 U	3.99 U	3.87 U	3.83 U	5.84 UX	7.63 UX	5.06 UX
PCB-170	35065-30-6	ng/kg	584	784	818	778	409	629	1510	2690	2320	2920
PCB-171/173	171-173	ng/kg	154	225	222	196	118	190	435	840	702	832
PCB-172	52663-74-8	ng/kg	140	221	211	222	104	161	352	642	514	713
PCB-174	38411-25-5	ng/kg	392	570	538	468	193	374	805	745	743	1500
PCB-175	40186-70-7	ng/kg	22.7 J	35.0 J	34.8 J	32.3 J	17.8 J	26.6 J	78.4	135	109	143

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:			BR-FF-01	BR-FF-02	BR-FF-03	BR-FF-04	BR-FF-05	BR-FF-06	BR-FF-07	BR-FF-08	BR-FF-09	BR-FF-10
Location:			BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF	BR-FF
Species:			Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Pumpkinseed	White Sucker	White Sucker	White Sucker	White Sucker
Length (cm):			20.4	19.7	18.3	16.1	16.1	15.9	30.9	37.7	37.2	33.3
Weight (g):			205	195	157.7	87	80.4	91.6	346.1	629.1	538.7	425.3
Sample Date:			5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
Lab Sample ID:			40227352001	40227352002	40227352003	40227352004	40227352005	40227352006	40227352007	40227352008	40227352009	40227352010
PCB Congeners	**CAS Number**	**Units**										
PCB-176	52663-65-7	ng/kg	63.2	95.6	90.2	78.6	32.5 J	49.6	128	140	169	230
PCB-177	52663-70-4	ng/kg	362	545	530	470	261	407	892	1820	1420	1770
PCB-178	52663-67-9	ng/kg	141	217	204	182	104	178	387	622	564	755
PCB-179	52663-64-6	ng/kg	164	233	208	219	116	222	303	271	425	484
PCB-180/193	180-193	ng/kg	1400	2060	1940	1730	958	1480	3710	7140	5740	7770
PCB-181	74472-47-2	ng/kg	9.00 J	14.0 J	13.5 J	11.9 J	5.98 J	7.82 UX	22.9 J	40.1 J	32.3 J	43.6 J
PCB-182	60145-23-5	ng/kg	7.15 J	10.5 J	7.38 J	7.55 UX	4.19 J	6.83 J	17.2 J	24.2 J	22.4 J	32.1 J
PCB-183/185	183-185	ng/kg	398	572	578	509	276	449	1200	2090	1730	2330
PCB-184	74472-48-3	ng/kg	2.11 UX	3.19 J	1.80 U	2.58 J	1.80 U	1.78 UX	4.99 J	7.61 J	5.77 J	8.33 UX
PCB-186	74472-49-4	ng/kg	1.53 U	1.49 U	1.57 U	1.57 U	1.57 U	1.52 U	1.51 U	1.54 U	1.58 U	1.57 U
PCB-187	52663-68-0	ng/kg	1440	1940	1990	1760	1300	2600	2570	4600	4270	5000
PCB-188	74487-85-7	ng/kg	1.86 U	2.57 UX	2.77 J	3.02 UX	1.90 U	2.03 UX	4.58 J	6.29 J	6.46 J	8.02 J
PCB-189	39635-31-9	ng/kg	29.4 J	46.4 J	43.7 J	45.8 J	19.5 J	31.9 J	75.8	141	106	149
PCB-190	41411-64-7	ng/kg	61.1	83.9	84.1	85.3	36.0 J	53.6	194	375	293	388
PCB-191	74472-50-7	ng/kg	26.8 J	38.3 J	39.3 J	32.7 J	17.3 J	26.9 J	67.2	126	99.9	139
PCB-192	74472-51-8	ng/kg	2.62 U	2.54 U	2.67 U	2.68 U	2.67 U	2.59 U	2.57 U	2.63 U	2.70 U	2.68 U
PCB-194	35694-08-7	ng/kg	293	467	394	478	240	313	667	1530	1050	1480
PCB-195	52663-78-2	ng/kg	93.8	147	137	139	74.1	107	241	565	411	507
PCB-196	42740-50-1	ng/kg	127	185	173	174	99.6	126	334	792	556	728
PCB-197/200	197-200	ng/kg	31.0 J	50.9 J	45.0 J	46.9 J	21.9 J	35.4 J	74.2 J	104 J	96.3 J	149
PCB-198/199	198-199	ng/kg	415	631	544	596	354	540	921	1930	1440	1880
PCB-201	40186-71-8	ng/kg	39.6 J	57.7 J	52.6 J	55.2 J	32.6 J	44.2 J	85.1	164	131	179
PCB-202	2136-99-4	ng/kg	94.6	134	120	129	78.4	119	169	285	266	355
PCB-203	52663-76-0	ng/kg	232	341	314	337	185	255	625	1240	954	1290
PCB-204	74472-52-9	ng/kg	1.80 U	1.75 U	1.84 U	1.85 U	1.84 U	1.79 U	1.77 U	3.04 J	2.01 J	1.84 U
PCB-205	74472-53-0	ng/kg	15.8 J	24.7 J	22.4 J	20.6 UX	12.5 J	17.6 J	37.1 J	90.2	61.6 J	82.8
PCB-206	40186-72-9	ng/kg	153	217	209	264	160	184	330	1050	603	796
PCB-207	52663-79-3	ng/kg	19.4 J	26.9 J	26.3 J	28.9 J	17.5 J	20.9 J	35.1 J	79.1	58.0 J	82.1
PCB-208	52663-77-1	ng/kg	46.7 J	64.8 J	63.7 J	79.5	54.8 J	60.9 J	86.3	205	157	203
PCB-209	ARC-209	ng/kg	58.3 J	72.3	83.4	106	69.9 J	75.0	80.8	246	160	229
Total PCB Congeners	**--**	**ng/kg**	**397413.3 J**	**605827.1 J**	**519759.05 J**	**579183.74 J**	**345250.87 J**	**593187.87 J**	**1427534.47 J**	**1341361.99 J**	**1718683.66 J**	**1722057.86 J**
Lipid Content	ARC-LIPID	%	0.30	0.34	0.32	0.31	0.39	0.72	0.99	0.76	0.46	0.99

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
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Shiawassee River Superfund Site, Howell, Michigan

Sample ID:			BR-FF-11	CL-FF-23	CL-FF-24	CL-FF-25	CL-FF-26	CL-FF-27	CL-FF-28	CL-FF-29	CL-FF-30	CL-FF-31
Location:			BR-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF
Species:			White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	White Sucker	White Sucker	White Sucker
Length (cm):			39.1	18.0	18.3	19.7	17.5	18.7	19	40	37.1	39.6
Weight (g):			681.1	134.6	139.8	196.7	120.1	144.1	158.5	737	588.9	781.8
Sample Date:			5/18/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
Lab Sample ID:			40227352011	40227353003	40227353004	40227353005	40227353006	40227353007	40227353008	40227353009	40227353010	40227353011
PCB Congeners	**CAS Number**	**Units**										
PCB-1	2051-60-7	ng/kg	5320	695	879	793	528	612	508	1400	2310	1730
PCB-2	2051-61-8	ng/kg	28.0	13.2 J	15.7 J	15.0 J	10.8 J	10.2 J	9.63 J	13.5 J	15.2 J	13.9 J
PCB-3	2051-62-9	ng/kg	504	239	259	246	169	200	161	249	247	231
PCB-4	13029-08-8	ng/kg	22300	4340	5680	5330	3640	3610	3240	8760	12800	10700
PCB-5	16605-91-7	ng/kg	45.5 UX	6.67 J	8.66 UX	10.7 UX	4.44 J	10.3 UX	6.27 UX	24.3	32.1	30.9 UX
PCB-6	25569-80-6	ng/kg	4190	872	1350	1220	907	1010	922	1990	2280	2250
PCB-7	33284-50-3	ng/kg	782	93.3	149	114	74.5	102	73.5 UX	321	434	423
PCB-8	34883-43-7	ng/kg	17600	2870	4420	3810	2830	2910	2660	5640	7050	6710
PCB-9	34883-39-1	ng/kg	622	144	202	181	127	140	124	291	392	364
PCB-10	33146-45-1	ng/kg	923	142	214	180	125	140	122	341	495	353
PCB-11	2050-67-1	ng/kg	105 J	92.1 U	91.8 U	93.9 U	97.3 U	95.8 U	95.8 J	95.1 U	95.2 U	92.0 U
PCB-12/13	12-13	ng/kg	246	113	104	109	76.3	89.7	70.8 UX	112	94.6	99.5
PCB-14	34883-41-5	ng/kg	3.13 U	3.10 U	3.09 U	3.16 U	3.28 U	3.23 U	3.20 U	3.20 U	3.21 U	3.10 U
PCB-15	2050-68-2	ng/kg	2330	2000	1570	2160	1310	1490	1410	2160	2060	1820
PCB-16	38444-78-9	ng/kg	1100	245	371	345	245	293	264	582	851	746
PCB-17	37680-66-3	ng/kg	27400	3540	5970	5310	3540	4230	3740	7660	9750	9220
PCB-18/30	18-30	ng/kg	2220	1470	2490	2130	1600	2300	2330	2250	4250	3220
PCB-19	38444-73-4	ng/kg	7300	1320	1880	1810	1270	1400	1130	2990	4060	3670
PCB-20/28	20-28	ng/kg	94000	19700	30300	23700	16600	18400	22500	22400	28900	31600
PCB-21/33	21-33	ng/kg	1140	214	367	268	210	233	231	480	622	648
PCB-22	38444-85-8	ng/kg	11000	2760	4260	3300	2480	2490	3000	3230	4460	4420
PCB-23	55720-44-0	ng/kg	46.5	9.28 J	14.9 J	10.0 J	8.19 J	8.59 J	10.2 J	12.7 J	17.8 J	23.8
PCB-24	55702-45-9	ng/kg	172	28.1	54.1	41.5	29.1	31.9	32.8	69.2	85.1	75.7
PCB-25	55712-37-3	ng/kg	8430	2910	4880	3410	2570	2840	2990	3210	4250	4130
PCB-26/29	26-29	ng/kg	9350	4350	6910	4930	3790	3950	4500	3720	4870	4720
PCB-27	38444-76-7	ng/kg	4490	773	1270	1270	860	911	807	1710	2290	2020
PCB-31	16606-02-3	ng/kg	32400	4820	8340	6270	4630	4410	4870	11000	14000	13100
PCB-32	38444-77-8	ng/kg	31700	3050	5240	4740	3460	3550	3610	5730	7970	7560
PCB-34	37680-68-5	ng/kg	976	247	436	317	246	289	305	306	352	397
PCB-35	37680-69-6	ng/kg	3.06 U	3.03 U	3.02 U	3.08 U	3.20 U	3.15 U	3.12 U	3.13 U	3.13 U	3.02 U
PCB-36	38444-87-0	ng/kg	2.29 U	2.27 U	2.26 U	2.31 U	2.39 U	2.36 U	2.34 U	2.34 U	2.34 U	2.26 U
PCB-37	38444-90-5	ng/kg	420	632	732	789	529	667	838	911	1070	778
PCB-38	53555-66-1	ng/kg	52.3	18.6 J	26.1	18.2 J	20.5 J	13.0 J	29.9	2.65 U	16.0 J	21.0 J
PCB-39	38444-88-1	ng/kg	66.2	11.3 J	15.2 J	16.3 J	12.7 J	19.6 J	15.9 J	42.9 UX	31.6	16.3 UX
PCB-40/41/71	40-41-71	ng/kg	27900	4710	9390	7810	5060	5250	5890	8480	10900	12100
PCB-42	36559-22-5	ng/kg	29200	5900	9690	8380	5480	6070	8350	6410	8760	9810
PCB-43/73	43-73	ng/kg	1650	584	1100	781	620	545	648	551	817	860
PCB-44/47/65	44-57-65	ng/kg	118000	23900	41200	38800	24800	29300	37700	22600	28900	33200
PCB-45/51	45-51	ng/kg	9200	1500	2500	1900	1340	1510	1680	2400	3030	3080
PCB-46	41464-47-5	ng/kg	1390	124	200	183	133	128	108	429	601	618
PCB-48	70362-47-9	ng/kg	4210	1010	1700	1500	943	1120	1230	1260	1820	2000
PCB-49/69	49-69	ng/kg	93200	22900	39100	34800	22300	28700	37200	21600	27100	31000
PCB-50/53	50-53	ng/kg	6220	1630	2670	2050	1440	1740	1700	1990	2670	2890
PCB-52	35693-99-3	ng/kg	9410	27300	44100	38900	25800	33400	43800	8880	28400	18700

Table 5-6
Analytical Results for Fish Tissue Samples
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		Sample ID:	BR-FF-11	CL-FF-23	CL-FF-24	CL-FF-25	CL-FF-26	CL-FF-27	CL-FF-28	CL-FF-29	CL-FF-30	CL-FF-31
		Location:	BR-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF
		Species:	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	White Sucker	White Sucker	White Sucker
		Length (cm):	39.1	18.0	18.3	19.7	17.5	18.7	19	40	37.1	39.6
		Weight (g):	681.1	134.6	139.8	196.7	120.1	144.1	158.5	737	588.9	781.8
		Sample Date:	5/18/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227352011	40227353003	40227353004	40227353005	40227353006	40227353007	40227353008	40227353009	40227353010	40227353011
PCB Congeners	**CAS Number**	**Units**										
PCB-54	15968-05-5	ng/kg	157	19.3 J	27.7 J	27.1 J	15.9 J	19.9 J	14.6 J	60.7	75.5	67.6
PCB-55	74338-24-2	ng/kg	628	137	245	180	116	129	147	202	207	245
PCB-56	41464-43-1	ng/kg	22000	4760	7640	6970	4250	6160	6620	5290	6680	6640
PCB-57	70424-67-8	ng/kg	992	298	561	439	308	466	475	280	308	349
PCB-58	41464-49-7	ng/kg	511	138	240	233	133	212	237	140	167	183
PCB-59/62/75	59-62-75	ng/kg	10500	3080	5070	4330	3150	3660	4690	2570	3450	3850
PCB-60	33025-41-1	ng/kg	20100	4690	7850	7870	5110	6370	7440	4380	5140	5660
PCB-61/70/74/76	61-70-74-76	ng/kg	127000	20400	36100	34700	21500	28400	31700	27600	32100	37500
PCB-63	74472-34-7	ng/kg	10900	2510	4060	4280	2550	3610	4000	2440	2800	3520
PCB-64	52663-58-8	ng/kg	52800	14700	24000	20500	14300	15800	22100	14600	18100	20100
PCB-66	32598-10-0	ng/kg	96000	20700	38000	39400	24700	34800	37600	20500	25600	30900
PCB-67	73575-53-8	ng/kg	1150	587	979	842	527	859	785	402	447	412
PCB-68	73575-52-7	ng/kg	2090	477	799	869	520	695	761	475	538	689
PCB-72	41464-42-0	ng/kg	2050	603	1110	1020	661	972	1050	655	710	893
PCB-77	32598-13-3	ng/kg	2490	1010	1690	1380	968	1520	1630	938	1180	1020
PCB-78	70362-49-1	ng/kg	2.46 U	2.43 U	2.43 U	2.48 U	2.57 U	2.53 U	2.51 U	2.51 U	2.52 U	2.43 U
PCB-79	41464-48-6	ng/kg	662	115	154	224	126	241	229	164	182	213
PCB-80	33284-52-5	ng/kg	2.06 U	2.04 U	2.03 U	2.08 U	2.15 U	2.12 U	2.10 U	2.11 U	2.11 U	2.04 U
PCB-81	70362-50-4	ng/kg	322	81.5	132	149	83.1	152	143	89.8	110	112
PCB-82	52663-62-4	ng/kg	7250	1590	2600	3050	1860	2500	2640	1750	2300	2410
PCB-83	60145-20-2	ng/kg	3500	1110	1800	2250	1210	1830	1900	1030	1170	1260
PCB-84	52663-60-2	ng/kg	6600	2190	3430	3580	2270	3000	3600	1850	2730	2790
PCB-85/116/117	85-116-117	ng/kg	20100	4750	8480	10800	6540	10100	9530	4920	5940	6590
PCB-86/87/97/108/119/125	868797108119125	ng/kg	38300	8710	14100	17700	10100	17300	17600	9050	11800	12200
PCB-88/91	88-91	ng/kg	12200	3230	5510	6310	4030	5760	6150	2810	3900	4310
PCB-89	73575-57-2	ng/kg	810	18.9 J	38.5 J	33.6 J	29.2 J	20.7 J	18.9 J	190	297	328
PCB-90/101/113	90-101-113	ng/kg	36400	12600	21700	26400	15800	28000	25400	9610	14700	15900
PCB-92	52663-61-3	ng/kg	5080	3050	5280	6300	3900	6480	6170	1990	3450	3470
PCB-93/98/100/102	9398100102	ng/kg	3720	769	1310	1270	861	1060	1190	961	1340	1480
PCB-94	73575-55-0	ng/kg	404	46.6 J	69.4	67.5	49.6 J	52.7	48.4 J	101	159	168
PCB-95	38379-99-6	ng/kg	11300	7000	11300	12500	8160	12400	13000	3790	6930	6720
PCB-96	73575-54-9	ng/kg	334	50.5	90.7	70.9	41.2 J	48.7 J	52.9	88.7	140	140
PCB-99	38380-01-7	ng/kg	45400	10200	17400	22700	13300	22400	20400	9610	12000	13700
PCB-103	60145-21-3	ng/kg	543	188	358	382	252	410	386	129	200	220
PCB-104	56558-16-8	ng/kg	9.52 J	1.09 U	1.09 U	1.11 U	1.15 U	1.67 J	1.13 U	1.13 U	1.13 U	3.22 J
PCB-105	32598-14-4	ng/kg	18800	5420	10200	13500	7620	12800	11400	5540	6360	6900
PCB-106	70424-69-0	ng/kg	75.9	2.14 U	2.14 U	2.18 U	2.26 U	2.23 U	2.21 U	2.21 U	2.22 U	2.14 U
PCB-107/124	107-124	ng/kg	1370	236	452	443	250	397	370	332	407	400
PCB-109	74472-35-8	ng/kg	5260	1440	2520	3270	1870	2630	2240	1110	1280	1750
PCB-110/115	110-115	ng/kg	45500	16300	26000	31700	19900	29000	31000	14200	18900	19300
PCB-111	39635-32-0	ng/kg	62.5	19.2 J	27.8 J	39.9 J	24.9 J	45.0 J	33.3 J	19.0 J	21.4 J	25.8 J
PCB-112	74472-36-9	ng/kg	318	119	508	465	166	248	233	138	159	142
PCB-114	74472-37-0	ng/kg	2470	524	914	1260	689	1070	1060	556	599	771
PCB-118	31508-00-6	ng/kg	55400	12900	23600	31200	17700	30500	26700	13600	15900	19900

Table 5-6
Analytical Results for Fish Tissue Samples
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		Sample ID:	BR-FF-11	CL-FF-23	CL-FF-24	CL-FF-25	CL-FF-26	CL-FF-27	CL-FF-28	CL-FF-29	CL-FF-30	CL-FF-31
		Location:	BR-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF
		Species:	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	White Sucker	White Sucker	White Sucker
		Length (cm):	39.1	18.0	18.3	19.7	17.5	18.7	19	40	37.1	39.6
		Weight (g):	681.1	134.6	139.8	196.7	120.1	144.1	158.5	737	588.9	781.8
		Sample Date:	5/18/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227352011	40227353003	40227353004	40227353005	40227353006	40227353007	40227353008	40227353009	40227353010	40227353011
PCB Congeners	**CAS Number**	**Units**										
PCB-120	68194-12-7	ng/kg	307	71.9	122	156	97.0	169	142	75.0	90.9	109
PCB-121	56558-18-0	ng/kg	20.0 J	5.79 J	9.17 J	9.46 UX	7.01 J	10.6 J	9.53 J	2.19 U	2.20 U	8.02 J
PCB-122	76842-07-4	ng/kg	627	125	229	291	102	201	180	131	163	213
PCB-123	65510-44-3	ng/kg	1290	336	673	879	474	940	770	393	448	523
PCB-126	57465-28-8	ng/kg	91.2	33.4 J	59.6	64.4	34.9 J	59.4	54.7	25.0 J	29.0 J	31.2 J
PCB-127	39635-33-1	ng/kg	44.0 J	9.37 J	14.7 J	18.9 J	14.4 J	26.8 J	23.0 J	7.02 UX	2.24 U	2.17 U
PCB-128/166	128-166	ng/kg	2530	719	1280	1900	1010	1560	1250	617	797	807
PCB-129/138/163	129-138-163	ng/kg	21900	5000	9130	13200	7520	11000	9030	4400	5440	6620
PCB-130	52663-66-8	ng/kg	1450	390	686	959	532	803	616	303	385	487
PCB-131	61798-70-7	ng/kg	237	54.9	84.2	129	66.0	97.9	74.8	43.1 J	72.9	85.3
PCB-132	38380-05-1	ng/kg	3680	1140	1990	2620	1590	2030	1690	902	1180	1500
PCB-133	35694-04-3	ng/kg	431	116	205	288	170	250	192	86.9	111	149
PCB-134/143	134-143	ng/kg	747	230	389	550	336	454	376	155	218	285
PCB-135/151	135-151	ng/kg	3190	989	1800	2340	1490	2020	1830	664	1090	1160
PCB-136	38411-22-2	ng/kg	699	249	462	593	347	500	444	158	258	268
PCB-137	35694-06-5	ng/kg	1260	320	590	833	454	605	469	226	312	412
PCB-139/140	139-140	ng/kg	521	113	241	323	193	243	191	89.3 J	130	168
PCB-141	52712-04-6	ng/kg	1510	571	1030	1450	786	1190	968	336	589	673
PCB-142	41411-61-4	ng/kg	11.7 UX	2.32 U	4.85 J	6.66 J	3.88 UX	7.51 J	4.97 J	2.40 U	2.40 U	2.32 U
PCB-144	68194-14-9	ng/kg	487	143	271	351	197	310	247	99.2	176	180
PCB-145	74472-40-5	ng/kg	9.88 J	2.90 U	2.90 U	2.96 U	3.07 U	3.02 U	3.00 U	3.00 U	3.20 J	3.23 J
PCB-146	51908-16-8	ng/kg	3770	875	1550	2150	1260	1840	1450	680	868	1220
PCB-147/149	147-149	ng/kg	10100	3150	5430	8080	4910	6670	5620	2030	2970	3440
PCB-148	74472-41-6	ng/kg	44.6 J	11.9 J	20.1 J	27.8 J	15.5 J	25.3 J	22.1 J	7.95 UX	9.41 UX	14.7 J
PCB-150	68194-08-1	ng/kg	23.3 J	6.53 J	13.1 J	16.1 J	9.67 J	14.4 J	11.5 J	4.58 J	6.60 J	7.48 UX
PCB-152	68194-09-2	ng/kg	20.9 J	4.68 J	10.1 J	10.6 J	7.16 J	5.75 J	7.67 J	4.33 J	7.60 J	7.45 J
PCB-153/168	153-168	ng/kg	15700	3650	6490	9670	5110	8300	6600	3170	4020	5430
PCB-154	60145-22-4	ng/kg	304	84.7	156	220	133	201	159	68.5	97.3	107
PCB-155	33979-03-2	ng/kg	3.63 UX	1.58 U	1.69 J	1.73 J	1.67 U	1.64 U	1.64 UX	1.63 U	1.63 U	1.58 U
PCB-156/157	156-157	ng/kg	2300	584	1020	1470	774	1410	1140	573	690	792
PCB-158	74472-42-7	ng/kg	1840	411	742	1070	596	811	765	371	446	543
PCB-159	39635-35-3	ng/kg	27.6 J	9.55 J	17.4 J	24.9 J	18.2 J	35.9 J	26.8 J	2.92 U	4.47 J	2.83 U
PCB-160	41411-62-5	ng/kg	17.3 J	4.91 J	7.03 J	12.2 J	10.2 J	16.8 J	30.2 J	2.04 U	2.04 U	1.97 U
PCB-161	74472-43-8	ng/kg	2.94 U	2.91 U	2.91 U	2.97 U	3.08 U	3.03 U	3.01 U	3.01 U	3.01 U	2.91 U
PCB-162	39635-34-2	ng/kg	94.3	24.9 J	38.6 J	64.4	29.3 J	47.3 J	36.6 J	16.4 J	11.2 J	28.1 J
PCB-164	74472-45-0	ng/kg	661	235	362	554	302	495	426	167	207	237
PCB-165	74472-46-1	ng/kg	23.9 J	7.75 J	11.7 J	17.0 J	9.89 J	15.9 J	9.25 J	2.43 U	2.43 U	9.63 J
PCB-167	52663-72-6	ng/kg	953	207	364	533	273	533	412	226	265	331
PCB-169	32774-16-6	ng/kg	4.98 J	3.83 U	3.81 U	5.46 UX	4.04 U	7.64 UX	6.40 UX	5.38 UX	6.64 UX	3.91 UX
PCB-170	35065-30-6	ng/kg	2120	471	867	1130	724	1390	1110	644	689	839
PCB-171/173	171-173	ng/kg	676	171	291	376	265	377	280	172	209	245
PCB-172	52663-74-8	ng/kg	516	143	248	328	201	305	251	124	141	161
PCB-174	38411-25-5	ng/kg	949	387	619	909	534	1050	745	304	352	378
PCB-175	40186-70-7	ng/kg	106	27.6 J	46.1 J	60.3	37.6 J	60.3	42.3 J	27.5 J	31.7 J	37.4 J

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	BR-FF-11	CL-FF-23	CL-FF-24	CL-FF-25	CL-FF-26	CL-FF-27	CL-FF-28	CL-FF-29	CL-FF-30	CL-FF-31
		Location:	BR-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF	CL-FF
		Species:	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	White Sucker	White Sucker	White Sucker
		Length (cm):	39.1	18.0	18.3	19.7	17.5	18.7	19	40	37.1	39.6
		Weight (g):	681.1	134.6	139.8	196.7	120.1	144.1	158.5	737	588.9	781.8
		Sample Date:	5/18/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227352011	40227353003	40227353004	40227353005	40227353006	40227353007	40227353008	40227353009	40227353010	40227353011
PCB Congeners	**CAS Number**	**Units**										
PCB-176	52663-65-7	ng/kg	161	52.5	98.8	132	84.7	173	111	47.0 J	67.2	80.4
PCB-177	52663-70-4	ng/kg	1400	381	654	891	587	967	647	335	394	528
PCB-178	52663-67-9	ng/kg	567	179	302	404	277	428	319	137	168	207
PCB-179	52663-64-6	ng/kg	422	134	255	308	222	317	252	108	172	185
PCB-180/193	180-193	ng/kg	5590	1480	2750	3410	2050	4090	2980	1560	1830	2280
PCB-181	74472-47-2	ng/kg	35.1 J	9.80 J	16.9 J	21.6 J	14.7 J	22.1 UX	18.4 J	3.12 U	3.12 U	13.9 J
PCB-182	60145-23-5	ng/kg	21.7 J	8.36 J	12.4 J	18.8 J	10.7 J	15.2 UX	10.2 UX	1.05 U	1.05 U	9.26 UX
PCB-183/185	183-185	ng/kg	1700	427	752	1050	654	1090	783	414	493	660
PCB-184	74472-48-3	ng/kg	6.81 J	1.73 U	2.27 UX	3.42 J	2.12 UX	2.21 UX	1.78 U	1.79 U	1.79 U	2.22 UX
PCB-186	74472-49-4	ng/kg	1.52 U	1.50 U	1.50 U	1.53 U	1.59 U	1.56 U	1.55 U	1.55 U	1.55 U	1.50 U
PCB-187	52663-68-0	ng/kg	5080	1380	2490	3100	2510	3770	2680	1060	1430	1710
PCB-188	74487-85-7	ng/kg	6.26 J	2.07 J	2.65 J	4.72 J	2.96 UX	5.66 UX	3.63 J	1.88 U	1.89 U	2.84 UX
PCB-189	39635-31-9	ng/kg	111	26.3 J	46.1 J	62.3	35.8 J	61.6	46.1 J	28.3 J	31.7 UX	44.1 J
PCB-190	41411-64-7	ng/kg	276	61.6	115	144	99.6	352	242	118	134	111
PCB-191	74472-50-7	ng/kg	98.0	22.5 J	45.2 J	58.4	33.7 J	68.8	46.8 J	28.2 J	31.1 J	41.3 J
PCB-192	74472-51-8	ng/kg	2.59 U	2.57 U	2.56 U	2.61 U	2.71 U	2.67 U	2.65 U	2.65 U	2.65 U	2.56 U
PCB-194	35694-08-7	ng/kg	1150	244	409	531	321	573	404	230	342	382
PCB-195	52663-78-2	ng/kg	423	94.4	169	223	145	287	191	114	136	150
PCB-196	42740-50-1	ng/kg	596	126	226	279	184	393	276	152	196	220
PCB-197/200	197-200	ng/kg	113 J	36.4 J	62.1 J	77.7 J	55.8 J	104 J	76.0 J	33.0 J	50.8 J	50.3 J
PCB-198/199	198-199	ng/kg	1600	411	683	810	596	1440	934	455	606	677
PCB-201	40186-71-8	ng/kg	142	40.5 J	64.5 J	90.0	58.8 J	83.0	61.7 J	25.0 J	45.4 J	54.8 J
PCB-202	2136-99-4	ng/kg	273	85.5	143	188	130	238	150	57.6 J	96.1	107
PCB-203	52663-76-0	ng/kg	995	244	419	536	346	724	523	270	364	387
PCB-204	74472-52-9	ng/kg	1.79 U	1.77 U	1.76 U	1.80 U	1.87 U	1.84 U	1.82 U	1.83 U	1.83 U	1.77 U
PCB-205	74472-53-0	ng/kg	69.8 J	15.0 J	24.6 J	33.5 J	22.8 J	38.8 J	21.7 UX	16.3 J	24.7 J	24.2 J
PCB-206	40186-72-9	ng/kg	698	140	228	305	212	290	206	148	202	265
PCB-207	52663-79-3	ng/kg	64.7 J	18.0 J	24.9 J	40.3 J	26.7 J	32.5 J	26.1 J	14.2 J	19.5 J	22.5 J
PCB-208	52663-77-1	ng/kg	172	43.5 J	66.7 J	93.5	64.4 J	89.6	73.7	38.8 J	51.8 J	65.5 J
PCB-209	ARC-209	ng/kg	211	47.8 J	66.5 J	102	79.5	80.3	74.0	40.2 J	66.9 J	76.7
Total PCB Congeners	**--**	**ng/kg**	**1362417.25 J**	**340744.56 J**	**574096.79 J**	**593236.23 J**	**374920.46 J**	**518004.12 J**	**548337.18 J**	**349039.31 J**	**466959.67 J**	**494378.25 J**
Lipid Content	ARC-LIPID	%	0.79	0.24	0.32	0.21	0.18	0.11	0.18	0.40	0.61	0.46

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:			CL-FF-32	CL-FF-33	ISM27-FF-34	ISM27-FF-35	ISM27-FF-36	ISM27-FF-37	ISM27-FF-38	ISM27-FF-39	ISM27-FF-40	ISM27-FF-41
Location:			CL-FF	CL-FF	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27
Species:			White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed	Pumpkinseed	White Sucker	White Sucker
Length (cm):			36.3	41.9	19.4	17.8	15.3	15.8	15.7	14	34.1	28.7
Weight (g):			496.2	841.9	178.2	154.4	56.9	98.4	86.5	54.8	482.9	233.5
Sample Date:			5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
Lab Sample ID:			40227353012	40227353013	40227353014	40227353015	40227353016	40227353017	40227353018	40227353019	40227353020	40227354001-R
PCB Congeners	**CAS Number**	**Units**										
PCB-1	2051-60-7	ng/kg	557	1930	914	824	1720	902	1540	920	1560	2630
PCB-2	2051-61-8	ng/kg	8.15 J	15.3 J	11.7 J	8.94 J	21.7 J	10.2 J	16.9 J	9.52 J	9.81 J	14.5 J
PCB-3	2051-62-9	ng/kg	112	251	229	211	419	205	400	197	162	283
PCB-4	13029-08-8	ng/kg	3850	12800	3900	2940	6780	3510	3050	3160	7150	9360
PCB-5	16605-91-7	ng/kg	2.98 U	28.9	3.11 UX	3.23 UX	10.3 J	3.01 U	6.19 UX	6.81 UX	25.5	14.7 J
PCB-6	25569-80-6	ng/kg	979	2510	999	524	2880	879	1080	724	2120	1660
PCB-7	33284-50-3	ng/kg	154	306	33.5	24.4	121	28.3	213	94.9	145	207
PCB-8	34883-43-7	ng/kg	2920	7160	2890	1470	6020	2520	5040	2500	6420	7460
PCB-9	34883-39-1	ng/kg	157	380	116	64.2	625	94.2	161	125	286	251
PCB-10	33146-45-1	ng/kg	144	447	128	105	244	119	118	118	260	370
PCB-11	2050-67-1	ng/kg	96.2 U	94.1 U	96.1 U	90.7 U	95.6 U	97.1 U	96.6 U	122 U	92.6 U	89.3 U
PCB-12/13	12-13	ng/kg	58.9	116	51.8	43.6 J	143	44.6 J	76.0	57.9 J	73.6	74.7
PCB-14	34883-41-5	ng/kg	3.24 U	3.17 U	3.24 U	3.06 U	3.22 U	3.27 U	3.25 U	4.11 U	3.12 U	6.12 U
PCB-15	2050-68-2	ng/kg	1370	2060	671	486	2040	411	666	307	887	1480
PCB-16	38444-78-9	ng/kg	339	889	170	74.8	241	173	86.9	138	939	635
PCB-17	37680-66-3	ng/kg	3920	10300	2590	841	3830	2020	1440	2160	8810	5950
PCB-18/30	18-30	ng/kg	1350	4110	1540	599	6170	1420	680	1150	2780	1890
PCB-19	38444-73-4	ng/kg	1380	4750	1070	433	1290	777	265	562	2240	1950
PCB-20/28	20-28	ng/kg	12500	44100	15200	4590	51100	9560	31200	4280	33600	7980
PCB-21/33	21-33	ng/kg	299	713	95.1 J	74.6 J	235	184	159	425	1200	876
PCB-22	38444-85-8	ng/kg	1950	5250	1900	737	5860	1520	3140	963	4730	1970
PCB-23	55720-44-0	ng/kg	7.67 J	18.2 J	6.06 J	3.27 J	24.6	6.10 J	10.1 J	3.79 U	18.8 J	9.39 J
PCB-24	55702-45-9	ng/kg	36.1	90.8	27.8	10.2 J	24.9	23.9 J	12.7 J	16.5 J	85.6	57.7
PCB-25	55712-37-3	ng/kg	1750	4650	2300	633	8140	1430	3430	943	3360	1720
PCB-26/29	26-29	ng/kg	2360	5840	3240	978	12800	1990	3740	1440	4170	2240
PCB-27	38444-76-7	ng/kg	941	2190	760	175	1080	474	602	315	1440	1040
PCB-31	16606-02-3	ng/kg	6330	17200	3540	1220	17400	2790	9580	4320	14600	6610
PCB-32	38444-77-8	ng/kg	3220	8650	3450	813	6020	2370	4080	1750	9250	4280
PCB-34	37680-68-5	ng/kg	210	429	234	67.0	645	144	140	56.8	349	148
PCB-35	37680-69-6	ng/kg	3.16 U	3.09 U	3.16 U	2.98 U	3.14 U	3.19 U	3.18 U	4.01 U	3.04 U	2.46 U
PCB-36	38444-87-0	ng/kg	2.37 U	2.32 U	2.36 U	2.23 U	2.35 U	2.39 U	2.38 U	3.00 U	2.28 U	2.09 U
PCB-37	38444-90-5	ng/kg	482	962	244	106	852	94.4	269	99.8	263	306
PCB-38	53555-66-1	ng/kg	11.7 J	28.4	17.2 J	6.25 J	37.4	11.8 J	13.8 J	4.87 J	19.9 J	2.90 UX
PCB-39	38444-88-1	ng/kg	20.5 J	41.0	9.18 J	5.00 J	43.9	7.32 J	29.8	10.8 J	47.3	14.8 J
PCB-40/41/71	40-41-71	ng/kg	4920	12500	3530	1310	12300	3180	3810	1980	10600	3400
PCB-42	36559-22-5	ng/kg	4130	12300	4050	1830	11800	3280	2680	1510	11700	3310
PCB-43/73	43-73	ng/kg	485	745	471	160	1040	312	377	108 J	677	272
PCB-44/47/65	44-57-65	ng/kg	15200	49800	23300	9210	56400	14600	24900	5070	43700	15100
PCB-45/51	45-51	ng/kg	1420	4650	1210	446	2590	950	472	506	3940	1270
PCB-46	41464-47-5	ng/kg	296	809	129	53.7	311	111	41.2 J	60.0 J	728	267
PCB-48	70362-47-9	ng/kg	909	2730	512	205	2680	538	669	726	2570	833
PCB-49/69	49-69	ng/kg	12800	47800	18900	8400	51600	13400	15000	4880	39100	10500
PCB-50/53	50-53	ng/kg	1350	3590	1110	348	3210	908	488	453	2610	947
PCB-52	35693-99-3	ng/kg	8630	46900	21300	9280	64000	14800	14700	5580	14800	3680

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	CL-FF-32	CL-FF-33	ISM27-FF-34	ISM27-FF-35	ISM27-FF-36	ISM27-FF-37	ISM27-FF-38	ISM27-FF-39	ISM27-FF-40	ISM27-FF-41
		Location:	CL-FF	CL-FF	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27
		Species:	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed	Pumpkinseed	White Sucker	White Sucker
		Length (cm):	36.3	41.9	19.4	17.8	15.3	15.8	15.7	14	34.1	28.7
		Weight (g):	496.2	841.9	178.2	154.4	56.9	98.4	86.5	54.8	482.9	233.5
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227353012	40227353013	40227353014	40227353015	40227353016	40227353017	40227353018	40227353019	40227353020	40227354001-R
PCB Congeners	**CAS Number**	**Units**										
PCB-54	15968-05-5	ng/kg	26.7 J	89.4	14.2 J	3.94 UX	19.5 J	10.5 J	4.51 UX	14.4 J	57.3	35.6 UX
PCB-55	74338-24-2	ng/kg	146	300	143	62.6	483	113 UX	235	73.0	315	54.4
PCB-56	41464-43-1	ng/kg	3350	9230	3240	1220	13300	2360	4220	1150	8310	2130
PCB-57	70424-67-8	ng/kg	199	560	288	116	631	177	362	67.5	387	72.6
PCB-58	41464-49-7	ng/kg	106	272	118	52.5	259	72.7	119	24.4 J	201	80.9
PCB-59/62/75	59-62-75	ng/kg	1830	5310	2400	1070	5290	1720	2490	588	4300	1250
PCB-60	33025-41-1	ng/kg	2830	8470	4650	2220	11700	3520	7330	1160	8160	4200
PCB-61/70/74/76	61-70-74-76	ng/kg	18600	56700	18800	8350	48800	13000	33700	7960	49800	20100
PCB-63	74472-34-7	ng/kg	1750	5120	2220	1130	4660	1510	2780	575	4160	2070
PCB-64	52663-58-8	ng/kg	8940	27100	9540	4710	25100	8110	5830	2910	24100	6600
PCB-66	32598-10-0	ng/kg	14700	45800	21600	9240	52600	15100	34300	4960	38300	18900
PCB-67	73575-53-8	ng/kg	225	546	492	178	1620	305	905	196	457	142
PCB-68	73575-52-7	ng/kg	382	969	434	199	690	259	512	77.6	722	406
PCB-72	41464-42-0	ng/kg	560	1200	670	293	1240	403	828	159	926	440
PCB-77	32598-13-3	ng/kg	576	1690	845	374	2720	605	1180	225	1280	222
PCB-78	70362-49-1	ng/kg	2.54 U	2.49 U	2.54 U	2.40 U	2.53 U	2.57 U	2.55 U	3.23 U	2.45 U	3.61 U
PCB-79	41464-48-6	ng/kg	124	228	108	49.3	199	76.2	135	42.5 J	240	164
PCB-80	33284-52-5	ng/kg	2.13 U	2.08 U	2.13 U	2.01 U	2.12 U	2.15 U	2.14 U	2.71 U	2.05 U	2.64 U
PCB-81	70362-50-4	ng/kg	60.5	156	86.4	40.9 J	206	62.1	79.6	20.4 J	147	73.1
PCB-82	52663-62-4	ng/kg	1560	2870	1340	757	3130	1210	603	439	2790	1880
PCB-83	60145-20-2	ng/kg	763	1430	984	550	2060	799	243	92.6	1300	629
PCB-84	52663-60-2	ng/kg	1350	3440	1520	840	4000	1330	554	335	2810	1010
PCB-85/116/117	85-116-117	ng/kg	5580	10300	5440	2620	9230	3860	6050	1260	7790	7720
PCB-86/87/97/108/119/125	868797108119125	ng/kg	9000	17500	8670	4660	17700	6820	8180	2770	14200	12100
PCB-88/91	88-91	ng/kg	2670	6420	2980	1570	5890	2260	1800	679	4910	2800
PCB-89	73575-57-2	ng/kg	149	366	24.4 J	14.2 J	88.7	29.9 J	50.1	39.3 J	322	140
PCB-90/101/113	90-101-113	ng/kg	11100	25900	15000	8150	25700	11000	13000	4520	19200	10400
PCB-92	52663-61-3	ng/kg	1840	5710	3260	1730	5660	2330	3030	881	3390	824
PCB-93/98/100/102	9398100102	ng/kg	804	1890	657	325	1590	563	623	245 J	1490	700
PCB-94	73575-55-0	ng/kg	87.3	159	27.6 J	13.3 J	129	31.7 J	36.7 J	14.3 J	126	60.9
PCB-95	38379-99-6	ng/kg	3400	11200	6560	3530	14500	5400	3500	1710	7240	2390
PCB-96	73575-54-9	ng/kg	60.3	202	42.3 J	16.5 J	99.0	37.7 J	10.4 J	18.1 J	158	52.9
PCB-99	38380-01-7	ng/kg	11600	21100	11500	5910	19200	8250	12300	2740	16400	16400
PCB-103	60145-21-3	ng/kg	113	336	210	103	339	139	122	58.0 J	226	92.5
PCB-104	56558-16-8	ng/kg	1.14 U	5.29 J	1.14 U	1.07 U	1.52 UX	1.15 U	1.14 U	1.45 U	3.39 J	2.80 U
PCB-105	32598-14-4	ng/kg	6210	9830	6840	3520	11700	4900	7710	1520	8700	8340
PCB-106	70424-69-0	ng/kg	2.24 U	2.19 U	17.7 J	2.11 U	47.0 J	2.26 U	31.0 J	7.05 J	2.16 U	2.09 U
PCB-107/124	107-124	ng/kg	334	705	242	125	619	199	518	138	586	431
PCB-109	74472-35-8	ng/kg	1600	2530	1400	818	2480	1040	1450	431	2070	2320
PCB-110/115	110-115	ng/kg	15300	27800	15300	8690	31100	12500	8760	4360	21500	15900
PCB-111	39635-32-0	ng/kg	25.7 J	33.1 J	18.4 J	9.76 J	29.8 J	11.8 J	18.5 J	7.69 J	24.4 J	26.6 J
PCB-112	74472-36-9	ng/kg	132	212	138	66.1	245	126	93.7	16.3 J	184	73.3
PCB-114	74472-37-0	ng/kg	690	1070	680	337	1140	490	645	152	933	1140
PCB-118	31508-00-6	ng/kg	19600	28400	16200	8990	26500	11500	16100	3890	24100	25300

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	CL-FF-32	CL-FF-33	ISM27-FF-34	ISM27-FF-35	ISM27-FF-36	ISM27-FF-37	ISM27-FF-38	ISM27-FF-39	ISM27-FF-40	ISM27-FF-41
		Location:	CL-FF	CL-FF	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27
		Species:	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed	Pumpkinseed	White Sucker	White Sucker
		Length (cm):	36.3	41.9	19.4	17.8	15.3	15.8	15.7	14	34.1	28.7
		Weight (g):	496.2	841.9	178.2	154.4	56.9	98.4	86.5	54.8	482.9	233.5
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227353012	40227353013	40227353014	40227353015	40227353016	40227353017	40227353018	40227353019	40227353020	40227354001-R
PCB Congeners	**CAS Number**	**Units**										
PCB-120	68194-12-7	ng/kg	116	160	78.2	47.6	130	55.9	77.8	27.8 J	127	134
PCB-121	56558-18-0	ng/kg	7.61 J	11.2 J	5.94 J	3.66 J	7.85 J	4.96 J	6.21 J	2.82 U	8.27 J	6.71 UX
PCB-122	76842-07-4	ng/kg	107	281	104	56.3	264	74.8	203	51.3 J	215	133
PCB-123	65510-44-3	ng/kg	550	787	488	260	845	308	533	107	643	707
PCB-126	57465-28-8	ng/kg	26.7 J	47.6 J	38.2 J	21.0 J	70.6	27.5 J	21.4 J	9.02 J	36.6 J	28.9 J
PCB-127	39635-33-1	ng/kg	21.2 J	21.1 J	12.2 J	8.84 J	17.1 J	8.18 J	6.54 J	5.87 J	8.23 J	23.3 J
PCB-128/166	128-166	ng/kg	1090	1240	879	520	1300	671	648	478	1260	1810
PCB-129/138/163	129-138-163	ng/kg	9510	10200	6440	4000	9770	5090	4230	4480	11400	13600
PCB-130	52663-66-8	ng/kg	629	661	446	279	663	339	265	247	811	826
PCB-131	61798-70-7	ng/kg	77.4	82.0	43.3 J	30.4 J	84.1	37.2 J	20.5 J	18.9 J	94.6	110
PCB-132	38380-05-1	ng/kg	1550	2030	1210	921	2070	1260	557	634	2370	1610
PCB-133	35694-04-3	ng/kg	169	213	132	84.7	199	105	89.0	99.1	226	239
PCB-134/143	134-143	ng/kg	211	345	270	179	432	230	135	108 J	358	246
PCB-135/151	135-151	ng/kg	887	1710	1300	821	2160	1090	798	972	1990	1280
PCB-136	38411-22-2	ng/kg	167	407	325	205	558	275	103	179	441	275
PCB-137	35694-06-5	ng/kg	700	650	409	234	568	294	266	159	720	910
PCB-139/140	139-140	ng/kg	219	247	139	82.6 J	221	110	109	70.7 J	245	282
PCB-141	52712-04-6	ng/kg	763	1060	842	567	1250	666	489	776	1240	844
PCB-142	41411-61-4	ng/kg	5.32 J	2.72 J	2.42 U	2.29 U	4.74 UX	2.45 U	2.44 U	3.08 U	2.33 U	5.39 J
PCB-144	68194-14-9	ng/kg	182	274	194	124	314	159	104	156	306	260
PCB-145	74472-40-5	ng/kg	3.03 U	5.61 J	3.03 U	2.86 U	3.01 U	3.06 U	3.05 U	3.85 U	4.65 J	2.37 UX
PCB-146	51908-16-8	ng/kg	1700	1830	1100	698	1740	860	748	896	2060	2290
PCB-147/149	147-149	ng/kg	3440	4980	3860	2430	6540	3240	2020	2800	5610	5070
PCB-148	74472-41-6	ng/kg	14.9 J	24.3 J	13.1 J	8.59 J	21.3 J	9.86 J	9.86 J	9.53 J	20.5 J	19.9 J
PCB-150	68194-08-1	ng/kg	7.48 J	13.1 J	7.81 J	5.03 J	13.7 J	5.47 J	3.25 U	4.11 U	11.1 J	8.24 J
PCB-152	68194-09-2	ng/kg	4.42 J	12.1 J	5.20 J	3.11 U	9.42 J	3.87 J	3.31 U	4.19 U	7.60 J	4.50 J
PCB-153/168	153-168	ng/kg	8930	7950	4750	3150	7510	3980	2840	4080	9650	12100
PCB-154	60145-22-4	ng/kg	106	165	103	61.9	172	81.7	75.5	80.8	156	123
PCB-155	33979-03-2	ng/kg	1.65 U	2.51 J	2.10 J	1.56 U	3.77 J	2.11 J	1.66 U	7.57 J	3.69 J	3.48 J
PCB-156/157	156-157	ng/kg	1220	1220	790	488	1210	585	558	392	1160	1370
PCB-158	74472-42-7	ng/kg	765	824	525	330	751	415	337	341	929	1210
PCB-159	39635-35-3	ng/kg	15.0 J	15.7 J	14.0 J	13.1 J	30.4 J	17.5 J	8.19 J	18.4 UX	16.0 J	13.2 J
PCB-160	41411-62-5	ng/kg	2.06 U	13.6 UX	8.18 J	5.91 J	7.64 J	2.08 U	2.89 UX	4.69 J	13.4 J	15.4 J
PCB-161	74472-43-8	ng/kg	3.04 U	2.98 U	3.04 U	2.87 U	3.02 U	3.07 U	3.06 U	3.87 U	2.93 U	1.53 U
PCB-162	39635-34-2	ng/kg	46.3 J	48.4	29.9 J	18.0 J	46.4 J	21.7 J	17.5 J	20.1 J	48.9	57.7
PCB-164	74472-45-0	ng/kg	273	322	283	205	450	244	205	270	405	412
PCB-165	74472-46-1	ng/kg	11.0 J	11.6 J	7.65 J	3.24 J	11.8 J	4.06 J	4.67 UX	3.12 U	10.5 J	11.4 J
PCB-167	52663-72-6	ng/kg	543	495	296	197	462	233	207	207	535	615
PCB-169	32774-16-6	ng/kg	5.00 UX	8.14 J	6.86 J	4.88 UX	12.1 UX	7.63 J	4.01 U	7.05 J	6.66 UX	5.45 UX
PCB-170	35065-30-6	ng/kg	1620	1250	902	654	1380	856	483	1170	1610	1750
PCB-171/173	171-173	ng/kg	391	380	233	171	364	236	137	310	490	506
PCB-172	52663-74-8	ng/kg	316	241	183	144	303	177	101	275	294	372
PCB-174	38411-25-5	ng/kg	422	525	665	489	1020	617	289	1030	738	593
PCB-175	40186-70-7	ng/kg	64.6	57.2	38.0 J	27.6 J	59.4	38.7 J	20.5 J	48.6 J	80.4	76.4

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	CL-FF-32	CL-FF-33	ISM27-FF-34	ISM27-FF-35	ISM27-FF-36	ISM27-FF-37	ISM27-FF-38	ISM27-FF-39	ISM27-FF-40	ISM27-FF-41
		Location:	CL-FF	CL-FF	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-M1-27
		Species:	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed	Pumpkinseed	White Sucker	White Sucker
		Length (cm):	36.3	41.9	19.4	17.8	15.3	15.8	15.7	14	34.1	28.7
		Weight (g):	496.2	841.9	178.2	154.4	56.9	98.4	86.5	54.8	482.9	233.5
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227353012	40227353013	40227353014	40227353015	40227353016	40227353017	40227353018	40227353019	40227353020	40227354001-R
PCB Congeners	**CAS Number**	**Units**										
PCB-176	52663-65-7	ng/kg	116	117	97.4	70.2	137	85.3	28.9 J	114	166	121
PCB-177	52663-70-4	ng/kg	743	726	569	421	873	537	264	717	986	915
PCB-178	52663-67-9	ng/kg	256	299	238	177	365	218	125	313	391	372
PCB-179	52663-64-6	ng/kg	160	278	224	158	328	214	80.6	244	366	208
PCB-180/193	180-193	ng/kg	4790	3550	2530	1880	4090	2390	1360	3680	4460	4550
PCB-181	74472-47-2	ng/kg	30.1 J	19.5 J	14.9 J	10.5 J	21.7 J	11.7 J	8.04 J	11.7 J	23.1 J	26.3 J
PCB-182	60145-23-5	ng/kg	17.9 J	15.4 J	13.4 J	9.55 J	15.4 J	10.4 J	3.66 UX	14.4 J	18.0 J	15.5 J
PCB-183/185	183-185	ng/kg	1140	1090	706	526	1100	681	370	982	1350	1380
PCB-184	74472-48-3	ng/kg	4.21 J	3.57 J	3.47 J	2.08 J	5.05 J	2.69 UX	1.81 U	9.01 J	6.83 J	5.90 J
PCB-186	74472-49-4	ng/kg	1.57 U	1.54 U	1.57 U	1.48 U	1.56 U	1.59 U	1.58 U	2.00 U	1.51 U	2.24 U
PCB-187	52663-68-0	ng/kg	2460	2620	2070	1490	3150	1800	1670	2510	3320	2840
PCB-188	74487-85-7	ng/kg	4.57 J	4.23 J	3.64 J	2.00 J	4.83 J	2.73 J	1.91 U	3.68 J	4.07 J	3.50 UX
PCB-189	39635-31-9	ng/kg	85.4	63.9	40.0 J	30.2 J	62.4	38.4 J	21.1 J	48.8 J	77.5	88.5
PCB-190	41411-64-7	ng/kg	241	165	105	81.5	151	107	51.7	138	211	214
PCB-191	74472-50-7	ng/kg	72.3	57.5	40.4 J	31.4 J	64.7	42.7 J	23.7 J	60.9 J	76.0	79.6
PCB-192	74472-51-8	ng/kg	2.68 U	2.62 U	2.68 U	2.53 U	2.66 U	2.71 U	2.69 U	3.40 U	2.58 U	2.74 U
PCB-194	35694-08-7	ng/kg	882	597	382	299	640	362	209	490	718	830
PCB-195	52663-78-2	ng/kg	341	232	157	116	234	144	84.7	224	267	299
PCB-196	42740-50-1	ng/kg	469	329	222	161	327	192	116	286	418	376
PCB-197/200	197-200	ng/kg	78.6 J	69.9 J	61.1 J	41.9 J	88.2 J	51.8 J	27.4 J	72.6 J	94.3 J	67.6 J
PCB-198/199	198-199	ng/kg	1380	996	720	539	1040	630	427	850	1210	905
PCB-201	40186-71-8	ng/kg	96.7	74.6	56.3 J	38.3 J	79.7	50.5 J	30.0 J	68.7 J	104	104
PCB-202	2136-99-4	ng/kg	166	158	133	89.0	190	108	72.4 J	142	180	174
PCB-203	52663-76-0	ng/kg	935	576	385	289	574	338	207	460	697	712
PCB-204	74472-52-9	ng/kg	1.84 U	1.81 U	1.84 U	1.74 U	1.83 U	1.86 U	1.85 U	2.34 U	1.78 U	3.80 U
PCB-205	74472-53-0	ng/kg	57.1 J	37.1 J	23.0 J	18.0 J	36.1 J	22.1 J	12.3 J	29.0 J	47.4 J	49.8 J
PCB-206	40186-72-9	ng/kg	597	394	199	157	308	214	149	171	416	518
PCB-207	52663-79-3	ng/kg	55.3 J	33.4 J	22.1 J	16.3 J	34.0 J	20.3 J	17.1 J	21.4 J	38.9 J	54.1 J
PCB-208	52663-77-1	ng/kg	156	107	61.0 J	44.0 J	90.8	58.0 J	47.8 J	53.7 J	102	131
PCB-209	ARC-209	ng/kg	193	116	65.0 J	46.2 J	83.0	67.3 J	81.4	51.6 J	103	152
Total PCB Congeners	**--**	**ng/kg**	**298335.63 J**	**716727.77 J**	**321869.69 J**	**156248.72 J**	**752565.16 J**	**238752.79 J**	**337012.54 J**	**126541.75 J**	**581946.14 J**	**333829.1 J**
Lipid Content	ARC-LIPID	%	0.27	0.77	0.29	0.32	0.29	0.34	0.38	0.26	0.45	0.53

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	ISM27-FF-42	ISM27-FF-43	ISM27-FF-44	ISM29-FF-45	ISM29-FF-46	ISM29-FF-47	ISM29-FF-48	ISM29-FF-49	ISM29-FF-50	ISM29-FF-51
		Location:	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29
		Species:	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Bluegill	White Sucker
		Length (cm):	32.1	33.5	32.4	16.1	23	19.8	22.1	16.8	15.1	30.6
		Weight (g):	386.2	366.1	413.9	104	336.5	195.7	287.8	99.2	63.2	309.2
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227354002-R	40227354003-R	40227354004-R	40227354005-R	40227354006-R	40227354007-R	40227354008-R	40227354009-R	40227354010	40227354011-R
PCB Congeners	**CAS Number**	**Units**										
PCB-1	2051-60-7	ng/kg	1330	1140	3510	8.96 UX	5.49 J	5.17 J	391	4.87 UJX	3.63 U	11.7 J
PCB-2	2051-61-8	ng/kg	15.2 J	9.70 UX	21.2 J	2.46 U	2.41 U	2.33 U	6.73 J	2.37 UJ	2.42 U	2.37 U
PCB-3	2051-62-9	ng/kg	223	110	334	3.87 U	3.79 U	3.67 U	76.1	3.73 UJ	3.81 U	3.74 U
PCB-4	13029-08-8	ng/kg	5030	6220	20700	33.1	26.3	15.2 UX	3040	15.4 UJX	7.37 UX	31.5 UX
PCB-5	16605-91-7	ng/kg	13.9 J	22.9 J	38.3	4.37 U	4.29 U	4.15 U	5.23 UX	4.22 UJ	4.31 U	4.23 U
PCB-6	25569-80-6	ng/kg	925	2360	3980	9.85 UX	11.3 UX	3.37 U	1420	3.42 UJ	3.50 U	7.75 UX
PCB-7	33284-50-3	ng/kg	127	153	561	3.94 U	3.86 U	3.74 U	41.3 UX	3.80 UJ	3.88 U	3.80 U
PCB-8	34883-43-7	ng/kg	3170	7100	14300	32.0	43.6	14.8 J	4390	27.3 J	12.8 UX	28.4
PCB-9	34883-39-1	ng/kg	154	318	699	2.55 U	2.50 U	2.42 U	230	2.46 UJ	2.52 U	2.47 U
PCB-10	33146-45-1	ng/kg	180	238	736	2.91 U	2.86 U	2.76 U	111	2.81 UJ	2.87 U	2.81 U
PCB-11	2050-67-1	ng/kg	90.9 J	100 J	104 J	92.5 U	90.7 U	87.8 U	85.4 U	89.3 UJ	91.3 U	89.4 U
PCB-12/13	12-13	ng/kg	73.0	59.6	151	4.90 U	4.81 U	4.65 U	29.5 J	4.73 UJ	4.83 U	4.74 U
PCB-14	34883-41-5	ng/kg	5.98 U	6.25 U	6.01 U	6.34 U	6.22 U	6.02 U	5.85 U	6.12 UJ	6.25 U	6.13 U
PCB-15	2050-68-2	ng/kg	806	693	1280	5.13 UX	7.25 UX	5.43 UX	1010	2.83 UJ	2.89 U	2.83 U
PCB-16	38444-78-9	ng/kg	291	869	1260	6.58 J	4.86 UX	3.31 U	219	3.51 J	3.44 U	16.3 J
PCB-17	37680-66-3	ng/kg	2020	7250	19600	46.9	64.7	47.3	6400	34.8 J	9.26 J	595
PCB-18/30	18-30	ng/kg	900	3110	5400	32.5 J	37.2 J	38.1 J	3500	14.3 J	11.6 U	43.9 J
PCB-19	38444-73-4	ng/kg	614	1770	6630	12.3 J	15.3 J	6.23 J	1170	3.32 UJ	3.39 U	14.6 J
PCB-20/28	20-28	ng/kg	10200	31000	41500	354	1290	4460	44600	442 J	137	8070
PCB-21/33	21-33	ng/kg	516	780	836	15.4 J	20.1 J	18.9 J	657	15.4 J	7.21 J	78.6 J
PCB-22	38444-85-8	ng/kg	1020	4860	6220	50.9 J	146	426	5020	82.0 J	26.3 J	410
PCB-23	55720-44-0	ng/kg	6.06 J	9.62 J	24.2	1.44 U	1.41 U	1.37 U	16.6 J	1.39 UJ	1.42 U	1.39 U
PCB-24	55702-45-9	ng/kg	20.6 J	99.1	174	2.55 U	2.50 U	2.42 U	39.1	2.46 UJ	2.52 U	2.47 U
PCB-25	55712-37-3	ng/kg	462	2470	6090	30.5	102	310	5490	40.1 J	9.64 J	60.3
PCB-26/29	26-29	ng/kg	734	4880	7720	75.3	225	524	8270	107 J	28.4 J	263
PCB-27	38444-76-7	ng/kg	329	1070	3950	12.1 J	15.7 J	7.56 J	1160	9.96 J	3.06 U	67.2
PCB-31	16606-02-3	ng/kg	2200	12200	19100	117 J	268	166	8750	166 J	50.9 J	610
PCB-32	38444-77-8	ng/kg	1900	6440	15700	59.9	138	140	8070	63.7 J	14.6 UX	711
PCB-34	37680-68-5	ng/kg	120	219	517	4.05 J	12.0 UX	47.7	534	3.99 J	1.75 U	80.8
PCB-35	37680-69-6	ng/kg	2.40 U	2.51 U	2.41 U	2.54 U	2.50 U	2.42 U	2.35 U	2.45 UJ	2.51 U	2.46 U
PCB-36	38444-87-0	ng/kg	2.04 U	2.14 U	2.05 U	2.17 U	2.12 U	2.06 U	2.00 U	2.09 UJ	2.14 U	2.09 U
PCB-37	38444-90-5	ng/kg	153	121	320	5.76 J	9.27 J	5.53 J	732	3.38 J	3.52 J	8.44 UX
PCB-38	53555-66-1	ng/kg	9.24 J	13.5 J	17.8 J	1.76 U	1.73 U	4.94 J	25.2	1.70 UJ	1.74 U	9.17 J
PCB-39	38444-88-1	ng/kg	20.4 J	15.6 UX	56.9	2.49 U	2.44 U	2.36 U	22.1 J	2.40 UJ	2.45 U	15.1 J
PCB-40/41/71	40-41-71	ng/kg	13300	7510	14800	132 J	328	657	7340	138 J	41.5 J	4890
PCB-42	36559-22-5	ng/kg	7760	10000	11700	157	531	1830	8760	167 J	41.4 UX	7070
PCB-43/73	43-73	ng/kg	601	328	1050	13.2 J	24.6 J	146	901	18.5 J	5.56 U	416
PCB-44/47/65	44-57-65	ng/kg	35800	48200	44800	718	2590	12400	53200	681 J	204	32100
PCB-45/51	45-51	ng/kg	1210	2340	5440	39.5 J	66.0 J	160	2290	16.0 J	7.19 J	1030
PCB-46	41464-47-5	ng/kg	121	412	1110	4.63 J	3.78 U	3.66 U	86.1	3.72 UJ	3.80 U	66.0
PCB-48	70362-47-9	ng/kg	1900	1500	3550	27.8 J	62.6	95.8	1570	34.0 J	10.8 J	1280
PCB-49/69	49-69	ng/kg	24300	30500	32500	595	2030	9170	38200	509 J	142	22400
PCB-50/53	50-53	ng/kg	773	1190	4050	32.1 J	49.4 J	130	2470	17.1 J	5.90 J	549
PCB-52	35693-99-3	ng/kg	5620	6650	35400	843	2020	9250	44800	478 J	175	2610

Table 5-6
Analytical Results for Fish Tissue Samples
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Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	**ISM27-FF-42**	**ISM27-FF-43**	**ISM27-FF-44**	**ISM29-FF-45**	**ISM29-FF-46**	**ISM29-FF-47**	**ISM29-FF-48**	**ISM29-FF-49**	**ISM29-FF-50**	**ISM29-FF-51**
		Location:	**ISM-M1-27**	**ISM-M1-27**	**ISM-M1-27**	**ISM-29**	**ISM-29**	**ISM-29**	**ISM-29**	**ISM-29**	**ISM-29**	**ISM-29**
		Species:	**White Sucker**	**White Sucker**	**White Sucker**	**Rock Bass**	**Rock Bass**	**Rock Bass**	**Rock Bass**	**Bluegill**	**Bluegill**	**White Sucker**
		Length (cm):	**32.1**	**33.5**	**32.4**	**16.1**	**23**	**19.8**	**22.1**	**16.8**	**15.1**	**30.6**
		Weight (g):	**386.2**	**366.1**	**413.9**	**104**	**336.5**	**195.7**	**287.8**	**99.2**	**63.2**	**309.2**
		Sample Date:	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**
		Lab Sample ID:	**40227354002-R**	**40227354003-R**	**40227354004-R**	**40227354005-R**	**40227354006-R**	**40227354007-R**	**40227354008-R**	**40227354009-R**	**40227354010**	**40227354011-R**
PCB Congeners	**CAS Number**	**Units**										
PCB-54	15968-05-5	ng/kg	9.43 J	34.6 J	133	2.41 U	2.36 U	2.28 U	19.5 J	2.32 UJ	2.37 U	2.52 J
PCB-55	74338-24-2	ng/kg	55.5	131	280	4.37 J	15.3 J	25.4 UX	231	7.84 UJX	3.97 U	45.9 UX
PCB-56	41464-43-1	ng/kg	3790	8480	7930	110	419	959	8620	118 J	40.2 J	4210
PCB-57	70424-67-8	ng/kg	145	336	388	3.52 J	20.0 J	155	593	4.71 J	2.48 U	187
PCB-58	41464-49-7	ng/kg	221	284	194	3.39 UX	15.2 J	74.0	294	3.58 UJX	2.84 U	193
PCB-59/62/75	59-62-75	ng/kg	3340	3930	4480	65.7 J	228	1340	5510	64.8 J	18.4 J	2920
PCB-60	33025-41-1	ng/kg	10700	11600	7300	139	618	2710	10700	175 J	56.6	8420
PCB-61/70/74/76	61-70-74-76	ng/kg	50200	57100	40600	754	2890	11400	44000	889 J	322	43500
PCB-63	74472-34-7	ng/kg	6550	5530	3480	67.6	321	1670	5020	80.2 J	25.7 J	4440
PCB-64	52663-58-8	ng/kg	15400	20200	19300	339	1110	5620	20000	263 J	73.1	13800
PCB-66	32598-10-0	ng/kg	47400	47800	30300	693	2760	12000	45500	678 J	242	36400
PCB-67	73575-53-8	ng/kg	80.3	208	666	11.2 J	41.7 J	109	1260	11.5 J	3.76 J	49.9
PCB-68	73575-52-7	ng/kg	1200	1070	606	13.8 J	64.3	349	1070	17.3 J	5.90 J	896
PCB-72	41464-42-0	ng/kg	1200	1320	726	20.8 J	81.9	374	1130	25.1 J	7.65 UX	1010
PCB-77	32598-13-3	ng/kg	277	555	1130	30.3 J	81.7	241	1990	19.4 J	8.75 J	404
PCB-78	70362-49-1	ng/kg	3.52 U	3.68 U	3.54 U	3.74 U	3.66 U	3.55 U	3.45 U	3.60 UJ	3.69 U	3.61 U
PCB-79	41464-48-6	ng/kg	509	288	209	10.8 J	37.0 J	41.8 J	179	7.33 UJX	3.49 UX	310
PCB-80	33284-52-5	ng/kg	2.58 U	2.69 U	2.59 U	2.73 U	2.68 U	2.59 U	2.52 U	2.64 UJ	2.70 U	2.64 U
PCB-81	70362-50-4	ng/kg	170	154	105	2.60 UX	10.7 UX	32.9 J	165	2.42 UJ	2.47 U	129
PCB-82	52663-62-4	ng/kg	5630	3380	2570	132	332	956	2160	72.3 J	27.8 J	3970
PCB-83	60145-20-2	ng/kg	1740	1610	1430	110	251	828	1900	33.6 J	15.3 J	1660
PCB-84	52663-60-2	ng/kg	2340	2130	3210	225	405	934	3460	59.7 J	29.5 J	2410
PCB-85/116/117	85-116-117	ng/kg	23300	11600	6650	491	1370	4120	10100	334 J	192	14000
PCB-86/87/97/108/119/125	868797108119125	ng/kg	35600	18600	13800	1100	2880	5830	16100	637 J	313	23100
PCB-88/91	88-91	ng/kg	7120	4730	4340	280	661	2300	5560	113 J	52.9 J	5870
PCB-89	73575-57-2	ng/kg	419	277	375	3.56 J	3.40 J	2.56 UX	21.5 J	4.54 J	2.27 U	282
PCB-90/101/113	90-101-113	ng/kg	43200	20300	18600	2610	5410	13400	26600	1240 J	748	29200
PCB-92	52663-61-3	ng/kg	4780	2320	3380	527	1030	2760	5770	252 J	174	3830
PCB-93/98/100/102	9398100102	ng/kg	2010	1310	1630	48.1 J	88.3 J	413	1260	34.6 J	16.8 J	1540
PCB-94	73575-55-0	ng/kg	139	61.6	158	2.42 U	3.75 UX	7.97 J	70.9	2.39 UJX	2.38 U	127
PCB-95	38379-99-6	ng/kg	5730	4510	8270	1110	1960	4520	12600	335 J	195	5750
PCB-96	73575-54-9	ng/kg	87.0	107	174	4.31 U	4.69 J	11.3 J	70.5	4.16 UJ	4.25 U	93.5
PCB-99	38380-01-7	ng/kg	49200	23900	13800	1370	3350	9720	21000	823 J	496	30500
PCB-103	60145-21-3	ng/kg	250	191	203	27.3 J	51.6	171	384	9.62 UJX	5.33 J	227
PCB-104	56558-16-8	ng/kg	2.74 U	2.86 U	3.93 J	2.90 U	2.85 U	2.75 U	2.68 U	2.80 UJ	2.86 U	2.80 U
PCB-105	32598-14-4	ng/kg	21700	10800	6320	537	1590	4860	11900	339 J	209	13500
PCB-106	70424-69-0	ng/kg	2.04 U	2.14 U	2.05 U	2.17 U	2.12 U	2.06 U	2.00 U	2.09 UJ	2.14 U	2.09 U
PCB-107/124	107-124	ng/kg	741	767	529	36.9 J	88.2 J	171	481	38.1 J	26.7 J	717
PCB-109	74472-35-8	ng/kg	7670	3070	1840	174	478	1220	2490	102 J	65.2	4080
PCB-110/115	110-115	ng/kg	41000	23500	18200	2340	4560	12500	24900	858 J	463	27800
PCB-111	39635-32-0	ng/kg	94.7	37.7 J	21.7 J	2.66 UX	7.09 UX	17.0 J	33.0 J	2.55 UJ	2.61 U	48.4
PCB-112	74472-36-9	ng/kg	303	109	94.7	5.88 J	21.0 J	78.6	201	4.86 J	2.62 U	233
PCB-114	74472-37-0	ng/kg	3600	1440	772	32.7 J	154	470	1190	27.1 J	15.6 J	1830
PCB-118	31508-00-6	ng/kg	76800	32900	17700	1750	4590	13100	27700	1020 J	674	44800

Table 5-6
Analytical Results for Fish Tissue Samples
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Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	ISM27-FF-42	ISM27-FF-43	ISM27-FF-44	ISM29-FF-45	ISM29-FF-46	ISM29-FF-47	ISM29-FF-48	ISM29-FF-49	ISM29-FF-50	ISM29-FF-51
		Location:	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29
		Species:	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Bluegill	White Sucker
		Length (cm):	32.1	33.5	32.4	16.1	23	19.8	22.1	16.8	15.1	30.6
		Weight (g):	386.2	366.1	413.9	104	336.5	195.7	287.8	99.2	63.2	309.2
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227354002-R	40227354003-R	40227354004-R	40227354005-R	40227354006-R	40227354007-R	40227354008-R	40227354009-R	40227354010	40227354011-R
PCB Congeners	**CAS Number**	**Units**										
PCB-120	68194-12-7	ng/kg	456	185	105	16.0 J	32.2 J	84.6	149	9.85 J	6.88 J	258
PCB-121	56558-18-0	ng/kg	25.4 J	12.5 UX	7.88 J	2.53 U	2.49 U	5.84 J	12.1 J	2.44 UJ	2.50 U	16.2 J
PCB-122	76842-07-4	ng/kg	270	303	214	12.0 J	26.3 UX	53.0	265	8.83 UJX	6.41 UX	299
PCB-123	65510-44-3	ng/kg	1770	951	532	38.5 J	125	300	820	26.8 J	14.4 J	1130
PCB-126	57465-28-8	ng/kg	54.2	36.1 J	31.2 J	7.26 J	11.1 J	22.5 J	73.9	3.55 UJ	3.63 U	47.2 J
PCB-127	39635-33-1	ng/kg	21.2 J	14.9 J	15.9 J	6.35 J	13.3 J	14.4 J	17.0 J	2.60 UJX	2.64 UX	35.7 J
PCB-128/166	128-166	ng/kg	5290	1810	1300	617	1030	1550	1560	309 J	293	3290
PCB-129/138/163	129-138-163	ng/kg	40900	13600	10700	5410	8680	11200	10400	2340 J	2360	24900
PCB-130	52663-66-8	ng/kg	2500	919	686	319	562	742	790	163 J	138	1640
PCB-131	61798-70-7	ng/kg	328	84.1	94.0	29.6 J	51.6	58.7	73.3	14.4 J	6.01 UX	210
PCB-132	38380-05-1	ng/kg	3340	1750	1890	822	1190	1680	1670	245 J	194	3190
PCB-133	35694-04-3	ng/kg	679	270	179	103	175	241	254	51.5 J	51.4	467
PCB-134/143	134-143	ng/kg	571	310	332	157	253	387	443	57.1 J	42.3 J	565
PCB-135/151	135-151	ng/kg	2510	1640	1690	1120	1650	2360	2180	378 J	305	2970
PCB-136	38411-22-2	ng/kg	505	355	398	228	402	535	544	55.3 J	30.9 J	606
PCB-137	35694-06-5	ng/kg	2930	972	607	228	452	548	690	103 J	113	1500
PCB-139/140	139-140	ng/kg	930	314	230	82.1 J	134	216	232	44.3 J	38.4 J	581
PCB-141	52712-04-6	ng/kg	3080	1230	1230	717	1240	1650	1360	318 J	291	2350
PCB-142	41411-61-4	ng/kg	20.3 J	1.95 U	3.82 J	1.98 U	1.94 U	1.88 U	3.10 UX	1.91 UJ	1.95 U	9.95 UX
PCB-144	68194-14-9	ng/kg	670	297	270	154	247	352	318	62.9 J	39.1 J	571
PCB-145	74472-40-5	ng/kg	5.92 UX	3.53 J	4.69 J	1.97 U	1.93 U	1.87 U	1.82 U	1.90 UJ	1.94 U	6.88 J
PCB-146	51908-16-8	ng/kg	7020	2380	1780	929	1600	2110	1930	444 J	468	4480
PCB-147/149	147-149	ng/kg	10100	5040	5150	2960	4960	6720	6520	1080 J	845	9310
PCB-148	74472-41-6	ng/kg	53.0	21.5 UX	16.3 UX	7.79 J	9.95 J	19.7 J	18.7 UX	3.88 UJX	4.65 J	39.6 J
PCB-150	68194-08-1	ng/kg	19.9 J	8.61 J	10.0 J	5.01 J	6.49 J	12.0 J	14.2 J	1.56 J	1.54 U	17.3 UX
PCB-152	68194-09-2	ng/kg	10.1 J	7.62 J	7.49 J	1.84 U	1.80 U	4.93 UX	8.38 J	1.77 UJ	1.81 U	11.5 J
PCB-153/168	153-168	ng/kg	34900	11500	8670	4660	7570	9890	8030	2260 J	2180	23200
PCB-154	60145-22-4	ng/kg	313	163	111	59.4	94.5	160	177	33.0 J	25.9 J	266
PCB-155	33979-03-2	ng/kg	4.85 J	2.62 J	3.39 J	2.85 J	2.80 UX	4.55 J	2.53 J	2.73 J	1.91 J	5.96 J
PCB-156/157	156-157	ng/kg	4120	1300	878	351	639	980	1230	159 J	169	2510
PCB-158	74472-42-7	ng/kg	3810	1180	913	406	640	906	882	192 J	192	2310
PCB-159	39635-35-3	ng/kg	24.8 J	14.0 J	27.1 J	21.2 J	39.5 J	46.3 J	31.4 J	7.41 J	3.87 UX	44.6 J
PCB-160	41411-62-5	ng/kg	27.4 J	5.73 UX	4.83 UX	0 U	0 U	0 U	0 U	0 UJ	0 U	8.18 UX
PCB-161	74472-43-8	ng/kg	1.49 U	1.56 U	1.50 U	1.58 U	1.55 U	1.50 U	1.46 U	1.52 UJ	1.56 U	1.53 U
PCB-162	39635-34-2	ng/kg	167	62.0	40.6 J	19.3 J	32.2 J	48.7	49.3	11.8 J	9.36 J	120
PCB-164	74472-45-0	ng/kg	717	390	421	275	463	632	530	118 J	83.8	774
PCB-165	74472-46-1	ng/kg	44.0 J	14.3 J	9.05 J	2.35 UX	3.19 J	8.46 J	14.6 UX	2.14 UJ	2.19 U	22.0 J
PCB-167	52663-72-6	ng/kg	1910	627	421	169	347	458	435	93.7 J	96.0	1150
PCB-169	32774-16-6	ng/kg	13.1 UX	2.56 UJ	3.68 UX	3.69 UJX	5.97 UJX	3.88 UX	2.39 UJ	4.20 UJX	4.00 UX	7.87 UX
PCB-170	35065-30-6	ng/kg	4950	1530	1160	724	1160	1610	1000	361 J	419	3290
PCB-171/173	171-173	ng/kg	1410	435	387	244	356	501	304	123 J	126	1030
PCB-172	52663-74-8	ng/kg	1160	335	236	166	285	433	279	92.0 J	106	757
PCB-174	38411-25-5	ng/kg	971	536	713	560	1120	1410	883	236 J	195	1280
PCB-175	40186-70-7	ng/kg	217	70.9	57.3	39.0 J	58.6	78.6	48.8	19.7 J	20.1 J	166

Table 5-6
Analytical Results for Fish Tissue Samples
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		Sample ID:	ISM27-FF-42	ISM27-FF-43	ISM27-FF-44	ISM29-FF-45	ISM29-FF-46	ISM29-FF-47	ISM29-FF-48	ISM29-FF-49	ISM29-FF-50	ISM29-FF-51
		Location:	ISM-M1-27	ISM-M1-27	ISM-M1-27	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29	ISM-29
		Species:	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Bluegill	Bluegill	White Sucker
		Length (cm):	32.1	33.5	32.4	16.1	23	19.8	22.1	16.8	15.1	30.6
		Weight (g):	386.2	366.1	413.9	104	336.5	195.7	287.8	99.2	63.2	309.2
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/19/2021
		Lab Sample ID:	40227354002-R	40227354003-R	40227354004-R	40227354005-R	40227354006-R	40227354007-R	40227354008-R	40227354009-R	40227354010	40227354011-R
PCB Congeners	**CAS Number**	**Units**										
PCB-176	52663-65-7	ng/kg	233	96.9	107	80.6	145	188	105	28.1 J	17.0 J	240
PCB-177	52663-70-4	ng/kg	2380	888	808	574	920	1290	813	275 J	270	2050
PCB-178	52663-67-9	ng/kg	908	385	277	254	378	516	356	118 J	131	781
PCB-179	52663-64-6	ng/kg	353	223	219	209	324	449	271	60.2 J	41.3 J	493
PCB-180/193	180-193	ng/kg	14200	4140	3210	1940	3550	4960	2930	920 J	1210	8950
PCB-181	74472-47-2	ng/kg	82.5	21.7 J	17.4 J	10.3 UX	19.7 J	25.1 J	19.7 J	5.42 J	4.48 UX	53.2
PCB-182	60145-23-5	ng/kg	39.7 J	7.74 J	7.66 J	6.50 J	11.3 J	19.9 J	13.8 J	2.98 UJX	3.69 UX	29.6 J
PCB-183/185	183-185	ng/kg	3780	1200	1040	678	1040	1420	843	326 J	351	2830
PCB-184	74472-48-3	ng/kg	12.0 J	4.32 J	5.24 J	3.18 UX	3.71 J	6.84 J	3.79 J	2.78 UJX	2.80 J	10.4 J
PCB-186	74472-49-4	ng/kg	2.18 U	2.28 U	2.20 U	2.32 U	2.27 U	2.20 U	2.14 U	2.23 UJ	2.28 U	2.24 U
PCB-187	52663-68-0	ng/kg	8640	2670	2680	1970	3320	4570	2960	865 J	1230	6050
PCB-188	74487-85-7	ng/kg	10.3 J	3.13 U	3.02 U	3.18 U	3.12 U	5.92 J	3.95 J	3.07 UJ	3.14 U	7.38 J
PCB-189	39635-31-9	ng/kg	241	72.1	54.1	32.8 J	61.4	79.3	53.9	14.1 J	18.7 J	171
PCB-190	41411-64-7	ng/kg	511	150	112	65.0	109	228	116	28.3 J	51.0	341
PCB-191	74472-50-7	ng/kg	236	67.9	58.5	36.3 J	60.3	77.0	49.0	19.7 J	20.3 J	165
PCB-192	74472-51-8	ng/kg	2.67 U	2.79 U	2.69 U	2.83 U	2.78 U	2.69 U	2.61 U	2.73 UJ	2.79 U	2.74 U
PCB-194	35694-08-7	ng/kg	2730	691	546	350	560	778	513	174 J	222	1970
PCB-195	52663-78-2	ng/kg	927	236	203	129	189	273	184	56.6 J	70.8 J	679
PCB-196	42740-50-1	ng/kg	1210	292	234	174	258	394	242	89.0 J	115	824
PCB-197/200	197-200	ng/kg	157	54.7 J	47.8 J	37.5 J	63.8 J	109 J	62.9 J	14.6 UJX	19.5 J	145
PCB-198/199	198-199	ng/kg	2940	521	512	381	638	1200	750	175 J	348	1530
PCB-201	40186-71-8	ng/kg	299	86.2	65.9 J	55.5 J	77.7	122	78.5	26.8 J	34.2 J	229
PCB-202	2136-99-4	ng/kg	450	154	111	117	181	263	164	57.4 J	69.9 J	375
PCB-203	52663-76-0	ng/kg	2230	565	478	326	469	668	433	157 J	184	1580
PCB-204	74472-52-9	ng/kg	4.02 J	3.88 U	3.73 U	3.94 U	3.86 U	3.74 U	3.63 U	3.80 UJ	3.88 U	3.80 U
PCB-205	74472-53-0	ng/kg	157	37.8 J	36.9 J	20.0 J	32.0 J	40.3 J	26.6 J	11.2 J	11.0 UX	110
PCB-206	40186-72-9	ng/kg	1830	387	305	190	255	366	222	85.3 J	126	1230
PCB-207	52663-79-3	ng/kg	172	41.9 J	30.0 J	21.3 UX	33.5 J	45.0 J	28.9 J	10.3 J	14.0 UX	111
PCB-208	52663-77-1	ng/kg	398	97.4	64.3 J	55.9 UX	78.3	106	66.8 J	22.1 UJX	34.8 J	282
PCB-209	ARC-209	ng/kg	467	115	61.8 J	61.8 J	55.7 J	107	69.3	27.8 J	47.3 J	345
Total PCB Congeners	--	**ng/kg**	**784135.9 J**	**594822.96 J**	**630635.75 J**	**47977.41 J**	**96555.59 J**	**221859.31 J**	**642814.88 J**	**24689.12 J**	**18847.86 J**	**542916.61 J**
Lipid Content	ARC-LIPID	%	0.25	0.50	1.09	0.37	0.48	0.26	0.34	0.36	0.27	0.64

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	**ISM29-FF-52**	**ISM29-FF-53**	**ISM29-FF-54**	**ISM29-FF-55**	**MR-FF-12**	**MR-FF-13**	**MR-FF-14**	**MR-FF-15**	**MR-FF-16**	**MR-FF-17**
		Location:	**ISM-29**	**ISM-29**	**ISM-29**	**ISM-29**	**MR-FF**	**MR-FF**	**MR-FF**	**MR-FF**	**MR-FF**	**MR-FF**
		Species:	**White Sucker**	**White Sucker**	**White Sucker**	**White Sucker**	**Rock Bass**	**Rock Bass**	**Rock Bass**	**Rock Bass**	**Rock Bass**	**Pumpkinseed**
		Length (cm):	**33.8**	**34.3**	**31.5**	**32.6**	**16.8**	**19.4**	**17.2**	**17.9**	**17.8**	**16.2**
		Weight (g):	**434**	**483**	**322.5**	**505.4**	**102**	**180.1**	**120.9**	**145.3**	**118.7**	**99.7**
		Sample Date:	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/19/2021**	**5/18/2021**	**5/18/2021**	**5/18/2021**	**5/18/2021**	**5/18/2021**	**5/18/2021**
		Lab Sample ID:	**40227354012-R**	**40227354013-R**	**40227354014-R**	**40227354015-R**	**40227352012**	**40227352013**	**40227352014**	**40227352015**	**40227352016**	**40227352017**
PCB Congeners	**CAS Number**	**Units**										
PCB-1	2051-60-7	ng/kg	8.55 J	63.0	10.1 J	7.41 UX	1460	1940	1440	1500	816	3540
PCB-2	2051-61-8	ng/kg	2.28 U	2.35 U	2.46 U	2.30 U	20.5 J	24.5	23.1 J	21.8 J	12.1 J	41.2
PCB-3	2051-62-9	ng/kg	3.59 U	3.70 U	3.87 U	3.63 U	423	571	426	412	263	1070
PCB-4	13029-08-8	ng/kg	25.9 UX	1760	29.0	686	8670	9570	8560	8130	4650	11400
PCB-5	16605-91-7	ng/kg	4.06 U	8.67 UX	4.38 U	6.81 UX	8.28 J	17.5 J	3.04 U	11.0 UX	9.65 UX	19.2 J
PCB-6	25569-80-6	ng/kg	7.64 UX	702	10.7 UX	566	1610	1680	1630	1530	1060	2950
PCB-7	33284-50-3	ng/kg	3.65 U	74.8 UX	3.94 U	65.6	190	207	163	177	159	798
PCB-8	34883-43-7	ng/kg	31.3	2950	43.9	1680	6280	5540	6520	6330	4240	17000
PCB-9	34883-39-1	ng/kg	2.37 U	135	2.56 U	100	253	248	234	229	165	570
PCB-10	33146-45-1	ng/kg	2.70 U	87.5	2.92 U	32.2	340	374	309	336	206	395
PCB-11	2050-67-1	ng/kg	85.8 U	88.7 U	92.7 U	86.8 U	124 J	119 J	142 J	97.9 U	96.8 U	111 J
PCB-12/13	12-13	ng/kg	4.54 U	18.6 UX	4.91 U	16.5 UX	202	237	188	161	122	409
PCB-14	34883-41-5	ng/kg	5.88 U	6.08 U	6.35 U	5.95 U	3.16 U	3.03 U	3.30 U	3.30 U	3.26 U	3.15 U
PCB-15	2050-68-2	ng/kg	2.72 U	86.7	2.94 U	18.7 J	4050	7710	2650	2570	1760	4920
PCB-16	38444-78-9	ng/kg	16.3 J	465	15.9 J	416	355	244	371	346	257	436
PCB-17	37680-66-3	ng/kg	684	9450	304	8080	7340	3980	7990	6520	5510	9650
PCB-18/30	18-30	ng/kg	87.7	949	53.5	1600	2740	1640	2600	2080	1420	2150
PCB-19	38444-73-4	ng/kg	16.1 J	1770	17.5 J	1150	2870	2320	2560	2720	1440	1470
PCB-20/28	20-28	ng/kg	10600	49500	3220	27900	27200	35600	39000	25100	23100	83100
PCB-21/33	21-33	ng/kg	81.5 J	437	41.8 J	391	207	183	256	225	247	576
PCB-22	38444-85-8	ng/kg	458	5670	244	3670	3710	2800	5890	3830	3440	11000
PCB-23	55720-44-0	ng/kg	1.34 U	17.0 J	1.44 U	13.2 UX	11.5 UX	2.79 U	15.1 J	9.49 J	12.2 J	43.8
PCB-24	55702-45-9	ng/kg	2.72 J	60.6	2.56 U	61.0	42.3	30.0	49.4	48.1	38.5	46.9
PCB-25	55712-37-3	ng/kg	56.9	4970	65.5	2980	4150	5580	7490	4780	3550	15500
PCB-26/29	26-29	ng/kg	338	5060	340	5450	5150	6190	9230	5380	4740	17100
PCB-27	38444-76-7	ng/kg	90.5	1490	56.1	1700	1540	2030	1820	1470	1310	2770
PCB-31	16606-02-3	ng/kg	433	18800	604	11500	7470	7560	9590	6110	5290	43700
PCB-32	38444-77-8	ng/kg	827	10400	391	8740	7350	6970	8920	6510	5950	15900
PCB-34	37680-68-5	ng/kg	126	434	30.8	337	399	817	549	348	362	643
PCB-35	37680-69-6	ng/kg	2.36 U	2.44 U	2.55 U	2.39 U	3.09 U	2.96 U	3.22 U	3.22 U	3.18 U	5.50 J
PCB-36	38444-87-0	ng/kg	2.01 U	2.08 U	2.17 U	2.03 U	2.31 U	2.22 U	2.41 U	2.41 U	2.38 U	2.30 U
PCB-37	38444-90-5	ng/kg	16.9 J	392	5.99 UX	72.9	852	1330	999	713	652	1340
PCB-38	53555-66-1	ng/kg	11.8 UX	11.8 J	3.35 J	20.1 J	23.8 J	27.2	57.5	25.1	26.7	37.3
PCB-39	38444-88-1	ng/kg	25.5	21.8 J	4.08 J	18.7 UX	17.5 J	47.8	8.34 UX	24.1 J	24.4 J	99.2
PCB-40/41/71	40-41-71	ng/kg	7560	12100	2040	12000	8410	4610	9770	6400	8280	12200
PCB-42	36559-22-5	ng/kg	10800	13800	2220	11200	8760	4930	11000	7100	7920	9870
PCB-43/73	43-73	ng/kg	784	630	110	830	946	947	744	671	841	1620
PCB-44/47/65	44-57-65	ng/kg	45700	59000	9090	37200	39700	56100	46100	30800	40000	66200
PCB-45/51	45-51	ng/kg	1010	3660	276	2850	2610	1390	3110	2170	1930	2140
PCB-46	41464-47-5	ng/kg	61.2	490	40.2 J	531	221	127	211	191	136	175
PCB-48	70362-47-9	ng/kg	2490	1850	433	2100	1510	757	1890	1350	1660	2160
PCB-49/69	49-69	ng/kg	36500	46600	6650	31600	34500	32900	39700	24400	32300	45700
PCB-50/53	50-53	ng/kg	804	2570	224	2300	2720	1590	3450	2290	2110	2430
PCB-52	35693-99-3	ng/kg	30600	5580	4000	16700	39500	45700	46200	28700	36600	42700

Table 5-6
Analytical Results for Fish Tissue Samples
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Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	ISM29-FF-52	ISM29-FF-53	ISM29-FF-54	ISM29-FF-55	MR-FF-12	MR-FF-13	MR-FF-14	MR-FF-15	MR-FF-16	MR-FF-17
		Location:	ISM-29	ISM-29	ISM-29	ISM-29	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed
		Length (cm):	33.8	34.3	31.5	32.6	16.8	19.4	17.2	17.9	17.8	16.2
		Weight (g):	434	483	322.5	505.4	102	180.1	120.9	145.3	118.7	99.7
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227354012-R	40227354013-R	40227354014-R	40227354015-R	40227352012	40227352013	40227352014	40227352015	40227352016	40227352017
PCB Congeners	**CAS Number**	**Units**										
PCB-54	15968-05-5	ng/kg	2.23 U	52.4	2.41 U	30.8 J	49.1	38.3 J	29.3 J	37.7 J	16.5 J	43.6 J
PCB-55	74338-24-2	ng/kg	48.3 UX	323	30.3 J	209	164	379 UX	294	189	219	573
PCB-56	41464-43-1	ng/kg	5630	13000	1520	6960	4840	8580	8420	5120	5980	8890
PCB-57	70424-67-8	ng/kg	202	730	75.7	399	358	625	571	360	455	892
PCB-58	41464-49-7	ng/kg	270	365	58.7	205	182	278	235	149	230	295
PCB-59/62/75	59-62-75	ng/kg	4350	5410	823	3790	4390	4180	5470	3510	4550	6290
PCB-60	33025-41-1	ng/kg	11000	11300	2430	5840	6660	10100	8040	5140	7540	13400
PCB-61/70/74/76	61-70-74-76	ng/kg	55800	74700	12400	36400	29300	43900	34900	22000	32900	72900
PCB-63	74472-34-7	ng/kg	5950	6960	1230	3270	3400	4310	3850	2510	4150	6240
PCB-64	52663-58-8	ng/kg	21100	26600	4340	16700	19800	12700	24100	14400	19300	17300
PCB-66	32598-10-0	ng/kg	51600	51200	10400	26800	31600	47600	36600	22900	36100	61200
PCB-67	73575-53-8	ng/kg	54.1	850	25.5 J	485	664	1280	1140	759	798	2000
PCB-68	73575-52-7	ng/kg	1270	1270	243	682	750	1130	782	533	900	1340
PCB-72	41464-42-0	ng/kg	1540	1210	327	885	995	1610	1010	677	1030	1780
PCB-77	32598-13-3	ng/kg	347	1130	168	661	1230	2350	1860	1200	1410	2820
PCB-78	70362-49-1	ng/kg	3.47 U	3.58 U	3.75 U	3.51 U	2.48 U	2.38 U	2.59 U	2.59 U	2.56 U	2.47 U
PCB-79	41464-48-6	ng/kg	351	286	93.3	177	119	176	166	125	218	316
PCB-80	33284-52-5	ng/kg	2.53 U	2.62 U	2.74 U	2.57 U	2.08 U	1.99 U	2.17 U	2.17 U	2.14 U	2.07 U
PCB-81	70362-50-4	ng/kg	171	155	37.5 J	67.7	100	170	134	87.6	130	153
PCB-82	52663-62-4	ng/kg	4880	3950	1250	2730	2060	1780	2460	1560	2880	1420
PCB-83	60145-20-2	ng/kg	2570	2000	585	1440	1390	1810	1680	1140	1850	801
PCB-84	52663-60-2	ng/kg	3980	2860	750	3080	2800	2220	4130	2730	3350	1290
PCB-85/116/117	85-116-117	ng/kg	16500	12900	4090	6870	6700	8890	7940	5180	10400	11700
PCB-86/87/97/108/119/125	868797108119125	ng/kg	30000	21300	7040	13900	10500	13700	14000	9400	16800	17400
PCB-88/91	88-91	ng/kg	8990	6000	1500	4300	4880	4440	5850	3790	6440	4520
PCB-89	73575-57-2	ng/kg	384	362	87.0	333	44.0 J	23.0 J	27.9 J	34.7 J	16.3 J	87.5
PCB-90/101/113	90-101-113	ng/kg	44100	24000	11200	17300	17600	24500	20500	13600	27200	26600
PCB-92	52663-61-3	ng/kg	7880	3530	1660	3640	4230	5210	4900	3200	6160	6650
PCB-93/98/100/102	9398100102	ng/kg	2400	2020	404	1480	1200	768	1550	1080	1380	1540
PCB-94	73575-55-0	ng/kg	201	164	30.6 J	136	73.1	65.8	95.6	73.8	52.4	98.0
PCB-95	38379-99-6	ng/kg	12900	6090	2410	7250	9620	10700	13300	8840	12100	8690
PCB-96	73575-54-9	ng/kg	114	149	21.8 J	117	82.0	45.3 J	109	80.5	50.5	48.4
PCB-99	38380-01-7	ng/kg	34800	28300	9070	13800	14400	18600	16000	10500	22200	23900
PCB-103	60145-21-3	ng/kg	396	313	72.8	229	308	293	364	242	418	331
PCB-104	56558-16-8	ng/kg	2.69 U	2.78 U	2.91 U	2.72 U	1.11 U	1.07 U	1.16 U	1.16 U	1.15 U	3.98 J
PCB-105	32598-14-4	ng/kg	16600	11100	3660	5770	7730	11100	8690	5340	11600	12900
PCB-106	70424-69-0	ng/kg	2.01 U	2.08 U	2.17 U	2.03 U	21.6 J	29.7 J	2.28 U	2.28 U	2.25 U	44.4 J
PCB-107/124	107-124	ng/kg	1170	943	242	464	295	558	376	255	393	836
PCB-109	74472-35-8	ng/kg	4310	3500	1170	1590	1810	2290	1770	1110	2480	2610
PCB-110/115	110-115	ng/kg	42700	24900	9350	16700	21300	21200	26200	16400	32700	17500
PCB-111	39635-32-0	ng/kg	55.4	46.3 J	17.6 J	24.7 J	24.5 J	24.9 UX	27.8 J	20.8 J	38.2 J	34.6 J
PCB-112	74472-36-9	ng/kg	207	192	37.4 J	93.1	158	205	2.78 U	147	242	402
PCB-114	74472-37-0	ng/kg	1900	1340	476	599	778	1100	753	488	1120	1170
PCB-118	31508-00-6	ng/kg	44300	34200	13000	15600	17900	25600	19800	12300	28200	28700

Table 5-6
Analytical Results for Fish Tissue Samples
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Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	ISM29-FF-52	ISM29-FF-53	ISM29-FF-54	ISM29-FF-55	MR-FF-12	MR-FF-13	MR-FF-14	MR-FF-15	MR-FF-16	MR-FF-17
		Location:	ISM-29	ISM-29	ISM-29	ISM-29	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed
		Length (cm):	33.8	34.3	31.5	32.6	16.8	19.4	17.2	17.9	17.8	16.2
		Weight (g):	434	483	322.5	505.4	102	180.1	120.9	145.3	118.7	99.7
		Sample Date:	5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227354012-R	40227354013-R	40227354014-R	40227354015-R	40227352012	40227352013	40227352014	40227352015	40227352016	40227352017
PCB Congeners	**CAS Number**	**Units**										
PCB-120	68194-12-7	ng/kg	265	226	90.3	104	103	147	115	80.8	164	153
PCB-121	56558-18-0	ng/kg	19.3 J	12.1 J	5.91 J	8.14 J	7.94 J	8.55 J	10.00 J	6.88 J	11.6 J	12.8 J
PCB-122	76842-07-4	ng/kg	365	367	72.2	188	131	301	145	114	163	305
PCB-123	65510-44-3	ng/kg	1280	780	286	408	523	751	519	387	823	881
PCB-126	57465-28-8	ng/kg	56.0	36.9 J	14.3 J	21.1 UX	37.6 J	71.9	50.7	35.8 J	66.0	47.7
PCB-127	39635-33-1	ng/kg	38.1 J	20.6 J	22.4 J	13.9 UX	14.9 J	22.9 J	16.3 J	10.0 J	25.1 J	28.3 J
PCB-128/166	128-166	ng/kg	3470	2420	2050	1600	959	1380	1040	677	1560	1680
PCB-129/138/163	129-138-163	ng/kg	28900	20700	18100	11900	6750	9930	7650	4930	11700	11400
PCB-130	52663-66-8	ng/kg	1830	1390	1030	787	491	684	509	325	782	778
PCB-131	61798-70-7	ng/kg	249	145	127	136	61.7	65.0	63.5	40.7 J	81.7	46.0 J
PCB-132	38380-05-1	ng/kg	4360	2290	1700	2080	1550	1950	1420	916	1870	1410
PCB-133	35694-04-3	ng/kg	550	409	305	240	167	247	151	94.8	237	229
PCB-134/143	134-143	ng/kg	746	483	300	409	324	451	377	237	473	368
PCB-135/151	135-151	ng/kg	3950	2500	1750	2280	1420	2110	1760	1110	2050	1960
PCB-136	38411-22-2	ng/kg	839	498	305	483	383	559	434	315	478	263
PCB-137	35694-06-5	ng/kg	1510	1050	821	611	403	582	390	276	617	720
PCB-139/140	139-140	ng/kg	615	452	303	258	166	201	166	107	264	269
PCB-141	52712-04-6	ng/kg	3380	1470	1900	1310	810	1320	759	535	1240	1310
PCB-142	41411-61-4	ng/kg	12.1 J	1.90 U	1.98 U	1.86 U	3.96 J	2.27 U	3.05 UX	2.47 U	5.26 J	3.27 J
PCB-144	68194-14-9	ng/kg	731	403	373	338	203	274	218	153	305	294
PCB-145	74472-40-5	ng/kg	6.95 J	5.45 UX	1.97 U	3.22 UX	2.96 U	2.84 U	3.09 U	3.09 U	3.05 U	4.03 J
PCB-146	51908-16-8	ng/kg	5170	3690	3180	2110	1210	1740	1290	808	1910	1900
PCB-147/149	147-149	ng/kg	13900	7160	5850	6160	4200	6240	5030	3210	6650	4540
PCB-148	74472-41-6	ng/kg	49.3	31.5 J	20.1 J	18.4 UX	15.5 J	17.5 J	19.9 J	11.4 J	24.2 J	28.1 J
PCB-150	68194-08-1	ng/kg	27.1 J	13.9 UX	7.91 J	13.1 J	9.62 J	12.5 J	11.7 J	7.36 J	14.4 J	6.41 J
PCB-152	68194-09-2	ng/kg	13.9 J	11.6 J	3.14 J	9.10 J	7.78 UX	6.28 J	8.61 J	5.87 J	9.88 J	8.75 J
PCB-153/168	153-168	ng/kg	26500	18300	18500	10500	4990	6900	5400	3490	8240	8060
PCB-154	60145-22-4	ng/kg	331	243	142	153	120	153	141	88.9	203	205
PCB-155	33979-03-2	ng/kg	6.71 J	4.81 UX	3.81 UX	3.32 UX	1.61 U	2.69 J	1.68 U	1.68 U	1.87 J	2.12 UX
PCB-156/157	156-157	ng/kg	2520	1800	1340	943	789	1130	804	520	1250	1150
PCB-158	74472-42-7	ng/kg	2390	1830	1550	995	553	733	568	375	894	941
PCB-159	39635-35-3	ng/kg	55.3	36.5 J	35.4 J	26.0 J	14.9 J	35.0 J	3.01 U	12.3 J	26.8 J	26.9 J
PCB-160	41411-62-5	ng/kg	12.2 J	8.38 J	0 U	0 U	5.45 J	6.79 UX	2.10 U	2.10 U	6.76 J	2.00 U
PCB-161	74472-43-8	ng/kg	1.47 U	1.51 U	1.58 U	1.48 U	2.97 U	2.85 U	3.10 U	3.10 U	3.06 U	2.96 U
PCB-162	39635-34-2	ng/kg	120	79.4	79.1	43.6 J	33.1 J	49.0	32.5 J	21.7 J	43.5 J	48.0
PCB-164	74472-45-0	ng/kg	1100	458	492	448	326	525	343	224	518	453
PCB-165	74472-46-1	ng/kg	26.9 J	18.8 J	10.5 J	9.26 J	9.28 J	12.4 J	9.63 UX	5.59 J	15.0 J	11.3 J
PCB-167	52663-72-6	ng/kg	1210	849	829	440	272	440	302	194	445	436
PCB-169	32774-16-6	ng/kg	5.15 UX	5.57 UJX	4.28 UX	3.59 UJX	3.90 U	3.74 U	6.03 UX	4.07 U	4.02 U	3.88 U
PCB-170	35065-30-6	ng/kg	3970	2590	3120	1330	705	943	608	439	1000	830
PCB-171/173	171-173	ng/kg	1210	837	1010	485	205	291	233	154	359	304
PCB-172	52663-74-8	ng/kg	839	580	774	321	173	283	184	123	269	246
PCB-174	38411-25-5	ng/kg	1770	878	1000	765	454	978	540	405	774	566
PCB-175	40186-70-7	ng/kg	196	134	154	74.6	32.8 J	45.4 J	38.4 J	24.1 J	56.7	51.5

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:			ISM29-FF-52	ISM29-FF-53	ISM29-FF-54	ISM29-FF-55	MR-FF-12	MR-FF-13	MR-FF-14	MR-FF-15	MR-FF-16	MR-FF-17
Location:			ISM-29	ISM-29	ISM-29	ISM-29	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
Species:			White Sucker	White Sucker	White Sucker	White Sucker	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Rock Bass	Pumpkinseed
Length (cm):			33.8	34.3	31.5	32.6	16.8	19.4	17.2	17.9	17.8	16.2
Weight (g):			434	483	322.5	505.4	102	180.1	120.9	145.3	118.7	99.7
Sample Date:			5/19/2021	5/19/2021	5/19/2021	5/19/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
Lab Sample ID:			40227354012-R	40227354013-R	40227354014-R	40227354015-R	40227352012	40227352013	40227352014	40227352015	40227352016	40227352017
PCB Congeners	**CAS Number**	**Units**										
PCB-176	52663-65-7	ng/kg	323	142	175	128	67.3	137	84.8	55.9	101	58.6
PCB-177	52663-70-4	ng/kg	2480	1750	1840	994	465	819	553	356	787	654
PCB-178	52663-67-9	ng/kg	936	705	658	410	211	353	262	160	357	308
PCB-179	52663-64-6	ng/kg	642	342	313	340	190	339	223	138	267	203
PCB-180/193	180-193	ng/kg	10700	6910	9520	3730	1840	2930	1780	1150	2580	2310
PCB-181	74472-47-2	ng/kg	61.2	32.8 J	40.9 J	22.9 J	12.1 J	19.7 J	12.5 J	8.13 J	19.6 J	13.6 UX
PCB-182	60145-23-5	ng/kg	37.6 J	22.4 J	25.7 J	15.1 J	9.37 J	15.2 J	8.01 J	6.60 J	16.5 J	12.4 J
PCB-183/185	183-185	ng/kg	3370	2160	2770	1240	541	836	621	403	880	844
PCB-184	74472-48-3	ng/kg	14.5 J	8.85 UX	9.90 J	5.68 J	1.76 U	4.16 J	3.31 J	1.91 J	2.95 UX	3.04 J
PCB-186	74472-49-4	ng/kg	2.15 U	2.22 U	2.32 U	2.17 U	1.53 U	1.47 U	1.60 U	1.60 U	1.58 U	1.53 U
PCB-187	52663-68-0	ng/kg	8380	5070	5690	3320	1680	2750	2590	1360	3060	2540
PCB-188	74487-85-7	ng/kg	10.3 J	6.28 J	5.46 J	4.02 J	2.72 J	4.77 J	2.90 J	1.94 U	4.72 J	3.28 UX
PCB-189	39635-31-9	ng/kg	185	128	156	63.4	31.8 J	55.7	38.2 J	23.7 J	46.9 J	44.8 J
PCB-190	41411-64-7	ng/kg	478	255	407	148	90.5	138	104	61.7	142	119
PCB-191	74472-50-7	ng/kg	177	116	161	63.4	32.0 J	55.7	32.8 J	24.0 J	50.3	44.8 J
PCB-192	74472-51-8	ng/kg	2.63 U	2.71 U	2.84 U	2.66 U	2.62 U	2.51 U	2.73 U	2.73 U	2.70 U	2.60 U
PCB-194	35694-08-7	ng/kg	1880	1340	1790	657	338	506	334	208	452	358
PCB-195	52663-78-2	ng/kg	712	477	649	257	130	207	129	82.5	191	144
PCB-196	42740-50-1	ng/kg	880	655	879	331	177	278	150	93.6	217	184
PCB-197/200	197-200	ng/kg	172	87.0 J	119 J	67.2 J	42.8 J	76.2 J	46.1 J	28.7 J	61.5 J	39.6 J
PCB-198/199	198-199	ng/kg	1790	1400	1830	762	553	896	530	282	673	553
PCB-201	40186-71-8	ng/kg	243	162	210	96.2	45.7 J	78.7	52.9 J	32.7 J	69.2 J	58.2 J
PCB-202	2136-99-4	ng/kg	436	290	306	177	108	180	122	72.5 J	171	120
PCB-203	52663-76-0	ng/kg	1660	1070	1480	600	328	465	334	195	415	360
PCB-204	74472-52-9	ng/kg	3.65 U	3.77 U	3.94 U	3.69 U	1.80 U	1.73 U	1.88 U	1.88 U	1.86 U	1.79 U
PCB-205	74472-53-0	ng/kg	111	76.2	102	41.5 J	17.5 J	26.1 J	22.8 J	12.4 J	25.4 J	20.0 J
PCB-206	40186-72-9	ng/kg	1050	870	1020	382	182	227	209	126	209	183
PCB-207	52663-79-3	ng/kg	110	77.2	97.9	41.5 J	18.0 UX	27.9 J	25.2 J	13.8 J	27.3 J	22.9 J
PCB-208	52663-77-1	ng/kg	279	189	247	96.7	54.2 J	74.1	62.6 J	37.0 J	69.7 J	54.7 J
PCB-209	ARC-209	ng/kg	256	215	206	87.6	65.6 J	65.0 J	68.3 J	49.2 J	70.4 J	61.5 J
Total PCB Congeners	**--**	**ng/kg**	**743145.13 J**	**747398.76 J**	**231244.05 J**	**477581.8 J**	**500271.02 J**	**601949.45 J**	**599720.73 J**	**394369.23 J**	**563187.09 J**	**850970.18 J**
Lipid Content	ARC-LIPID	%	0.46	1.12	0.41	1.49	0.40	0.50	0.26	0.30	0.18	0.78

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	MR-FF-18	MR-FF-19	MR-FF-20	MR-FF-21	MR-FF-22
		Location:	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	38.7	37.2	31	35	40.8
		Weight (g):	708	623.9	354.4	495.8	626.4
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352018	40227352019	40227352020	40227353001	40227353002
PCB Congeners	**CAS Number**	**Units**					
PCB-1	2051-60-7	ng/kg	2910	1710	4760	2600	1640
PCB-2	2051-61-8	ng/kg	19.5 J	12.7 J	25.8	13.2 J	14.2 J
PCB-3	2051-62-9	ng/kg	332	166	403	215	195
PCB-4	13029-08-8	ng/kg	15400	9800	26500	15100	10100
PCB-5	16605-91-7	ng/kg	32.4	17.2 UX	56.1	25.8	15.8 UX
PCB-6	25569-80-6	ng/kg	2450	1400	4270	2350	1390
PCB-7	33284-50-3	ng/kg	522	216	842	381	191
PCB-8	34883-43-7	ng/kg	9520	5430	16200	7870	5740
PCB-9	34883-39-1	ng/kg	393	233	690	386	239
PCB-10	33146-45-1	ng/kg	621	365	959	580	362
PCB-11	2050-67-1	ng/kg	94.3 U	94.6 U	94.1 U	97.2 U	95.8 U
PCB-12/13	12-13	ng/kg	135	73.7	198	104	89.8
PCB-14	34883-41-5	ng/kg	3.18 U	3.19 U	3.17 U	3.27 U	3.23 U
PCB-15	2050-68-2	ng/kg	2380	1360	3510	1760	1700
PCB-16	38444-78-9	ng/kg	792	451	1280	797	492
PCB-17	37680-66-3	ng/kg	12200	6770	20800	12100	8280
PCB-18/30	18-30	ng/kg	2720	1360	3520	4250	1370
PCB-19	38444-73-4	ng/kg	5180	3360	10100	5170	4240
PCB-20/28	20-28	ng/kg	34500	19300	49200	37200	20900
PCB-21/33	21-33	ng/kg	566	255	771	531	300
PCB-22	38444-85-8	ng/kg	4480	2620	7230	4500	3000
PCB-23	55720-44-0	ng/kg	18.9 J	10.5 J	29.5	20.0 J	9.60 J
PCB-24	55702-45-9	ng/kg	78.5	45.2	169	80.4	45.2
PCB-25	55712-37-3	ng/kg	4210	2440	7010	3440	2730
PCB-26/29	26-29	ng/kg	4700	2830	8110	4900	3810
PCB-27	38444-76-7	ng/kg	2560	1620	4840	2590	1970
PCB-31	16606-02-3	ng/kg	12700	6780	21000	12900	10000
PCB-32	38444-77-8	ng/kg	9950	6480	18300	9570	7740
PCB-34	37680-68-5	ng/kg	455	225	649	422	262
PCB-35	37680-69-6	ng/kg	3.63 J	3.11 U	3.09 U	3.19 U	3.15 U
PCB-36	38444-87-0	ng/kg	2.32 U	2.33 U	2.32 U	2.39 U	2.36 U
PCB-37	38444-90-5	ng/kg	773	452	1260	806	503
PCB-38	53555-66-1	ng/kg	32.4	12.1 J	35.2	20.6 J	11.7 J
PCB-39	38444-88-1	ng/kg	42.4	26.2	81.1	39.2	26.6
PCB-40/41/71	40-41-71	ng/kg	13200	7070	18900	11900	8040
PCB-42	36559-22-5	ng/kg	11800	6210	13800	13300	6190
PCB-43/73	43-73	ng/kg	1060	444	1520	1180	464
PCB-44/47/65	44-57-65	ng/kg	43600	23400	49500	54800	22700
PCB-45/51	45-51	ng/kg	3510	2300	6690	4130	2980
PCB-46	41464-47-5	ng/kg	591	418	1290	729	513
PCB-48	70362-47-9	ng/kg	2430	1380	3130	2740	1480
PCB-49/69	49-69	ng/kg	38800	19000	41100	43500	18800
PCB-50/53	50-53	ng/kg	3040	1780	5780	3400	2230
PCB-52	35693-99-3	ng/kg	16100	19000	21700	38100	11600

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	MR-FF-18	MR-FF-19	MR-FF-20	MR-FF-21	MR-FF-22
		Location:	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	38.7	37.2	31	35	40.8
		Weight (g):	708	623.9	354.4	495.8	626.4
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352018	40227352019	40227352020	40227353001	40227353002
PCB Congeners	**CAS Number**	**Units**					
PCB-54	15968-05-5	ng/kg	90.7	62.0	190	102	102
PCB-55	74338-24-2	ng/kg	289	164	375	294	203
PCB-56	41464-43-1	ng/kg	7940	4520	9600	8090	4450
PCB-57	70424-67-8	ng/kg	445	208	493	385	231
PCB-58	41464-49-7	ng/kg	232	126	275	273	124
PCB-59/62/75	59-62-75	ng/kg	4340	2490	4960	5260	2470
PCB-60	33025-41-1	ng/kg	7700	4810	8390	10200	4130
PCB-61/70/74/76	61-70-74-76	ng/kg	47700	25300	50000	57200	25300
PCB-63	74472-34-7	ng/kg	4820	2490	4660	6150	2210
PCB-64	52663-58-8	ng/kg	20500	12700	26800	26800	12300
PCB-66	32598-10-0	ng/kg	37800	21500	38700	47000	18000
PCB-67	73575-53-8	ng/kg	534	282	796	449	354
PCB-68	73575-52-7	ng/kg	949	483	1020	1140	448
PCB-72	41464-42-0	ng/kg	1020	527	1170	1380	572
PCB-77	32598-13-3	ng/kg	1010	702	1760	1280	783
PCB-78	70362-49-1	ng/kg	2.49 U	2.50 U	2.49 U	2.57 U	2.53 U
PCB-79	41464-48-6	ng/kg	362	160	254	305	123
PCB-80	33284-52-5	ng/kg	2.09 U	2.09 U	2.08 U	2.15 U	2.12 U
PCB-81	70362-50-4	ng/kg	138	85.3	161	182	66.0
PCB-82	52663-62-4	ng/kg	3210	1720	3370	4080	1560
PCB-83	60145-20-2	ng/kg	1590	941	1760	1940	886
PCB-84	52663-60-2	ng/kg	2850	1740	4390	3110	1630
PCB-85/116/117	85-116-117	ng/kg	9890	5140	9640	12900	4340
PCB-86/87/97/108/119/125	868797108119125	ng/kg	17700	9100	17100	20600	8660
PCB-88/91	88-91	ng/kg	5340	3050	6230	6090	2780
PCB-89	73575-57-2	ng/kg	337	203	485	357	194
PCB-90/101/113	90-101-113	ng/kg	22000	12300	20400	29100	10600
PCB-92	52663-61-3	ng/kg	3920	2430	3930	5750	1780
PCB-93/98/100/102	9398100102	ng/kg	1750	1000	2380	1850	932
PCB-94	73575-55-0	ng/kg	170	82.7	286	210	86.9
PCB-95	38379-99-6	ng/kg	6990	5120	10100	8600	4160
PCB-96	73575-54-9	ng/kg	142	98.6	270	169	101
PCB-99	38380-01-7	ng/kg	20800	10500	18900	26700	9070
PCB-103	60145-21-3	ng/kg	269	145	307	296	130
PCB-104	56558-16-8	ng/kg	3.11 J	2.34 J	5.53 J	4.54 J	2.70 UX
PCB-105	32598-14-4	ng/kg	8780	5170	9390	12200	4720
PCB-106	70424-69-0	ng/kg	26.5 J	2.20 U	2.19 U	2.26 U	2.23 U
PCB-107/124	107-124	ng/kg	614	328	602	602	345
PCB-109	74472-35-8	ng/kg	2520	1220	2110	2870	1240
PCB-110/115	110-115	ng/kg	22600	14900	30600	27100	13000
PCB-111	39635-32-0	ng/kg	38.5 J	16.9 J	38.8 J	45.9 J	15.2 J
PCB-112	74472-36-9	ng/kg	268	116	203	268	107
PCB-114	74472-37-0	ng/kg	1120	581	1020	1500	557
PCB-118	31508-00-6	ng/kg	26500	12900	24200	38600	12500

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	MR-FF-18	MR-FF-19	MR-FF-20	MR-FF-21	MR-FF-22
		Location:	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	38.7	37.2	31	35	40.8
		Weight (g):	708	623.9	354.4	495.8	626.4
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352018	40227352019	40227352020	40227353001	40227353002
PCB Congeners	**CAS Number**	**Units**					
PCB-120	68194-12-7	ng/kg	163	82.0	158	215	73.3
PCB-121	56558-18-0	ng/kg	10.3 J	5.75 J	12.3 J	12.2 J	5.58 J
PCB-122	76842-07-4	ng/kg	324	144	227	243	156
PCB-123	65510-44-3	ng/kg	666	351	771	957	375
PCB-126	57465-28-8	ng/kg	39.8 J	25.4 J	41.6 J	41.8 J	20.0 J
PCB-127	39635-33-1	ng/kg	29.4 J	11.6 J	20.8 J	31.6 J	8.58 J
PCB-128/166	128-166	ng/kg	1520	764	1440	1630	620
PCB-129/138/163	129-138-163	ng/kg	11900	5770	10800	11600	4970
PCB-130	52663-66-8	ng/kg	814	389	748	831	344
PCB-131	61798-70-7	ng/kg	113	46.4 J	104	104	43.9 J
PCB-132	38380-05-1	ng/kg	1770	871	1840	1930	916
PCB-133	35694-04-3	ng/kg	220	102	194	252	99.3
PCB-134/143	134-143	ng/kg	351	221	459	353	171
PCB-135/151	135-151	ng/kg	1440	968	1950	1520	737
PCB-136	38411-22-2	ng/kg	332	241	541	339	184
PCB-137	35694-06-5	ng/kg	711	329	708	684	317
PCB-139/140	139-140	ng/kg	263	129	228	282	116
PCB-141	52712-04-6	ng/kg	1120	632	1050	1150	509
PCB-142	41411-61-4	ng/kg	5.67 J	2.38 U	7.31 J	3.56 J	2.41 U
PCB-144	68194-14-9	ng/kg	267	155	274	292	124
PCB-145	74472-40-5	ng/kg	4.34 J	2.98 U	6.40 J	4.48 J	3.02 U
PCB-146	51908-16-8	ng/kg	2010	909	1790	1950	883
PCB-147/149	147-149	ng/kg	4430	2920	5840	4320	2380
PCB-148	74472-41-6	ng/kg	21.3 J	10.6 UX	23.3 J	17.8 UX	11.3 J
PCB-150	68194-08-1	ng/kg	11.2 J	6.08 J	13.0 J	11.7 J	5.37 J
PCB-152	68194-09-2	ng/kg	7.93 J	6.27 J	13.5 J	9.39 J	5.16 J
PCB-153/168	153-168	ng/kg	9170	4340	8860	9690	3930
PCB-154	60145-22-4	ng/kg	153	81.4	148	189	64.6
PCB-155	33979-03-2	ng/kg	1.68 UX	1.62 U	2.64 J	3.11 J	1.64 U
PCB-156/157	156-157	ng/kg	1200	599	1130	1470	565
PCB-158	74472-42-7	ng/kg	1020	496	911	1080	426
PCB-159	39635-35-3	ng/kg	24.3 J	9.42 J	32.1 J	18.9 J	7.82 J
PCB-160	41411-62-5	ng/kg	2.02 U	4.88 J	2.02 U	22.7 J	3.72 J
PCB-161	74472-43-8	ng/kg	2.98 U	2.99 U	2.98 U	3.08 U	3.03 U
PCB-162	39635-34-2	ng/kg	53.6	24.5 J	46.7 J	47.7 J	25.8 J
PCB-164	74472-45-0	ng/kg	328	218	452	307	205
PCB-165	74472-46-1	ng/kg	12.7 J	6.19 J	12.6 J	15.2 J	4.84 J
PCB-167	52663-72-6	ng/kg	544	240	465	630	239
PCB-169	32774-16-6	ng/kg	5.78 UX	3.93 U	3.91 U	8.40 UX	3.98 U
PCB-170	35065-30-6	ng/kg	1350	555	999	1580	585
PCB-171/173	171-173	ng/kg	454	219	357	409	189
PCB-172	52663-74-8	ng/kg	324	148	274	354	133
PCB-174	38411-25-5	ng/kg	583	432	745	489	302
PCB-175	40186-70-7	ng/kg	69.2	33.9 J	56.0	81.5	27.6 J

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

		Sample ID:	MR-FF-18	MR-FF-19	MR-FF-20	MR-FF-21	MR-FF-22
		Location:	MR-FF	MR-FF	MR-FF	MR-FF	MR-FF
		Species:	White Sucker	White Sucker	White Sucker	White Sucker	White Sucker
		Length (cm):	38.7	37.2	31	35	40.8
		Weight (g):	708	623.9	354.4	495.8	626.4
		Sample Date:	5/18/2021	5/18/2021	5/18/2021	5/18/2021	5/18/2021
		Lab Sample ID:	40227352018	40227352019	40227352020	40227353001	40227353002
PCB Congeners	**CAS Number**	**Units**					
PCB-176	52663-65-7	ng/kg	98.1	58.1	115	93.4	52.7
PCB-177	52663-70-4	ng/kg	890	447	730	900	344
PCB-178	52663-67-9	ng/kg	347	168	307	400	139
PCB-179	52663-64-6	ng/kg	211	146	273	219	118
PCB-180/193	180-193	ng/kg	3740	1350	2510	4090	1670
PCB-181	74472-47-2	ng/kg	22.2 J	9.96 J	21.6 J	18.5 J	10.9 J
PCB-182	60145-23-5	ng/kg	13.0 J	7.88 J	13.1 J	15.3 J	6.95 J
PCB-183/185	183-185	ng/kg	1110	542	961	1150	471
PCB-184	74472-48-3	ng/kg	4.33 J	2.32 UX	3.80 J	4.54 J	1.80 U
PCB-186	74472-49-4	ng/kg	1.54 U	1.54 U	1.54 U	1.59 U	1.56 U
PCB-187	52663-68-0	ng/kg	2600	1330	2130	2580	1180
PCB-188	74487-85-7	ng/kg	3.69 J	1.87 U	3.44 J	5.15 J	1.90 U
PCB-189	39635-31-9	ng/kg	65.8	30.2 J	55.8	74.7	28.6 J
PCB-190	41411-64-7	ng/kg	212	80.3	150	335	81.2
PCB-191	74472-50-7	ng/kg	61.9	30.2 J	57.5	67.2	27.4 J
PCB-192	74472-51-8	ng/kg	2.63 U	2.64 U	2.62 U	2.71 U	2.67 U
PCB-194	35694-08-7	ng/kg	597	271	501	759	261
PCB-195	52663-78-2	ng/kg	232	113	181	283	107
PCB-196	42740-50-1	ng/kg	340	123	207	460	143
PCB-197/200	197-200	ng/kg	61.7 J	36.2 J	59.9 J	74.3 J	31.8 J
PCB-198/199	198-199	ng/kg	848	325	560	1260	397
PCB-201	40186-71-8	ng/kg	81.3	38.2 J	70.3 J	86.0	36.2 J
PCB-202	2136-99-4	ng/kg	139	69.8 J	131	189	62.1 J
PCB-203	52663-76-0	ng/kg	576	240	442	739	266
PCB-204	74472-52-9	ng/kg	1.81 U	1.81 U	1.81 U	1.87 U	1.84 U
PCB-205	74472-53-0	ng/kg	39.3 J	16.6 J	34.2 J	47.0 J	19.3 J
PCB-206	40186-72-9	ng/kg	343	176	259	525	169
PCB-207	52663-79-3	ng/kg	33.6 J	20.7 J	28.8 J	44.4 J	19.6 J
PCB-208	52663-77-1	ng/kg	77.9	50.8 J	71.7 J	118	43.0 J
PCB-209	ARC-209	ng/kg	88.5	60.0 J	79.3	156	54.0 J
Total PCB Congeners	**--**	**ng/kg**	**616771.6 J**	**350444.97 J**	**747237.72 J**	**735779.97 J**	**339129.82 J**
Lipid Content	ARC-LIPID	%	0.63	0.37	0.90	0.47	0.30

See Notes on last page.

Table 5-6
Analytical Results for Fish Tissue Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Notes:
1. Fish were processed as skin-on, scales-off fillets for the laboratory analysis.
2. Stage 4 validation was completed for the analytical results summarized in this table.
3. Non-detects are not included in the total PCB congeners.

Data Qualifiers:
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
N - The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
U - The compound was analyzed for but not detected. The associated value is the compound limit of detection.
X - Data may only be used for screening purposes (nondefinitive data) if the quality assurance/quality control (QA/QC) deviation warrants the qualification of the data beyond estimation, but not rejection of the da

Acronyms and Abbreviations:
CAS = Chemical Abstracts Service registry
cm = centimeters
g = grams
ng/kg = nanograms per kilogram
PCB = polychlorinated biphenyl

Table 5-7
Statistical Summary for Fish Tissue Sample Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Species	Sampling Location	Frequency of Detection	Units	Minimum	Maximum	Mean	Standard Deviation	Percentile				
								10th	25th	50th	75th	90th
White Sucker	Upstream M-59 ISM-29	5/5 (100%)	mg/kg	0.231	0.747	0.548	0.214	0.330	0.478	0.543	0.743	0.746
	ISM-M1-27	5/5 (100%)	mg/kg	0.334	0.784	0.585	0.162	0.433	0.582	0.595	0.631	0.723
	Bowen Road	5/5 (100%)	mg/kg	1.34	1.72	1.51	0.191	1.35	1.36	1.43	1.72	1.72
	W. Marr Road	5/5 (100%)	mg/kg	0.339	0.747	0.558	0.201	0.344	0.350	0.617	0.736	0.743
	Chase Lake Road	5/5 (100%)	mg/kg	0.298	0.717	0.465	0.162	0.319	0.349	0.467	0.494	0.628
	Site Locations (excludes ISM-29)	20/20 (100%)	mg/kg	0.298	1.72	0.781	0.467	0.339	0.438	0.624	0.923	1.46
	All Sampling Locations	25/25 (100%)	mg/kg	0.231	1.72	0.734	0.435	0.336	0.467	0.617	0.747	1.40
Panfish	Upstream M-59 ISM-29	6/6 (100%)	mg/kg	0.0188	0.643	0.175	0.241	0.0218	0.0305	0.0723	0.191	0.432
	ISM-M1-27	6/6 (100%)	mg/kg	0.127	0.753	0.322	0.227	0.141	0.177	0.280	0.333	0.545
	Bowen Road	6/6 (100%)	mg/kg	0.345	0.606	0.507	0.110	0.371	0.428	0.549	0.590	0.600
	W. Marr Road	6/6 (100%)	mg/kg	0.394	0.851	0.585	0.152	0.447	0.516	0.581	0.601	0.726
	Chase Lake Road	6/6 (100%)	mg/kg	0.341	0.593	0.492	0.107	0.358	0.411	0.533	0.568	0.584
	Site Locations (excludes ISM-29)	24/24 (100%)	mg/kg	0.127	0.851	0.476	0.176	0.264	0.344	0.519	0.593	0.605
	All Sampling Locations	30/30 (100%)	mg/kg	0.0188	0.851	0.416	0.223	0.0917	0.260	0.449	0.590	0.610

Acronyms and Abbreviations:
% = percent
mg/kg = milligram per kilogram

Table 5-8
Statistical Summary for Fish Tissue Lipid Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Species	Sampling Location	Frequency of Detection	Units	Minimum	Maximum	Mean	Standard Deviation	Percentile				
								10th	25th	50th	75th	90th
White Sucker	Upstream M-59 ISM-29	5/5 (100%)	%	0.410	1.49	0.824	0.466	0.430	0.460	0.640	1.12	1.34
	ISM-M1-27	5/5 (100%)	%	0.250	1.09	0.564	0.314	0.330	0.450	0.500	0.530	0.866
	Bowen Road	5/5 (100%)	%	0.460	0.990	0.798	0.218	0.580	0.760	0.790	0.990	0.990
	W. Marr Road	5/5 (100%)	%	0.300	0.900	0.534	0.239	0.328	0.370	0.470	0.630	0.792
	Chase Lake Road	5/5 (100%)	%	0.270	0.770	0.502	0.193	0.322	0.400	0.460	0.610	0.706
	Site Locations (excludes ISM-29)	20/20 (100%)	%	0.250	1.09	0.600	0.255	0.297	0.438	0.515	0.775	0.990
	All Sampling Locations	25/25 (100%)	%	0.250	1.49	0.644	0.310	0.328	0.450	0.530	0.790	1.05
Panfish	Upstream M-59 ISM-29	6/6 (100%)	%	0.260	0.480	0.347	0.0799	0.265	0.288	0.350	0.367	0.425
	ISM-M1-27	6/6 (100%)	%	0.260	0.380	0.313	0.0427	0.275	0.290	0.305	0.335	0.360
	Bowen Road	6/6 (100%)	%	0.300	0.720	0.397	0.162	0.305	0.312	0.330	0.378	0.555
	W. Marr Road	6/6 (100%)	%	0.180	0.780	0.403	0.216	0.220	0.270	0.350	0.475	0.640
	Chase Lake Road	6/6 (100%)	%	0.110	0.320	0.207	0.0703	0.145	0.180	0.195	0.232	0.280
	Site Locations (excludes ISM-29)	24/24 (100%)	%	0.110	0.780	0.330	0.154	0.180	0.255	0.305	0.350	0.470
	All Sampling Locations	30/30 (100%)	%	0.110	0.780	0.333	0.142	0.180	0.260	0.315	0.367	0.482

Acronyms and Abbreviations:
% = percent

Table 5-9
Statistical Summary for Lipid-Normalized Fish Tissue Sample Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Species	Sampling Location	Frequency of Detection	Units	Minimum	Maximum	Mean	Standard Deviation	Percentile				
								10th	25th	50th	75th	90th
White Sucker	Upstream M-59 ISM-29	5/5 (100%)	mg/kg-lipid	32.1	162	80.3	49.3	41.8	56.4	66.7	84.8	131
	ISM-M1-27	5/5 (100%)	mg/kg-lipid	57.9	314	137	104	59.9	63.0	119	129	240
	Bowen Road	5/5 (100%)	mg/kg-lipid	144	374	208	93.4	156	172	174	176	295
	W. Marr Road	5/5 (100%)	mg/kg-lipid	83.0	157	109	28.6	87.7	94.7	97.9	113	139
	Chase Lake Road	5/5 (100%)	mg/kg-lipid	76.6	110	95.0	14.1	80.8	87.3	93.1	107	109
	Site Locations (excludes ISM-29)	20/20 (100%)	mg/kg-lipid	57.9	374	137	79.6	75.2	91.6	112	161	190
	All Sampling Locations	25/25 (100%)	mg/kg-lipid	32.1	374	126	77.2	59.9	83.0	107	157	175
Panfish	Upstream M-59 ISM-29	6/6 (100%)	mg/kg-lipid	6.86	189	53.6	72.8	6.92	8.48	16.5	69.0	137
	ISM-M1-27	6/6 (100%)	mg/kg-lipid	48.7	260	104	79.6	48.7	54.2	79.5	105	185
	Bowen Road	6/6 (100%)	mg/kg-lipid	82.4	187	138	45.1	85.5	99.5	147	174	183
	W. Marr Road	6/6 (100%)	mg/kg-lipid	109	313	172	82.2	115	122	128	206	272
	Chase Lake Road	6/6 (100%)	mg/kg-lipid	142	471	265	118	161	187	245	299	388
	Site Locations (excludes ISM-29)	24/24 (100%)	mg/kg-lipid	48.7	471	170	100	73.9	104	137	214	298
	All Sampling Locations	30/30 (100%)	mg/kg-lipid	6.86	471	147	105	19.4	83.1	128	189	285

Acronyms and Abbreviations:
% = percent
mg/kg-lipid = milligram per kilogram lipid

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		BG-1_SD_0-2_CMP	BG-1_SD_0-2_CMP_TRP_1	BG-1_SD_0-2_CMP_TRP_2	BG-1_SD_2-6_CMP	BG-1_SD_2-6_CMP_TRP_1	BG-1_SD_2-6_CMP_TRP_2	BG-3_SD_0-2_CMP	BG-3_SD_2-6_CMP
Location:		BG-1	BG-1	BG-1	BG-1	BG-1	BG-1	BG-3	BG-3
Sample Depth Range (inches)		0-2	0-2	0-2	2-6	2-6	2-6	0-2	2-6
Sample Date:		8/27/2021	8/27/2021	8/27/2021	8/27/2021	8/27/2021	8/27/2021	8/27/2021	8/27/2021
Lab Sample ID:		40232459007	40232459009	40232459011	40232459008	40232459010	40232459012	40232459013	40232459014
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	< 0.0642 U	< 0.0613 U
Aroclor 1221	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	< 0.0642 U	< 0.0613 U
Aroclor 1232	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	< 0.0642 U	< 0.0613 U
Aroclor 1242	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	< 0.0642 U	< 0.0613 U
Aroclor 1248	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	< 0.0642 U	< 0.0613 U
Aroclor 1254	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	**0.175**	< 0.0613 U
Aroclor 1260	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	**0.0314 J**	< 0.0613 U
Total Aroclor PCBs	mg/kg	< 0.0583 U	< 0.0556 U	< 0.0571 U	< 0.0589 U	< 0.0619 U	< 0.0592 U	**0.206 J**	< 0.0613 U
General Chemistry									
Total Organic Carbon	mg/kg	**11,400**	**7,360**	**7,160**	**10,700**	**2,550**	**5,260**	**2,960**	**9,460**
Percent Moisture	%	**14.2**	**10.0**	**12.4**	**15.1**	**19.4**	**15.7**	**22.1**	**18.7**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		BG-4_SD_0-2_CMP	BG-4_SD_2-6_CMP	BG-5_SD_0-2_CMP	BG-5_SD_2-6_CMP	T-001_SD_0-2_CMP	T-001_SD_0-2_CMP_TRP_1	T-001_SD_0-2_CMP_TRP_2	T-001_SD_2-6_CMP	T-001_SD_2-6_CMP_TRP_1
Location:		BG-4	BG-4	BG-5	BG-5	T-001	T-001	T-001	T-001	T-001
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6	2-6
Sample Date:		8/27/2021	8/27/2021	8/27/2021	8/27/2021	7/15/2021	7/16/2021	7/16/2021	7/15/2021	7/16/2021
Lab Sample ID:		40232459015	40232459016	40232459017	40232459018	40230298001	40230298003	40230298005	40230298002	40230298004
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	< 0.0711 U	< 0.0775 U	< 0.0751 U	< 0.0800 U	< 0.0834 U
Aroclor 1221	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	< 0.0711 U	< 0.0775 U	< 0.0751 U	< 0.0800 U	< 0.0834 U
Aroclor 1232	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	< 0.0711 U	< 0.0775 U	< 0.0751 U	< 0.0800 U	< 0.0834 U
Aroclor 1242	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	**0.315**	**0.272**	**0.227**	**0.357**	**0.397**
Aroclor 1248	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	< 0.0711 U	< 0.0775 U	< 0.0751 U	< 0.0800 U	< 0.0834 U
Aroclor 1254	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	**0.124 J**	**0.100 J**	**0.0753**	**0.128**	**0.133 J**
Aroclor 1260	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	< 0.0711 U	< 0.0775 U	< 0.0751 U	< 0.0800 U	< 0.0834 U
Total Aroclor PCBs	mg/kg	< 0.0651 U	< 0.0608 U	< 0.0593 U	< 0.0631 U	**0.438 J**	**0.373 J**	**0.303**	**0.485**	**0.530 J**
General Chemistry										
Total Organic Carbon	mg/kg	**7,530**	**10,700**	**5,200**	**3,470**	**42,500**	**24,100**	**15,000**	**37,500**	**28,500**
Percent Moisture	%	**23.4**	**18.0**	**15.8**	**20.7**	**29.7**	**35.4**	**33.3**	**37.6**	**39.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-001_SD_2-6_CMP_TRP_2	T-002_SD_0-2_CMP	T-002_SD_0-2_CMP_DUP	T-002_SD_2-6_CMP	T-003_SD_0-2_CMP	T-003_SD_2-6_CMP	T-004_SD_0-2_CMP	T-004_SD_2-6_CMP	T-005_SD_0-2_CMP
Location:		T-001	T-002	T-002	T-002	T-003	T-003	T-004	T-004	T-005
Sample Depth Range (inches)		2-6	0-2	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/16/2021	7/16/2021	7/16/2021	7/16/2021	7/16/2021	7/16/2021	7/17/2021	7/17/2021	7/17/2021
Lab Sample ID:		40230298006	40230298007	40230298008	40230298009	40230298010	40230298011	40230298012	40230298013	40230468001
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0781 U	< 0.0872 U	< 0.0932 U	< 0.0848 U	< 0.0977 U	< 0.0869 U	< 0.124 U	< 0.0839 U	< 0.0721 U
Aroclor 1221	mg/kg	< 0.0781 U	< 0.0872 U	< 0.0932 U	< 0.0848 U	< 0.0977 U	< 0.0869 U	< 0.124 U	< 0.0839 U	< 0.0721 U
Aroclor 1232	mg/kg	< 0.0781 U	< 0.0872 U	< 0.0932 U	< 0.0848 U	< 0.0977 U	< 0.0869 U	< 0.124 U	< 0.0839 U	< 0.0721 U
Aroclor 1242	mg/kg	**0.215**	**0.350 J**	**0.299 JN**	**0.405**	**0.439**	**0.598**	**0.623 JN**	**0.455**	**0.227**
Aroclor 1248	mg/kg	< 0.0781 U	< 0.0872 U	< 0.0932 U	< 0.0848 U	< 0.0977 U	< 0.0869 U	< 0.124 U	< 0.0839 U	< 0.0721 U
Aroclor 1254	mg/kg	**0.0725 J**	**0.135**	**0.114**	**0.165**	**0.166 J**	**0.197**	**0.241**	**0.159**	**0.0785**
Aroclor 1260	mg/kg	< 0.0781 U	< 0.0872 U	< 0.0932 U	< 0.0848 U	< 0.0977 U	< 0.0869 U	< 0.124 U	< 0.0839 U	< 0.0721 U
Total Aroclor PCBs	mg/kg	**0.288 J**	**0.485 J**	**0.413 J**	**0.570**	**0.606 J**	**0.795**	**0.863 J**	**0.614**	**0.305**
General Chemistry										
Total Organic Carbon	mg/kg	**28,100**	**27,400**	**29,900**	**34,900**	**35,000**	**32,400**	**64,700**	**32,600**	**19,900**
Percent Moisture	%	**36.2**	**42.7**	**46.5**	**41.1**	**48.8**	**42.4**	**59.8**	**40.2**	**30.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-005_SD_2-6_CMP	T-006_SD_0-2_CMP	T-006_SD_2-6_CMP	T-007_SD_0-2_CMP	T-007_SD_2-6_CMP	T-008_SD_0-2_CMP	T-008_SD_2-6_CMP	T-009_SD_0-2_CMP	T-009_SD_2-6_CMP	T-010_SD_0-2_CMP
Location:		T-005	T-006	T-006	T-007	T-007	T-008	T-008	T-009	T-009	T-010
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/17/2021	7/17/2021	7/17/2021	7/17/2021	7/17/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021
Lab Sample ID:		40230468002	40230468003	40230468004	40230468005	40230468006	40230468007	40230468008	40230468009	40230468010	40230468011
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0634 U	< 0.0977 U	< 0.0911 U	< 0.0794 U	< 0.0798 U	< 0.0849 U	< 0.0976 U	< 0.0807 U	< 0.0874 U	< 0.0774 U
Aroclor 1221	mg/kg	< 0.0634 U	< 0.0977 U	< 0.0911 U	< 0.0794 U	< 0.0798 U	< 0.0849 U	< 0.0976 U	< 0.0807 U	< 0.0874 U	< 0.0774 U
Aroclor 1232	mg/kg	< 0.0634 U	< 0.0977 U	< 0.0911 U	< 0.0794 U	< 0.0798 U	< 0.0849 U	< 0.0976 U	< 0.0807 U	< 0.0874 U	< 0.0774 U
Aroclor 1242	mg/kg	**0.237**	**0.501**	**0.601 J**	**0.248 JN**	**0.418**	**0.450**	**0.612**	**0.315**	**0.464**	**0.296**
Aroclor 1248	mg/kg	< 0.0634 U	< 0.0977 U	< 0.0911 U	< 0.0794 U	< 0.0798 U	< 0.0849 U	< 0.0976 U	< 0.0807 U	< 0.0874 U	< 0.0774 U
Aroclor 1254	mg/kg	**0.0721**	**0.184**	**0.184**	**0.0946**	**0.156**	**0.151**	**0.212**	**0.0933**	**0.153**	**0.101**
Aroclor 1260	mg/kg	< 0.0634 U	< 0.0977 U	< 0.0911 U	< 0.0794 U	< 0.0798 U	< 0.0849 U	< 0.0976 U	< 0.0807 U	< 0.0874 U	< 0.0774 U
Total Aroclor PCBs	mg/kg	**0.309**	**0.685**	**0.785 J**	**0.342 J**	**0.574**	**0.601**	**0.823**	**0.408**	**0.617**	**0.397**
General Chemistry											
Total Organic Carbon	mg/kg	**19,500**	**48,300**	**44,400**	**29,000**	**33,800**	**37,500**	**44,200**	**22,500 J**	**55,200**	**24,900**
Percent Moisture	%	**21.1**	**48.8**	**45.2**	**37.1**	**37.5**	**41.3**	**48.6**	**38.1**	**42.9**	**35.2**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-010_SD_0-2_CMP-DUP	T-010_SD_2-6_CMP	T-010_SD_2-6_CMP-DUP	T-011_SD_0-2_CMP	T-011_SD_2-6_CMP	T-012_SD_0-2_CMP	T-012_SD_2-6_CMP	T-013_SD_0-2_CMP	T-013_SD_2-6_CMP
Location:		T-010	T-010	T-010	T-011	T-011	T-012	T-012	T-013	T-013
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021	7/18/2021
Lab Sample ID:		40230468013	40230468012	40230468014	40230468015	40230468016	40230468017	40230468018	40230468019	40230468020
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0758 U	< 0.0813 U	< 0.0788 U	< 0.0760 U	< 0.0808 U	< 0.0711 U	< 0.0748 U	< 0.0770 U	< 0.0752 U
Aroclor 1221	mg/kg	< 0.0758 U	< 0.0813 U	< 0.0788 U	< 0.0760 U	< 0.0808 U	< 0.0711 U	< 0.0748 U	< 0.0770 U	< 0.0752 U
Aroclor 1232	mg/kg	< 0.0758 U	< 0.0813 U	< 0.0788 U	< 0.0760 U	< 0.0808 U	< 0.0711 U	< 0.0748 U	< 0.0770 U	< 0.0752 U
Aroclor 1242	mg/kg	**0.273 J**	**0.414**	**0.416**	**0.370**	**0.413**	**0.217**	**0.421**	**0.227**	**0.237**
Aroclor 1248	mg/kg	< 0.0758 U	< 0.0813 U	< 0.0788 U	< 0.0760 U	< 0.0808 U	< 0.0711 U	< 0.0748 U	< 0.0770 U	< 0.0752 U
Aroclor 1254	mg/kg	**0.0906**	**0.122**	**0.129**	**0.0896**	**0.143**	**0.0680 J**	**0.125**	**0.0631 J**	**0.0706 J**
Aroclor 1260	mg/kg	< 0.0758 U	< 0.0813 U	< 0.0788 U	< 0.0760 U	< 0.0808 U	< 0.0711 U	< 0.0748 U	< 0.0770 U	< 0.0752 U
Total Aroclor PCBs	mg/kg	**0.364 J**	**0.536**	**0.545**	**0.459**	**0.556**	**0.285 J**	**0.546**	**0.290 J**	**0.308 J**
General Chemistry										
Total Organic Carbon	mg/kg	**24,400**	**31,600**	**26,500**	**24,000**	**34,500**	**19,700**	**29,300**	**27,000**	**25,800**
Percent Moisture	%	**34.0**	**38.4**	**36.6**	**34.3**	**38.0**	**29.8**	**33.0**	**35.0**	**33.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

	Sample ID:	T-014_SD_0-2_CMP	T-014_SD_2-6_CMP	T-015_SD_0-2_CMP	T-015_SD_2-6_CMP	T-016_SD_0-2_CMP	T-016_SD_2-6_CMP	T-017_SD_0-2_CMP	T-017_SD_2-6_CMP	T-018_SD_0-2_CMP	T-018_SD_2-6_CMP
	Location:	T-014	T-014	T-015	T-015	T-016	T-016	T-017	T-017	T-018	T-018
	Sample Depth Range (inches)	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
	Sample Date:	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021
	Lab Sample ID:	40230468021	40230468022	40230468023	40230468024	40230468025	40230468026	40230468027	40230468028	40230468029	40230468030
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0934 U	< 0.0916 U	< 0.0710 U	< 0.0853 U	< 0.0790 U	< 0.0768 U	< 0.0691 U	< 0.0747 U	< 0.0699 U	< 0.0703 U
Aroclor 1221	mg/kg	< 0.0934 U	< 0.0916 U	< 0.0710 U	< 0.0853 U	< 0.0790 U	< 0.0768 U	< 0.0691 U	< 0.0747 U	< 0.0699 U	< 0.0703 U
Aroclor 1232	mg/kg	< 0.0934 U	< 0.0916 U	< 0.0710 U	< 0.0853 U	< 0.0790 U	< 0.0768 U	< 0.0691 U	< 0.0747 U	< 0.0699 U	< 0.0703 U
Aroclor 1242	mg/kg	**0.279 J**	**0.383 J**	**0.192 J**	**0.215**	**0.302**	**0.424 J**	**0.282**	**0.500**	**0.323 J**	**0.460**
Aroclor 1248	mg/kg	< 0.0934 U	< 0.0916 U	< 0.0710 U	< 0.0853 U	< 0.0790 U	< 0.0768 U	< 0.0691 U	< 0.0747 U	< 0.0699 U	< 0.0703 U
Aroclor 1254	mg/kg	**0.101**	**0.143**	**0.0639 J**	**0.0732 J**	**0.0904**	**0.115**	**0.0599 J**	**0.103**	**0.0842**	**0.105**
Aroclor 1260	mg/kg	< 0.0934 U	< 0.0916 U	< 0.0710 U	< 0.0853 U	< 0.0790 U	< 0.0768 U	< 0.0691 U	< 0.0747 U	< 0.0699 U	< 0.0703 U
Total Aroclor PCBs	mg/kg	**0.380 J**	**0.526 J**	**0.256 J**	**0.289 J**	**0.392**	**0.539 J**	**0.342**	**0.602**	**0.407 J**	**0.565**
General Chemistry											
Total Organic Carbon	mg/kg	**47,600**	**42,600**	**13,000**	**45,300**	**22,800**	**24,200**	**14,900**	**16,100**	**21,700**	**18,100**
Percent Moisture	%	**46.6**	**45.4**	**29.6**	**41.4**	**36.8**	**35.1**	**27.8**	**33.1**	**28.7**	**28.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-019_SD_0-2_CMP	T-019_SD_2-6_CMP	T-020_SD_0-2_CMP	T-020_SD_2-6_CMP	T-021_SD_0-2_CMP	T-021_SD_0-2_CMP_TRP_1	T-021_SD_0-2_CMP_TRP_2	T-021_SD_2-6_CMP
Location:		T-019	T-019	T-020	T-020	T-021	T-021	T-021	T-021
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021	7/19/2021
Lab Sample ID:		40230468031	40230468032	40230468033	40230468034	40230468035	40230468037	40230531014	40230468036
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0721 U	< 0.0750 U	< 0.0828 U	< 0.0710 U	< 0.0774 U	< 0.0705 U	< 0.0696 U	< 0.0852 U
Aroclor 1221	mg/kg	< 0.0721 U	< 0.0750 U	< 0.0828 U	< 0.0710 U	< 0.0774 U	< 0.0705 U	< 0.0696 U	< 0.0852 U
Aroclor 1232	mg/kg	< 0.0721 U	< 0.0750 U	< 0.0828 U	< 0.0710 U	< 0.0774 U	< 0.0705 U	< 0.0696 U	< 0.0852 U
Aroclor 1242	mg/kg	**0.681 J**	**1.05**	**0.549 J**	**0.778 J**	**0.574**	**0.438**	**0.345**	**1.30**
Aroclor 1248	mg/kg	< 0.0721 U	< 0.0750 U	< 0.0828 U	< 0.0710 U	< 0.0774 U	< 0.0705 U	< 0.0696 U	< 0.0852 U
Aroclor 1254	mg/kg	**0.214 J**	**0.267**	**0.173 J**	**0.230**	**0.144 J**	**0.0884**	**0.0981**	**0.254**
Aroclor 1260	mg/kg	< 0.0721 U	< 0.0750 U	< 0.0828 U	< 0.0710 U	< 0.0774 U	< 0.0705 U	< 0.0696 U	< 0.0852 U
Total Aroclor PCBs	mg/kg	**0.895 J**	**1.31**	**0.722 J**	**1.01 J**	**0.719 J**	**0.526**	**0.443**	**1.55**
General Chemistry									
Total Organic Carbon	mg/kg	**27,200**	**27,800**	**22,700 J**	**25,900 J**	**25,400**	**19,200**	**10,600**	**31,700**
Percent Moisture	%	**30.9**	**33.5**	**39.7**	**29.8**	**35.5**	**29.0**	**28.1**	**41.2**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-021_SD_2-6_CMP_TRP_1	T-021_SD_2-6_CMP_TRP_2	T-022_SD_0-2_CMP	T-022_SD_2-6_CMP	T-023_SD_0-2_CMP	T-023_SD_2-6_CMP	T-024_SD_0-2_CMP	T-024_SD_2-6_CMP	T-025_SD_0-2_CMP
Location:		T-021	T-021	T-022	T-022	T-023	T-023	T-024	T-024	T-025
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/19/2021	7/19/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021
Lab Sample ID:		40230468038	40230531013	40230531015	40230531016	40230531017	40230531018	40230531019	40230531020	40230531021
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0710 U	< 0.0792 U	< 0.0795 U	< 0.0986 U	< 0.0730 U	< 0.0751 U	< 0.0784 U	< 0.0839 U	< 0.0728 U
Aroclor 1221	mg/kg	< 0.0710 U	< 0.0792 U	< 0.0795 U	< 0.0986 U	< 0.0730 U	< 0.0751 U	< 0.0784 U	< 0.0839 U	< 0.0728 U
Aroclor 1232	mg/kg	< 0.0710 U	< 0.0792 U	< 0.0795 U	< 0.0986 U	< 0.0730 U	< 0.0751 U	< 0.0784 U	< 0.0839 U	< 0.0728 U
Aroclor 1242	mg/kg	**1.29**	**0.711**	**1.15**	**0.532**	**0.543**	**1.32**	**0.440**	**0.739**	**0.314**
Aroclor 1248	mg/kg	< 0.0710 U	< 0.0792 U	< 0.0795 U	< 0.0986 U	< 0.0730 U	< 0.0751 U	< 0.0784 U	< 0.0839 U	< 0.0728 U
Aroclor 1254	mg/kg	**0.175 J**	**0.196 J**	**0.128**	**0.195**	**0.235**	**0.246**	**0.122**	**0.185 J**	**0.0897**
Aroclor 1260	mg/kg	< 0.0710 U	< 0.0792 U	< 0.0795 U	< 0.0986 U	< 0.0730 U	< 0.0751 U	< 0.0784 U	< 0.0839 U	< 0.0728 U
Total Aroclor PCBs	mg/kg	**1.46 J**	**0.907 J**	**1.27**	**0.728**	**0.778**	**1.56**	**0.562**	**0.924 J**	**0.404**
General Chemistry										
Total Organic Carbon	mg/kg	**22,600**	**24,900 J**	**17,400**	**47,300**	**24,100**	**21,300**	**22,200**	**36,400**	**18,900**
Percent Moisture	%	**29.7**	**37.0**	**37.1**	**49.4**	**31.7**	**33.6**	**36.4**	**40.4**	**31.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-025_SD_2-6_CMP	T-026_SD_0-2_CMP	T-026_SD_2-6_CMP	T-027_SD_0-2_CMP	T-027_SD_2-6_CMP	T-028_SD_0-2_CMP	T-028_SD_2-6_CMP	T-029_SD_0-2_CMP	T-029_SD_2-6_CMP	T-030_SD_0-2_CMP
Location:		T-025	T-026	T-026	T-027	T-027	T-028	T-028	T-029	T-029	T-030
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021
Lab Sample ID:		40230531022	40230531024	40230531001	40230531002	40230531003	40230531004	40230531005	40230531006	40230531007	40230531008
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0698 U	< 0.0681 U	< 0.0770 U	< 0.0771 U	< 0.0789 U	< 0.0931 U	< 0.0863 U	< 0.0840 U	< 0.0731 U	< 0.0703 U
Aroclor 1221	mg/kg	< 0.0698 U	< 0.0681 U	< 0.0770 U	< 0.0771 U	< 0.0789 U	< 0.0931 U	< 0.0863 U	< 0.0840 U	< 0.0731 U	< 0.0703 U
Aroclor 1232	mg/kg	< 0.0698 U	< 0.0681 U	< 0.0770 U	< 0.0771 U	< 0.0789 U	< 0.0931 U	< 0.0863 U	< 0.0840 U	< 0.0731 U	< 0.0703 U
Aroclor 1242	mg/kg	**0.332**	**0.293**	**0.188 J**	**0.337**	**0.388**	**0.397 JN**	**0.793 J**	**0.305 J**	**0.417 J**	**0.316 J**
Aroclor 1248	mg/kg	< 0.0698 U	< 0.0681 U	< 0.0770 U	< 0.0771 U	< 0.0789 U	< 0.0931 U	< 0.0863 U	< 0.0840 U	< 0.0731 U	< 0.0703 U
Aroclor 1254	mg/kg	**0.0989 J**	**0.0844**	**0.0584 J**	**0.0929**	**0.109**	**0.143**	**0.284**	**0.0958**	**0.128**	**0.111**
Aroclor 1260	mg/kg	< 0.0698 U	< 0.0681 U	< 0.0770 U	< 0.0771 U	< 0.0789 U	< 0.0931 U	< 0.0863 U	< 0.0840 U	< 0.0731 U	< 0.0703 U
Total Aroclor PCBs	mg/kg	**0.431 J**	**0.377**	**0.247 J**	**0.430**	**0.497**	**0.540 J**	**1.08 J**	**0.400 J**	**0.544 J**	**0.427 J**
General Chemistry											
Total Organic Carbon	mg/kg	**14,500**	**17,000**	**25,800**	**20,400**	**32,800**	**47,400**	**39,300**	**39,300**	**23,900**	**28,600**
Percent Moisture	%	**28.3**	**26.5**	**35.1**	**35.2**	**36.6**	**46.2**	**42.2**	**40.7**	**31.8**	**28.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-030_SD_0-2_CMP_DUP	T-030_SD_2-6_CMP	T-030_SD_2-6_CMP_DUP	T-031_SD_0-2_CMP	T-031_SD_2-6_CMP	T-032_SD_0-2_CMP	T-032_SD_2-6_CMP	T-033_SD_0-2_CMP	T-033_SD_2-6_CMP
Location:		T-030	T-030	T-030	T-031	T-031	T-032	T-032	T-033	T-033
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/20/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021
Lab Sample ID:		40230531010	40230531009	40230531011	40230526001	40230526002	40230526003	40230526004	40230526005	40230526006
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0738 U	< 0.0744 U	< 0.0712 U	< 0.0906 U	< 0.0863 U	< 0.0885 U	< 0.0977 U	< 0.133 U	< 0.340 U
Aroclor 1221	mg/kg	< 0.0738 U	< 0.0744 U	< 0.0712 U	< 0.0906 U	< 0.0863 U	< 0.0885 U	< 0.0977 U	< 0.133 U	< 0.340 U
Aroclor 1232	mg/kg	< 0.0738 U	< 0.0744 U	< 0.0712 U	< 0.0906 U	< 0.0863 U	< 0.0885 U	< 0.0977 U	< 0.133 U	< 0.340 U
Aroclor 1242	mg/kg	**0.433**	**0.962 J**	**1.19**	**0.907**	**0.996**	**0.393 J**	**0.640 J**	**0.973 J**	**4.85**
Aroclor 1248	mg/kg	< 0.0738 U	< 0.0744 U	< 0.0712 U	< 0.0906 U	< 0.0863 U	< 0.0885 U	< 0.0977 U	< 0.133 U	< 0.340 U
Aroclor 1254	mg/kg	**0.167**	**0.246**	**0.311**	**0.253**	**0.307 J**	**0.148**	**0.239**	**0.341**	**0.511 J**
Aroclor 1260	mg/kg	< 0.0738 U	< 0.0744 U	< 0.0712 U	< 0.0906 U	< 0.0863 U	< 0.0885 U	< 0.0977 U	< 0.133 U	< 0.340 U
Total Aroclor PCBs	mg/kg	**0.600**	**1.21 J**	**1.50**	**1.16**	**1.30 J**	**0.542 J**	**0.879 J**	**1.31 J**	**5.36**
General Chemistry										
Total Organic Carbon	mg/kg	**22,600**	**32,400 J**	**28,700 J**	**42,700**	**31,300**	**36,000**	**41,200**	**73,700**	**62,500**
Percent Moisture	%	**32.4**	**32.5**	**30.0**	**44.8**	**42.1**	**43.5**	**48.7**	**62.3**	**56.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-034_SD_0-2_CMP	T-034_SD_2-6_CMP	T-035_SD_0-2_CMP	T-035_SD_2-6_CMP	T-036_SD_0-2_CMP	T-036_SD_2-6_CMP	T-037_SD_0-2_CMP	T-037_SD_2-6_CMP	T-038_SD_0-2_CMP	T-038_SD_2-6_CMP
Location:		T-034	T-034	T-035	T-035	T-036	T-036	T-037	T-037	T-038	T-038
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021
Lab Sample ID:		40230526007	40230526008	40230526009	40230526010	40230526012	40230526013	40230526014	40230526015	40230526016	40230526017
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0864 U	< 0.0842 U	< 0.0687 U	< 0.0738 U	< 0.0758 U	< 0.0775 U	< 0.0907 U	< 0.0822 U	< 0.0900 U	< 0.106 U
Aroclor 1221	mg/kg	< 0.0864 U	< 0.0842 U	< 0.0687 U	< 0.0738 U	< 0.0758 U	< 0.0775 U	< 0.0907 U	< 0.0822 U	< 0.0900 U	< 0.106 U
Aroclor 1232	mg/kg	< 0.0864 U	< 0.0842 U	< 0.0687 U	< 0.0738 U	< 0.0758 U	< 0.0775 U	< 0.0907 U	< 0.0822 U	< 0.0900 U	< 0.106 U
Aroclor 1242	mg/kg	**0.430 J**	**0.516 J**	**0.274 J**	**0.502**	**0.291 J**	**0.463 J**	**0.242 JN**	**0.320 J**	**0.218 J**	**0.640 JN**
Aroclor 1248	mg/kg	< 0.0864 U	< 0.0842 U	< 0.0687 U	< 0.0738 U	< 0.0758 U	< 0.0775 U	< 0.0907 U	< 0.0822 U	< 0.0900 U	< 0.106 U
Aroclor 1254	mg/kg	**0.157 J**	**0.198**	**0.0929**	**0.104**	**0.0919**	**0.131**	**0.0900 J**	**0.130**	**0.0836 J**	**0.219**
Aroclor 1260	mg/kg	< 0.0864 U	< 0.0842 U	< 0.0687 U	< 0.0738 U	< 0.0758 U	< 0.0775 U	< 0.0907 U	< 0.0822 U	< 0.0900 U	< 0.106 U
Total Aroclor PCBs	mg/kg	**0.587 J**	**0.713 J**	**0.367 J**	**0.606**	**0.383 J**	**0.593 J**	**0.332 J**	**0.450 J**	**0.302 J**	**0.859 J**
General Chemistry											
Total Organic Carbon	mg/kg	**37,900**	**29,700**	**30,600**	**31,400**	**29,100**	**29,400**	**38,000**	**29,800**	**42,600**	**65,100**
Percent Moisture	%	**42.1**	**40.6**	**27.1**	**32.3**	**33.8**	**35.7**	**44.9**	**39.3**	**44.3**	**52.7**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-039_SD_0-2_CMP	T-039_SD_2-6_CMP	T-040_SD_0-2_CMP	T-040_SD_2-6_CMP	T-041_SD_0-2_CMP	T-041_SD_0-2_CMP_TRP_1	T-041_SD_0-2_CMP_TRP_2	T-041_SD_2-6_CMP
Location:		T-039	T-039	T-040	T-040	T-041	T-041	T-041	T-041
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/26/2021	7/26/2021	7/26/2021	7/26/2021
Lab Sample ID:		40230526018	40230526019	40230526020	40230526021	40230801014	40230801016	40230801018	40230801015
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0839 U	< 0.108 U	< 0.0924 U	< 0.0994 U	< 0.0884 U	< 0.0912 U	< 0.0976 U	< 0.0845 U
Aroclor 1221	mg/kg	< 0.0839 U	< 0.108 U	< 0.0924 U	< 0.0994 U	< 0.0884 U	< 0.0912 U	< 0.0976 U	< 0.0845 U
Aroclor 1232	mg/kg	< 0.0839 U	< 0.108 U	< 0.0924 U	< 0.0994 U	< 0.0884 U	< 0.0912 U	< 0.0976 U	< 0.0845 U
Aroclor 1242	mg/kg	**0.294 J**	**0.867 J**	**0.460**	**0.493**	**0.369**	**0.388**	**0.401**	**0.316**
Aroclor 1248	mg/kg	< 0.0839 U	< 0.108 U	< 0.0924 U	< 0.0994 U	< 0.0884 U	< 0.0912 U	< 0.0976 U	< 0.0845 U
Aroclor 1254	mg/kg	**0.0965**	**0.324**	**0.142**	**0.188**	**0.146**	**0.145**	**0.155**	**0.114**
Aroclor 1260	mg/kg	< 0.0839 U	< 0.108 U	< 0.0924 U	< 0.0994 U	< 0.0884 U	< 0.0912 U	< 0.0976 U	< 0.0845 U
Total Aroclor PCBs	mg/kg	**0.390 J**	**1.19 J**	**0.602**	**0.681**	**0.515**	**0.534**	**0.556**	**0.430**
General Chemistry									
Total Organic Carbon	mg/kg	**36,600**	**64,100**	**52,600**	**63,800 J**	**36,000**	**31,900**	**34,900**	**29,600**
Percent Moisture	%	**40.6**	**53.6**	**46.0**	**49.8**	**43.3**	**45.3**	**48.7**	**40.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-041_SD_2-6_CMP_TRP_1	T-041_SD_2-6_CMP_TRP_2	T-042_SD_0-2_CMP	T-042_SD_2-6_CMP	T-043_SD_0-2_CMP	T-043_SD_2-6_CMP	T-044_SD_0-2_CMP	T-044_SD_2-6_CMP	T-045_SD_0-2_CMP
Location:		T-041	T-041	T-042	T-042	T-043	T-043	T-044	T-044	T-045
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/26/2021	7/26/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021
Lab Sample ID:		40230801017	40230801019	40230801020	40230801021	40230801022	40230801023	40230801024	40230801025	40230801026
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0833 U	< 0.0891 U	< 0.0963 U	< 0.111 U	< 0.102 U	< 0.0936 U	< 0.0762 U	< 0.0779 U	< 0.0816 U
Aroclor 1221	mg/kg	< 0.0833 U	< 0.0891 U	< 0.0963 U	< 0.111 U	< 0.102 U	< 0.0936 U	< 0.0762 U	< 0.0779 U	< 0.0816 U
Aroclor 1232	mg/kg	< 0.0833 U	< 0.0891 U	< 0.0963 U	< 0.111 U	< 0.102 U	< 0.0936 U	< 0.0762 U	< 0.0779 U	< 0.0816 U
Aroclor 1242	mg/kg	**0.705**	**0.287**	**0.278 JN**	**0.366**	**0.354 J**	**0.455 J**	**0.216**	**0.233**	**0.276 J**
Aroclor 1248	mg/kg	< 0.0833 U	< 0.0891 U	< 0.0963 U	< 0.111 U	< 0.102 U	< 0.0936 U	< 0.0762 U	< 0.0779 U	< 0.0816 U
Aroclor 1254	mg/kg	**0.167**	**0.107**	**0.0981 J**	**0.137**	**0.123 J**	**0.168**	**0.0694 J**	**0.0837**	**0.108**
Aroclor 1260	mg/kg	< 0.0833 U	< 0.0891 U	< 0.0963 U	< 0.111 U	< 0.102 U	< 0.0936 U	< 0.0762 U	< 0.0779 U	< 0.0816 U
Total Aroclor PCBs	mg/kg	**0.872**	**0.394**	**0.376 J**	**0.503**	**0.477 J**	**0.623 J**	**0.285 J**	**0.317**	**0.384 J**
General Chemistry										
Total Organic Carbon	mg/kg	**27,100**	**37,500**	**38,700**	**48,000**	**42,600**	**29,700**	**14,900 J**	**14,500**	**18,700**
Percent Moisture	%	**40.1**	**44.0**	**48.1**	**54.8**	**51.1**	**46.7**	**34.2**	**35.7**	**38.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-045_SD_2-6_CMP	T-046_SD_0-2_CMP	T-046_SD_2-6_CMP	T-047_SD_0-2_CMP	T-047_SD_2-6_CMP	T-048_SD_0-2_CMP	T-048_SD_2-6_CMP	T-049_SD_0-2_CMP	T-049_SD_2-6_CMP	T-050_SD_0-2_CMP
Location:		T-045	T-046	T-046	T-047	T-047	T-048	T-048	T-049	T-049	T-050
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021
Lab Sample ID:		40230801001	40230801002	40230801003	40230801006	40230801007	40230801008	40230801009	40230801010	40230801011	40230801012
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0774 U	< 0.0797 U	< 0.0779 U	< 0.118 U	< 0.102 U	< 0.110 U	< 0.0894 U	< 0.107 U	< 0.0955 U	< 0.107 U
Aroclor 1221	mg/kg	< 0.0774 U	< 0.0797 U	< 0.0779 U	< 0.118 U	< 0.102 U	< 0.110 U	< 0.0894 U	< 0.107 U	< 0.0955 U	< 0.107 U
Aroclor 1232	mg/kg	< 0.0774 U	< 0.0797 U	< 0.0779 U	< 0.118 U	< 0.102 U	< 0.110 U	< 0.0894 U	< 0.107 U	< 0.0955 U	< 0.107 U
Aroclor 1242	mg/kg	**0.291**	**0.314**	**0.315**	**0.578**	**0.389**	**0.753**	**0.614 J**	**0.780 J**	**0.737 J**	**0.837 J**
Aroclor 1248	mg/kg	< 0.0774 U	< 0.0797 U	< 0.0779 U	< 0.118 U	< 0.102 U	< 0.110 U	< 0.0894 U	< 0.107 U	< 0.0955 U	< 0.107 U
Aroclor 1254	mg/kg	**0.100**	**0.0908**	**0.0976**	**0.227**	**0.167**	**0.332**	**0.294**	**0.387**	**0.385**	**0.380**
Aroclor 1260	mg/kg	< 0.0774 U	< 0.0797 U	< 0.0779 U	< 0.118 U	< 0.102 U	< 0.110 U	< 0.0894 U	< 0.107 U	< 0.0955 U	< 0.107 U
Total Aroclor PCBs	mg/kg	**0.391**	**0.405**	**0.413**	**0.805**	**0.556**	**1.09**	**0.908 J**	**1.17 J**	**1.12 J**	**1.22 J**
General Chemistry											
Total Organic Carbon	mg/kg	**19,700**	**21,600**	**26,300 J**	**71,500**	**34,900**	**47,700**	**36,400**	**47,400**	**45,600**	**42,000**
Percent Moisture	%	**35.3**	**37.1**	**35.9**	**57.5**	**51.0**	**54.4**	**44.0**	**53.6**	**47.8**	**53.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-050_SD_0-2_CMP_DUP	T-050_SD_2-6_CMP	T-050_SD_2-6_CMP_DUP	T-051_SD_0-2_CMP	T-051_SD_2-6_CMP	T-052_SD_0-2_CMP	T-052_SD_2-6_CMP	T-053_SD_0-2_CMP	T-053_SD_2-6_CMP
Location:		T-050	T-050	T-050	T-051	T-051	T-052	T-052	T-053	T-053
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/28/2021	7/28/2021
Lab Sample ID:		40230802001	40230801013	40230802002	40230802005	40230802006	40230802007	40230802008	40230802009	40230802010
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.108 U	< 0.102 U	< 0.0979 U	< 0.0982 U	< 0.0765 U	< 0.0871 U	< 0.0780 U	< 0.0941 U	< 0.0811 U
Aroclor 1221	mg/kg	< 0.108 U	< 0.102 U	< 0.0979 U	< 0.0982 U	< 0.0765 U	< 0.0871 U	< 0.0780 U	< 0.0941 U	< 0.0811 U
Aroclor 1232	mg/kg	< 0.108 U	< 0.102 U	< 0.0979 U	< 0.0982 U	< 0.0765 U	< 0.0871 U	< 0.0780 U	< 0.0941 U	< 0.0811 U
Aroclor 1242	mg/kg	**0.811 J**	**0.609**	**0.939**	**1.25**	**0.636**	**0.739**	**0.876**	**0.653 J**	**0.391 JN**
Aroclor 1248	mg/kg	< 0.108 U	< 0.102 U	< 0.0979 U	< 0.0982 U	< 0.0765 U	< 0.0871 U	< 0.0780 U	< 0.0941 U	< 0.0811 U
Aroclor 1254	mg/kg	**0.358**	**0.285**	**0.424**	**0.602**	**0.279**	**0.307**	**0.431**	**0.277**	**0.169**
Aroclor 1260	mg/kg	< 0.108 U	< 0.102 U	< 0.0979 U	< 0.0982 U	< 0.0765 U	< 0.0871 U	< 0.0780 U	< 0.0941 U	< 0.0811 U
Total Aroclor PCBs	mg/kg	**1.17 J**	**0.894**	**1.36**	**1.85**	**0.915**	**1.05**	**1.31**	**0.930 J**	**0.560 J**
General Chemistry										
Total Organic Carbon	mg/kg	**48,500**	**36,300**	**48,100**	**48,300**	**24,000**	**30,000**	**28,600**	**28,400**	**25,900**
Percent Moisture	%	**53.8**	**50.8**	**49.1**	**48.9**	**34.9**	**42.5**	**36.1**	**46.9**	**38.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-054_SD_0-2_CMP	T-054_SD_2-6_CMP	T-055_SD_0-2_CMP	T-055_SD_2-6_CMP	T-056_SD_0-2_CMP	T-056_SD_2-6_CMP	T-057_SD_0-2_CMP	T-057_SD_2-6_CMP	T-058_SD_0-2_CMP	T-058_SD_2-6_CMP
Location:		T-054	T-054	T-055	T-055	T-056	T-056	T-057	T-057	T-058	T-058
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021
Lab Sample ID:		40230802011	40230802012	40230802013	40230802014	40230802015	40230802016	40230802019	40230802020	40230802021	40230802022
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0849 U	< 0.0788 U	< 0.107 U	< 0.0824 U	< 0.0870 U	< 0.0752 U	< 0.0853 U	< 0.0761 U	< 0.0942 U	< 0.0812 U
Aroclor 1221	mg/kg	< 0.0849 U	< 0.0788 U	< 0.107 U	< 0.0824 U	< 0.0870 U	< 0.0752 U	< 0.0853 U	< 0.0761 U	< 0.0942 U	< 0.0812 U
Aroclor 1232	mg/kg	< 0.0849 U	< 0.0788 U	< 0.107 U	< 0.0824 U	< 0.0870 U	< 0.0752 U	< 0.0853 U	< 0.0761 U	< 0.0942 U	< 0.0812 U
Aroclor 1242	mg/kg	**0.588 J**	**0.927**	**0.773 JN**	**1.03**	**0.552 J**	**0.688**	**0.541**	**0.645**	**0.367 JN**	**0.216**
Aroclor 1248	mg/kg	< 0.0849 U	< 0.0788 U	< 0.107 U	< 0.0824 U	< 0.0870 U	< 0.0752 U	< 0.0853 U	< 0.0761 U	< 0.0942 U	< 0.0812 U
Aroclor 1254	mg/kg	**0.185**	**0.310**	**0.288**	**0.281**	**0.238**	**0.204**	**0.192**	**0.246**	**0.125**	**0.0695 J**
Aroclor 1260	mg/kg	< 0.0849 U	< 0.0788 U	< 0.107 U	< 0.0824 U	< 0.0870 U	< 0.0752 U	< 0.0853 U	< 0.0761 U	< 0.0942 U	< 0.0812 U
Total Aroclor PCBs	mg/kg	**0.773 J**	**1.24**	**1.06 J**	**1.31**	**0.790 J**	**0.892**	**0.733**	**0.891**	**0.491 J**	**0.285 J**
General Chemistry											
Total Organic Carbon	mg/kg	**20,100**	**25,400**	**36,000**	**27,300**	**23,800**	**24,300**	**28,300**	**25,300**	**50,200**	**25,500**
Percent Moisture	%	**41.1**	**36.7**	**53.3**	**39.3**	**42.7**	**33.5**	**41.5**	**34.5**	**47.0**	**38.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-059_SD_0-2_CMP	T-059_SD_2-6_CMP	T-060_SD_0-2_CMP	T-060_SD_2-6_CMP	T-061_SD_0-2_CMP	T-061_SD_0-2_CMP_TRP_1	T-061_SD_0-2_CMP_TRP_2	T-061_SD_2-6_CMP
Location:		T-059	T-059	T-060	T-060	T-061	T-061	T-061	T-061
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021	7/28/2021
Lab Sample ID:		40230802023	40230802024	40230802025	40230802026	40230946001	40230946005	40230946007	40230946002
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0790 U	< 0.0685 U	< 0.0849 U	< 0.0889 U	< 0.0745 UJ	< 0.0730 UJ	< 0.0774 UJ	< 0.0722 UJ
Aroclor 1221	mg/kg	< 0.0790 U	< 0.0685 U	< 0.0849 U	< 0.0889 U	< 0.0745 UJ	< 0.0730 UJ	< 0.0774 UJ	< 0.0722 UJ
Aroclor 1232	mg/kg	< 0.0790 U	< 0.0685 U	< 0.0849 U	< 0.0889 U	< 0.0745 UJ	< 0.0730 UJ	< 0.0774 UJ	< 0.0722 UJ
Aroclor 1242	mg/kg	**0.303 J**	**0.354 J**	**0.267 JN**	**0.256 J**	**0.527 J**	**0.721 J**	**0.405 J**	**0.461 J**
Aroclor 1248	mg/kg	< 0.0790 U	< 0.0685 U	< 0.0849 U	< 0.0889 U	< 0.0745 UJ	< 0.0730 UJ	< 0.0774 UJ	< 0.0722 UJ
Aroclor 1254	mg/kg	**0.111**	**0.125**	**0.0900 JN**	**0.0955**	**0.166 J**	**0.237 J**	**0.154 J**	**0.168 J**
Aroclor 1260	mg/kg	< 0.0790 U	< 0.0685 U	< 0.0849 U	< 0.0889 U	< 0.0745 UJ	< 0.0730 UJ	< 0.0774 UJ	< 0.0722 UJ
Total Aroclor PCBs	mg/kg	**0.414 J**	**0.479 J**	**0.357 J**	**0.351 J**	**0.693 J**	**0.958 J**	**0.560 J**	**0.629 J**
General Chemistry									
Total Organic Carbon	mg/kg	**28,300**	**13,200**	**18,500**	**25,000**	**21,600 J**	**19,400 J**	**16,700 J**	**11,200 J**
Percent Moisture	%	**36.5**	**26.9**	**41.1**	**43.8**	**32.9**	**31.5**	**35.4**	**30.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-061_SD_2-6_CMP_TRP_1	T-062_SD_0-2_CMP	T-062_SD_2-6_CMP	T-063_SD_0-2_CMP	T-063_SD_2-6_CMP	T-064_SD_0-2_CMP	T-064_SD_2-6_CMP	T-065_SD_0-2_CMP	T-065_SD_2-6_CMP
Location:		T-061	T-062	T-062	T-063	T-063	T-064	T-064	T-065	T-065
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/28/2021	7/28/2021	7/28/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021
Lab Sample ID:		40230946006	40230946008	40230946009	40230946010	40230946011	40230946012	40230946013	40230946014	40230946015
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0661 UJ	< 0.103 UJ	< 0.0874 UJ	< 0.0787 UJ	< 0.0764 UJ	< 0.0805 UJ	< 0.0806 UJ	< 0.0857 UJ	< 0.0808 UJ
Aroclor 1221	mg/kg	< 0.0661 UJ	< 0.103 UJ	< 0.0874 UJ	< 0.0787 UJ	< 0.0764 UJ	< 0.0805 UJ	< 0.0806 UJ	< 0.0857 UJ	< 0.0808 UJ
Aroclor 1232	mg/kg	< 0.0661 UJ	< 0.103 UJ	< 0.0874 UJ	< 0.0787 UJ	< 0.0764 UJ	< 0.0805 UJ	< 0.0806 UJ	< 0.0857 UJ	< 0.0808 UJ
Aroclor 1242	mg/kg	**0.621 J**	**0.656 J**	**0.498 JN**	**0.248 J**	**0.283 J**	**0.411 J**	**0.535 J**	**0.250 J**	**0.232 J**
Aroclor 1248	mg/kg	< 0.0661 UJ	< 0.103 UJ	< 0.0874 UJ	< 0.0787 UJ	< 0.0764 UJ	< 0.0805 UJ	< 0.0806 UJ	< 0.0857 UJ	< 0.0808 UJ
Aroclor 1254	mg/kg	**0.236 J**	**0.272 J**	**0.199 J**	**0.0859 J**	**0.0929 J**	**0.136 J**	**0.183 J**	**0.0953 J**	**0.0892 J**
Aroclor 1260	mg/kg	< 0.0661 UJ	< 0.103 UJ	< 0.0874 UJ	< 0.0787 UJ	< 0.0764 UJ	< 0.0805 UJ	< 0.0806 UJ	< 0.0857 UJ	< 0.0808 UJ
Total Aroclor PCBs	mg/kg	**0.857 J**	**0.928 J**	**0.697 J**	**0.334 J**	**0.376 J**	**0.548 J**	**0.718 J**	**0.345 J**	**0.321 J**
General Chemistry										
Total Organic Carbon	mg/kg	**9,720 J**	**36,900 J**	**30,000 J**	**23,800 J**	**17,100 J**	**19,100 J**	**18,700 J**	**32,700 J**	**24,100 J**
Percent Moisture	%	**24.4**	**51.4**	**42.6**	**36.6**	**34.5**	**38.1**	**38.1**	**41.7**	**38.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-066_SD_0-2_CMP	T-066_SD_2-6_CMP	T-067_SD_0-2_CMP	T-067_SD_2-6_CMP	T-068_SD_0-2_CMP	T-068_SD_2-6_CMP	T-069_SD_0-2_CMP	T-069_SD_2-6_CMP	T-070_SD_0-2_CMP
Location:		T-066	T-066	T-067	T-067	T-068	T-068	T-069	T-069	T-070
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021
Lab Sample ID:		40230946018	40230946019	40230946020	40230946021	40230946022	40230946023	40230946024	40230946025	40230946026
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0851 UJ	< 0.0807 UJ	< 0.0924 UJ	< 0.0782 UJ	< 0.108 UJ	< 0.0842 UJ	< 0.0967 UJ	< 0.239 UJ	< 0.0968 U
Aroclor 1221	mg/kg	< 0.0851 UJ	< 0.0807 UJ	< 0.0924 UJ	< 0.0782 UJ	< 0.108 UJ	< 0.0842 UJ	< 0.0967 UJ	< 0.239 UJ	< 0.0968 U
Aroclor 1232	mg/kg	< 0.0851 UJ	< 0.0807 UJ	< 0.0924 UJ	< 0.0782 UJ	< 0.108 UJ	< 0.0842 UJ	< 0.0967 UJ	< 0.239 UJ	< 0.0968 U
Aroclor 1242	mg/kg	**0.411 JN**	**0.281 J**	**0.332 J**	**0.205 J**	**0.431 JN**	**0.263 J**	**0.813 J**	**1.54 JN**	**0.434**
Aroclor 1248	mg/kg	< 0.0851 UJ	< 0.0807 UJ	< 0.0924 UJ	< 0.0782 UJ	< 0.108 UJ	< 0.0842 UJ	< 0.0967 UJ	< 0.239 UJ	< 0.0968 U
Aroclor 1254	mg/kg	**0.200 J**	**0.113 J**	**0.126 J**	**0.0725 J**	**0.200 J**	**0.0944 J**	**0.409 J**	**0.971 J**	**0.186 J**
Aroclor 1260	mg/kg	< 0.0851 UJ	< 0.0807 UJ	< 0.0924 UJ	< 0.0782 UJ	< 0.108 UJ	< 0.0842 UJ	< 0.0967 UJ	< 0.239 UJ	< 0.0968 U
Total Aroclor PCBs	mg/kg	**0.612 J**	**0.393 J**	**0.457 J**	**0.278 J**	**0.631 J**	**0.358 J**	**1.22 J**	**2.51 J**	**0.620 J**
General Chemistry										
Total Organic Carbon	mg/kg	**28,000 J**	**27,700 J**	**26,500 J**	**18,300 J**	**45,500 J**	**28,900 J**	**31,200 J**	**21,700 J**	**38,000**
Percent Moisture	%	**41.3**	**38.1**	**45.7**	**36.1**	**53.6**	**40.6**	**48.4**	**37.0**	**48.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-070_SD_0-2_CMP_DUP	T-070_SD_2-6_CMP	T-070_SD_2-6_CMP_DUP	T-071_SD_0-2_CMP	T-071_SD_2-6_CMP	T-072_SD_0-2_CMP	T-072_SD_2-6_CMP	T-073_SD_0-2_CMP	T-073_SD_2-6_CMP
Location:		T-070	T-070	T-070	T-071	T-071	T-072	T-072	T-073	T-073
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021	7/29/2021
Lab Sample ID:		40230946028	40230946027	40230946029	40230946032	40230946033	40230946034	40230946035	40230946036	40230946037
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0964 U	< 0.0946 U	< 0.0905 U	< 0.0985 U	< 0.107 U	< 0.0966 U	< 0.0941 U	< 0.0913 U	< 0.0795 U
Aroclor 1221	mg/kg	< 0.0964 U	< 0.0946 U	< 0.0905 U	< 0.0985 U	< 0.107 U	< 0.0966 U	< 0.0941 U	< 0.0913 U	< 0.0795 U
Aroclor 1232	mg/kg	< 0.0964 U	< 0.0946 U	< 0.0905 U	< 0.0985 U	< 0.107 U	< 0.0966 U	< 0.0941 U	< 0.0913 U	< 0.0795 U
Aroclor 1242	mg/kg	**0.399**	**0.531**	**0.444 J**	**0.436 JN**	**0.536**	**0.589**	**0.646**	**0.406**	**0.320 J**
Aroclor 1248	mg/kg	< 0.0964 U	< 0.0946 U	< 0.0905 U	< 0.0985 U	< 0.107 U	< 0.0966 U	< 0.0941 U	< 0.0913 U	< 0.0795 U
Aroclor 1254	mg/kg	**0.168 J**	**0.217**	**0.199**	**0.181**	**0.186**	**0.239**	**0.266**	**0.161**	**0.135**
Aroclor 1260	mg/kg	< 0.0964 U	< 0.0946 U	< 0.0905 U	< 0.0985 U	< 0.107 U	< 0.0966 U	< 0.0941 U	< 0.0913 U	< 0.0795 U
Total Aroclor PCBs	mg/kg	**0.567 J**	**0.749**	**0.643 J**	**0.616 J**	**0.722**	**0.827**	**0.912**	**0.567**	**0.454 J**
General Chemistry										
Total Organic Carbon	mg/kg	**38,900**	**31,300**	**29,600**	**47,700**	**52,900**	**32,000**	**30,500**	**24,700**	**15,300**
Percent Moisture	%	**48.0**	**47.3**	**44.8**	**49.3**	**52.9**	**48.4**	**47.0**	**45.2**	**37.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-074_SD_0-2_CMP	T-074_SD_2-6_CMP	T-075_SD_0-2_CMP	T-075_SD_2-6_CMP	T-076_SD_0-2_CMP	T-076_SD_2-6_CMP	T-077_SD_0-2_CMP	T-077_SD_2-6_CMP	T-078_SD_0-2_CMP	T-078_SD_2-6_CMP
Location:		T-074	T-074	T-075	T-075	T-076	T-076	T-077	T-077	T-078	T-078
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021
Lab Sample ID:		40230971001	40230971002	40230971003	40230971004	40230971007	40230971008	40230971009	40230971010	40230971011	40230971012
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.105 U	< 0.0786 U	< 0.0895 U	< 0.0788 U	< 0.0808 U	< 0.0941 U	< 0.0954 U	< 0.0889 U	< 0.0778 U	< 0.0751 U
Aroclor 1221	mg/kg	< 0.105 U	< 0.0786 U	< 0.0895 U	< 0.0788 U	< 0.0808 U	< 0.0941 U	< 0.0954 U	< 0.0889 U	< 0.0778 U	< 0.0751 U
Aroclor 1232	mg/kg	< 0.105 U	< 0.0786 U	< 0.0895 U	< 0.0788 U	< 0.0808 U	< 0.0941 U	< 0.0954 U	< 0.0889 U	< 0.0778 U	< 0.0751 U
Aroclor 1242	mg/kg	**0.642**	**0.885 JN**	**0.267 JN**	**0.410 JN**	**0.365 J**	**0.720**	**0.487**	**0.538**	**0.221 J**	**0.369 JN**
Aroclor 1248	mg/kg	< 0.105 U	< 0.0786 U	< 0.0895 U	< 0.0788 U	< 0.0808 U	< 0.0941 U	< 0.0954 U	< 0.0889 U	< 0.0778 U	< 0.0751 U
Aroclor 1254	mg/kg	**0.271**	**0.356 J**	**0.118**	**0.162**	**0.142**	**0.223**	**0.193**	**0.218**	**0.0713 J**	**0.119 J**
Aroclor 1260	mg/kg	< 0.105 U	< 0.0786 U	< 0.0895 U	< 0.0788 U	< 0.0808 U	< 0.0941 U	< 0.0954 U	< 0.0889 U	< 0.0778 U	< 0.0751 U
Total Aroclor PCBs	mg/kg	**0.914**	**1.24 J**	**0.385 J**	**0.572 J**	**0.507 J**	**0.942**	**0.680**	**0.757**	**0.292 J**	**0.488 J**
General Chemistry											
Total Organic Carbon	mg/kg	**34,900**	**21,500**	**24,900**	**30,200**	**30,600**	**36,000**	**30,300**	**30,000**	**15,900**	**17,200**
Percent Moisture	%	**52.3**	**36.6**	**44.1**	**36.8**	**38.0**	**47.0**	**47.7**	**43.7**	**35.6**	**33.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-079_SD_0-2_CMP	T-079_SD_2-6_CMP	T-080_SD_0-2_CMP	T-080_SD_2-6_CMP	T-081_SD_0-2_CMP	T-081_SD_0-2_CMP_TRP_1	T-081_SD_0-2_CMP_TRP_2	T-081_SD_2-6_CMP
Location:		T-079	T-079	T-080	T-080	T-081	T-081	T-081	T-081
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/30/2021	7/31/2021	7/30/2021
Lab Sample ID:		40230971013	40230971014	40230971015	40230971016	40230971019	40230971021	40230971023	40230971020
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0898 U	< 0.0831 U	< 0.0883 U	< 0.0930 U	< 0.0886 U	< 0.0810 U	< 0.0783 U	< 0.0899 U
Aroclor 1221	mg/kg	< 0.0898 U	< 0.0831 U	< 0.0883 U	< 0.0930 U	< 0.0886 U	< 0.0810 U	< 0.0783 U	< 0.0899 U
Aroclor 1232	mg/kg	< 0.0898 U	< 0.0831 U	< 0.0883 U	< 0.0930 U	< 0.0886 U	< 0.0810 U	< 0.0783 U	< 0.0899 U
Aroclor 1242	mg/kg	**0.448 JN**	**0.395**	**0.288**	**0.617 J**	**0.529**	**0.503 J**	**0.437 J**	**0.755**
Aroclor 1248	mg/kg	< 0.0898 U	< 0.0831 U	< 0.0883 U	< 0.0930 U	< 0.0886 U	< 0.0810 U	< 0.0783 U	< 0.0899 U
Aroclor 1254	mg/kg	**0.165**	**0.137**	**0.113**	**0.236**	**0.178**	**0.189**	**0.176**	**0.269**
Aroclor 1260	mg/kg	< 0.0898 U	< 0.0831 U	< 0.0883 U	< 0.0930 U	< 0.0886 U	< 0.0810 U	< 0.0783 U	< 0.0899 U
Total Aroclor PCBs	mg/kg	**0.612 J**	**0.532**	**0.400**	**0.853 J**	**0.707**	**0.692 J**	**0.613 J**	**1.02**
General Chemistry									
Total Organic Carbon	mg/kg	**31,400**	**26,100**	**25,400 J**	**33,300 J**	**31,400**	**20,700**	**23,100**	**31,600**
Percent Moisture	%	**44.1**	**39.9**	**43.5**	**46.2**	**43.5**	**38.5**	**36.2**	**44.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-081_SD_2-6_CMP_TRP_1	T-081_SD_2-6_CMP_TRP_2	T-082_SD_0-2_CMP	T-082_SD_2-6_CMP	T-083_SD_0-2_CMP	T-083_SD_2-6_CMP	T-084_SD_0-2_CMP	T-084_SD_2-6_CMP	T-085_SD_0-2_CMP
Location:		T-081	T-081	T-082	T-082	T-083	T-083	T-084	T-084	T-085
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/30/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021
Lab Sample ID:		40230971022	40230971024	40230971025	40230971026	40230969001	40230969002	40230969003	40230969004	40230969005
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0822 U	< 0.0820 U	< 0.0724 U	< 0.0738 U	< 0.0770 U	< 0.0813 U	< 0.0701 U	< 0.0719 U	< 0.0735 U
Aroclor 1221	mg/kg	< 0.0822 U	< 0.0820 U	< 0.0724 U	< 0.0738 U	< 0.0770 U	< 0.0813 U	< 0.0701 U	< 0.0719 U	< 0.0735 U
Aroclor 1232	mg/kg	< 0.0822 U	< 0.0820 U	< 0.0724 U	< 0.0738 U	< 0.0770 U	< 0.0813 U	< 0.0701 U	< 0.0719 U	< 0.0735 U
Aroclor 1242	mg/kg	**0.505 J**	**0.433**	**0.336 JN**	**0.297**	**0.348**	**0.263 J**	**0.439 J**	**0.494 J**	**0.288 JN**
Aroclor 1248	mg/kg	< 0.0822 U	< 0.0820 U	< 0.0724 U	< 0.0738 U	< 0.0770 U	< 0.0813 U	< 0.0701 U	< 0.0719 U	< 0.0735 U
Aroclor 1254	mg/kg	**0.196**	**0.163**	**0.190 J**	**0.102**	**0.0810**	**0.0875**	**0.111**	**0.133**	**0.0999 J**
Aroclor 1260	mg/kg	< 0.0822 U	< 0.0820 U	< 0.0724 U	< 0.0738 U	< 0.0770 U	< 0.0813 U	< 0.0701 U	< 0.0719 U	< 0.0735 U
Total Aroclor PCBs	mg/kg	**0.702 J**	**0.596**	**0.525 J**	**0.399**	**0.429**	**0.350 J**	**0.551 J**	**0.627 J**	**0.388 J**
General Chemistry										
Total Organic Carbon	mg/kg	**29,600**	**34,900 J**	**13,600**	**18,600**	**15,000**	**30,800**	**13,800**	**16,900**	**17,500**
Percent Moisture	%	**39.2**	**39.1**	**31.1**	**32.2**	**35.0**	**38.6**	**28.8**	**30.6**	**31.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-085_SD_2-6_CMP	T-086_SD_0-2_CMP	T-086_SD_2-6_CMP	T-087_SD_0-2_CMP	T-087_SD_2-6_CMP	T-088_SD_0-2_CMP	T-088_SD_2-6_CMP	T-089_SD_0-2_CMP	T-089_SD_2-6_CMP	T-090_SD_0-2_CMP
Location:		T-085	T-086	T-086	T-087	T-087	T-088	T-088	T-089	T-089	T-090
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021	7/31/2021
Lab Sample ID:		40230969006	40230969009	40230969010	40230969011	40230969012	40230969013	40230969014	40230969015	40230969016	40230969017
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0698 U	< 0.0720 U	< 0.0710 U	< 0.0707 U	< 0.0866 U	< 0.0784 U	< 0.0773 U	< 0.0637 U	< 0.0661 U	< 0.0649 U
Aroclor 1221	mg/kg	< 0.0698 U	< 0.0720 U	< 0.0710 U	< 0.0707 U	< 0.0866 U	< 0.0784 U	< 0.0773 U	< 0.0637 U	< 0.0661 U	< 0.0649 U
Aroclor 1232	mg/kg	< 0.0698 U	< 0.0720 U	< 0.0710 U	< 0.0707 U	< 0.0866 U	< 0.0784 U	< 0.0773 U	< 0.0637 U	< 0.0661 U	< 0.0649 U
Aroclor 1242	mg/kg	**0.439 JN**	**0.243 J**	**0.362 J**	**0.183 J**	**0.375 JN**	**0.299 J**	**0.482**	**0.226**	**0.305**	**0.292**
Aroclor 1248	mg/kg	< 0.0698 U	< 0.0720 U	< 0.0710 U	< 0.0707 U	< 0.0866 U	< 0.0784 U	< 0.0773 U	< 0.0637 U	< 0.0661 U	< 0.0649 U
Aroclor 1254	mg/kg	**0.137 J**	< 0.0720 U	**0.0885 J**	**0.0662 J**	**0.133**	**0.0937**	**0.154**	**0.0511 J**	**0.0740**	**0.0574 J**
Aroclor 1260	mg/kg	< 0.0698 U	< 0.0720 U	< 0.0710 U	< 0.0707 U	< 0.0866 U	< 0.0784 U	< 0.0773 U	< 0.0637 U	< 0.0661 U	< 0.0649 U
Total Aroclor PCBs	mg/kg	**0.576 J**	**0.243 J**	**0.451 J**	**0.249 J**	**0.507 J**	**0.393 J**	**0.636**	**0.277 J**	**0.379**	**0.350 J**
General Chemistry											
Total Organic Carbon	mg/kg	**12,100**	**11,700**	**11,600**	**12,500**	**22,500**	**16,000**	**16,300**	**4,720**	**7,420**	**11,800**
Percent Moisture	%	**28.3**	**30.5**	**29.6**	**29.4**	**42.2**	**36.0**	**35.4**	**21.5**	**24.2**	**22.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-090_SD_0-2_CMP_DUP	T-090_SD_2-6_CMP	T-090_SD_2-6_CMP_DUP	T-091_SD_0-2_CMP	T-091_SD_2-6_CMP	T-092_SD_0-2_CMP	T-092_SD_2-6_CMP	T-093_SD_0-2_CMP	T-093_SD_2-6_CMP
Location:		T-090	T-090	T-090	T-091	T-091	T-092	T-092	T-093	T-093
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		7/31/2021	7/31/2021	7/31/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021
Lab Sample ID:		40230969019	40230969018	40230969020	40230969023	40230969024	40230969025	40230969026	40231009001	40231009002
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0637 U	< 0.0615 U	< 0.0618 U	< 0.0636 U	< 0.0647 U	< 0.0643 U	< 0.0665 U	< 0.0766 U	< 0.0703 U
Aroclor 1221	mg/kg	< 0.0637 U	< 0.0615 U	< 0.0618 U	< 0.0636 U	< 0.0647 U	< 0.0643 U	< 0.0665 U	< 0.0766 U	< 0.0703 U
Aroclor 1232	mg/kg	< 0.0637 U	< 0.0615 U	< 0.0618 U	< 0.0636 U	< 0.0647 U	< 0.0643 U	< 0.0665 U	< 0.0766 U	< 0.0703 U
Aroclor 1242	mg/kg	**0.246**	**0.245**	**0.263**	**0.258**	**0.315**	**0.343**	**0.314**	**0.386 J**	**0.475**
Aroclor 1248	mg/kg	< 0.0637 U	< 0.0615 U	< 0.0618 U	< 0.0636 U	< 0.0647 U	< 0.0643 U	< 0.0665 U	< 0.0766 U	< 0.0703 U
Aroclor 1254	mg/kg	**0.0562 J**	**0.0439 J**	**0.0492 J**	**0.0556 J**	**0.0730**	**0.0702**	**0.0714**	**0.121**	**0.123**
Aroclor 1260	mg/kg	< 0.0637 U	< 0.0615 U	< 0.0618 U	< 0.0636 U	< 0.0647 U	< 0.0643 U	< 0.0665 U	< 0.0766 U	< 0.0703 U
Total Aroclor PCBs	mg/kg	**0.303 J**	**0.289 J**	**0.312 J**	**0.313 J**	**0.388**	**0.413**	**0.385**	**0.507 J**	**0.598**
General Chemistry										
Total Organic Carbon	mg/kg	**6,780**	**5,640 J**	**3,150 J**	**9,160**	**7,690**	**5,800**	**7,780**	**15,400**	**17,100**
Percent Moisture	%	**21.6**	**19.0**	**19.3**	**21.4**	**22.9**	**22.1**	**25.0**	**34.6**	**28.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-094_SD_0-2_CMP	T-094_SD_2-6_CMP	T-095_SD_0-2_CMP	T-095_SD_2-6_CMP	T-096_SD_0-2_CMP	T-096_SD_2-6_CMP	T-097_SD_0-2_CMP	T-097_SD_2-6_CMP	T-098_SD_0-2_CMP	T-098_SD_2-6_CMP
Location:		T-094	T-094	T-095	T-095	T-096	T-096	T-097	T-097	T-098	T-098
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021
Lab Sample ID:		40231009003	40231009004	40231009005	40231009006	40231009009	40231009010	40231009011	40231009012	40231009013	40231009014
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0780 U	< 0.0782 U	< 0.0849 U	< 0.0848 U	< 0.0909 U	< 0.0840 U	< 0.0772 U	< 0.0779 U	< 0.0713 U	< 0.0706 U
Aroclor 1221	mg/kg	< 0.0780 U	< 0.0782 U	< 0.0849 U	< 0.0848 U	< 0.0909 U	< 0.0840 U	< 0.0772 U	< 0.0779 U	< 0.0713 U	< 0.0706 U
Aroclor 1232	mg/kg	< 0.0780 U	< 0.0782 U	< 0.0849 U	< 0.0848 U	< 0.0909 U	< 0.0840 U	< 0.0772 U	< 0.0779 U	< 0.0713 U	< 0.0706 U
Aroclor 1242	mg/kg	**0.212 J**	**0.201**	**0.263**	**0.342**	**0.336**	**0.234**	**0.205**	**0.397**	**0.238**	**0.416**
Aroclor 1248	mg/kg	< 0.0780 U	< 0.0782 U	< 0.0849 U	< 0.0848 U	< 0.0909 U	< 0.0840 U	< 0.0772 U	< 0.0779 U	< 0.0713 U	< 0.0706 U
Aroclor 1254	mg/kg	**0.0743 J**	**0.0564 J**	**0.0756 J**	**0.0980 J**	**0.133 J**	**0.0719 J**	**0.0621 J**	**0.122**	**0.0781**	**0.147**
Aroclor 1260	mg/kg	< 0.0780 U	< 0.0782 U	< 0.0849 U	< 0.0848 U	< 0.0909 U	< 0.0840 U	< 0.0772 U	< 0.0779 U	< 0.0713 U	< 0.0706 U
Total Aroclor PCBs	mg/kg	**0.287 J**	**0.257 J**	**0.338 J**	**0.440 J**	**0.468 J**	**0.306 J**	**0.267 J**	**0.519**	**0.316**	**0.563**
General Chemistry											
Total Organic Carbon	mg/kg	**19,000**	**21,500**	**47,000**	**27,200**	**32,400**	**29,700**	**19,300**	**22,100**	**12,400**	**17,100**
Percent Moisture	%	**36.1**	**36.1**	**41.3**	**41.0**	**44.9**	**40.5**	**35.2**	**35.8**	**29.7**	**29.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-099_SD_0-2_CMP	T-099_SD_2-6_CMP	T-100_SD_0-2_CMP	T-100_SD_2-6_CMP	T-101_SD_0-2_CMP	T-101_SD_0-2_CMP_TRP_1	T-101_SD_0-2_CMP_TRP_2	T-101_SD_2-6_CMP
Location:		T-099	T-099	T-100	T-100	T-101	T-101	T-101	T-101
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021
Lab Sample ID:		40231009015	40231009016	40231009017	40231009018	40231009021	40231009023	40231009025	40231009022
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0817 U	< 0.0707 U	< 0.0719 U	< 0.0697 U	< 0.0749 U	< 0.0805 U	< 0.0819 U	< 0.0692 U
Aroclor 1221	mg/kg	< 0.0817 U	< 0.0707 U	< 0.0719 U	< 0.0697 U	< 0.0749 U	< 0.0805 U	< 0.0819 U	< 0.0692 U
Aroclor 1232	mg/kg	< 0.0817 U	< 0.0707 U	< 0.0719 U	< 0.0697 U	< 0.0749 U	< 0.0805 U	< 0.0819 U	< 0.0692 U
Aroclor 1242	mg/kg	**0.215 J**	**0.179**	**0.357 J**	**0.310**	**0.238**	**0.398**	**0.331**	**0.399**
Aroclor 1248	mg/kg	< 0.0817 U	< 0.0707 U	< 0.0719 U	< 0.0697 U	< 0.0749 U	< 0.0805 U	< 0.0819 U	< 0.0692 U
Aroclor 1254	mg/kg	**0.0813 J**	**0.0563 J**	**0.0987**	**0.0846**	**0.0877**	**0.154**	**0.108**	**0.101**
Aroclor 1260	mg/kg	< 0.0817 U	< 0.0707 U	< 0.0719 U	< 0.0697 U	< 0.0749 U	< 0.0805 U	< 0.0819 U	< 0.0692 U
Total Aroclor PCBs	mg/kg	**0.296 J**	**0.235 J**	**0.456 J**	**0.394**	**0.326**	**0.552**	**0.440**	**0.500**
General Chemistry									
Total Organic Carbon	mg/kg	**20,300**	**21,800**	**17,400 J**	**13,200 J**	**17,900**	**23,900**	**20,200**	**14,900**
Percent Moisture	%	**39.0**	**29.5**	**30.3**	**28.2**	**33.5**	**38.0**	**38.7**	**27.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-101_SD_2-6_CMP_TRP_1	T-101_SD_2-6_CMP_TRP_2	T-102_SD_0-2_CMP	T-102_SD_2-6_CMP	T-103_SD_0-2_CMP	T-103_SD_2-6_CMP	T-104_SD_0-2_CMP	T-104_SD_2-6_CMP	T-105_SD_0-2_CMP
Location:		T-101	T-101	T-102	T-102	T-103	T-103	T-104	T-104	T-105
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021	8/1/2021
Lab Sample ID:		40231009024	40231009026	40230985001	40230985002	40230985003	40230985004	40230985005	40230985006	40230985007
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0664 U	< 0.0691 U	< 0.170 U	< 0.227 U	< 0.0764 U	< 0.0700 U	< 0.0686 U	< 0.0732 U	< 0.0739 U
Aroclor 1221	mg/kg	< 0.0664 U	< 0.0691 U	< 0.170 U	< 0.227 U	< 0.0764 U	< 0.0700 U	< 0.0686 U	< 0.0732 U	< 0.0739 U
Aroclor 1232	mg/kg	< 0.0664 U	< 0.0691 U	< 0.170 U	< 0.227 U	< 0.0764 U	< 0.0700 U	< 0.0686 U	< 0.0732 U	< 0.0739 U
Aroclor 1242	mg/kg	**0.332**	**0.427**	**2.43**	**3.07**	**0.535**	**0.769**	**0.314 J**	**0.495 J**	**0.355 J**
Aroclor 1248	mg/kg	< 0.0664 U	< 0.0691 U	< 0.170 U	< 0.227 U	< 0.0764 U	< 0.0700 U	< 0.0686 U	< 0.0732 U	< 0.0739 U
Aroclor 1254	mg/kg	**0.0835**	**0.101**	**0.636**	**0.291**	**0.184**	**0.256**	**0.0861**	**0.154**	**0.116**
Aroclor 1260	mg/kg	< 0.0664 U	< 0.0691 U	< 0.170 U	< 0.227 U	< 0.0764 U	< 0.0700 U	< 0.0686 U	< 0.0732 U	< 0.0739 U
Total Aroclor PCBs	mg/kg	**0.415**	**0.527**	**3.07**	**3.36**	**0.719**	**1.02**	**0.400 J**	**0.649 J**	**0.470 J**
General Chemistry										
Total Organic Carbon	mg/kg	**12,400**	**13,600**	**26,500**	**27,400 J**	**22,400**	**14,800**	**9,980**	**16,200**	**13,500**
Percent Moisture	%	**24.7**	**27.4**	**41.4**	**34.1**	**34.7**	**28.6**	**27.3**	**31.6**	**32.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-105_SD_2-6_CMP	T-106_SD_0-2_CMP	T-106_SD_2-6_CMP	T-107_SD_0-2_CMP	T-107_SD_2-6_CMP	T-108_SD_0-2_CMP	T-108_SD_2-6_CMP	T-109_SD_0-2_CMP	T-109_SD_2-6_CMP	T-110_SD_0-2_CMP
Location:		T-105	T-106	T-106	T-107	T-107	T-108	T-108	T-109	T-109	T-110
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/1/2021	8/1/2021	8/1/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021
Lab Sample ID:		40230985008	40230985011	40230985012	40230985013	40230985014	40230985015	40230985016	40230985017	40230985018	40230985019
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0783 U	< 0.0727 U	< 0.0721 U	< 0.0694 U	< 0.0676 U	< 0.0773 U	< 0.0704 U	< 0.0673 U	< 0.0722 U	< 0.0676 U
Aroclor 1221	mg/kg	< 0.0783 U	< 0.0727 U	< 0.0721 U	< 0.0694 U	< 0.0676 U	< 0.0773 U	< 0.0704 U	< 0.0673 U	< 0.0722 U	< 0.0676 U
Aroclor 1232	mg/kg	< 0.0783 U	< 0.0727 U	< 0.0721 U	< 0.0694 U	< 0.0676 U	< 0.0773 U	< 0.0704 U	< 0.0673 U	< 0.0722 U	< 0.0676 U
Aroclor 1242	mg/kg	**0.723 JN**	**0.336 J**	**0.650 JN**	**0.196**	**0.301**	**0.330 J**	**0.328**	**0.184 J**	**0.182 JN**	**0.188 J**
Aroclor 1248	mg/kg	< 0.0783 U	< 0.0727 U	< 0.0721 U	< 0.0694 U	< 0.0676 U	< 0.0773 U	< 0.0704 U	< 0.0673 U	< 0.0722 U	< 0.0676 U
Aroclor 1254	mg/kg	**0.253**	**0.120 J**	**0.183**	**0.0562 J**	**0.0798**	**0.102 JN**	**0.117**	**0.0564 J**	**0.0588 J**	**0.0623 J**
Aroclor 1260	mg/kg	< 0.0783 U	< 0.0727 U	< 0.0721 U	< 0.0694 U	< 0.0676 U	< 0.0773 U	< 0.0704 U	< 0.0673 U	< 0.0722 U	< 0.0676 U
Total Aroclor PCBs	mg/kg	**0.976 J**	**0.456 J**	**0.832 J**	**0.252 J**	**0.380**	**0.432 J**	**0.445**	**0.240 J**	**0.241 J**	**0.250 J**
General Chemistry											
Total Organic Carbon	mg/kg	**24,700**	**16,700**	**16,100**	**13,300**	**12,800**	**14,000**	**13,100**	**6,020**	**16,000**	**11,600**
Percent Moisture	%	**36.1**	**31.4**	**31.0**	**28.1**	**25.9**	**35.4**	**28.9**	**25.6**	**31.0**	**26.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-110_SD_0-2_CMP_DUP	T-110_SD_2-6_CMP	T-110_SD_2-6_CMP_DUP	T-111_SD_0-2_CMP	T-111_SD_2-6_CMP	T-112_SD_0-2_CMP	T-112_SD_2-6_CMP	T-113_SD_0-2_CMP	T-113_SD_2-6_CMP
Location:		T-110	T-110	T-110	T-111	T-111	T-112	T-112	T-113	T-113
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021
Lab Sample ID:		40230985021	40230985020	40230985022	40230985025	40230985026	40230967001	40230967002	40230967003	40230967004
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0705 U	< 0.0639 U	< 0.0666 U	< 0.0704 U	< 0.0646 U	< 0.0702 U	< 0.0655 U	< 0.0679 U	< 0.0712 U
Aroclor 1221	mg/kg	< 0.0705 U	< 0.0639 U	< 0.0666 U	< 0.0704 U	< 0.0646 U	< 0.0702 U	< 0.0655 U	< 0.0679 U	< 0.0712 U
Aroclor 1232	mg/kg	< 0.0705 U	< 0.0639 U	< 0.0666 U	< 0.0704 U	< 0.0646 U	< 0.0702 U	< 0.0655 U	< 0.0679 U	< 0.0712 U
Aroclor 1242	mg/kg	**0.211 JN**	**0.308**	**0.415**	**0.453**	**0.785**	**0.346 J**	**0.303 JN**	**0.269 J**	**0.286 J**
Aroclor 1248	mg/kg	< 0.0705 U	< 0.0639 U	< 0.0666 U	< 0.0704 U	< 0.0646 U	< 0.0702 U	< 0.0655 U	< 0.0679 U	< 0.0712 U
Aroclor 1254	mg/kg	**0.0706**	**0.0697**	**0.0827**	**0.120**	**0.203**	**0.0890**	**0.0992**	**0.0739**	**0.0842**
Aroclor 1260	mg/kg	< 0.0705 U	< 0.0639 U	< 0.0666 U	< 0.0704 U	< 0.0646 U	< 0.0702 U	< 0.0655 U	< 0.0679 U	< 0.0712 U
Total Aroclor PCBs	mg/kg	**0.281 J**	**0.378**	**0.498**	**0.573**	**0.988**	**0.435 J**	**0.402 J**	**0.343 J**	**0.371 J**
General Chemistry										
Total Organic Carbon	mg/kg	**12,300**	**5,750**	**6,610**	**17,800**	**8,470**	**6,260**	**9,550**	**7,260**	**15,600**
Percent Moisture	%	**29.0**	**21.7**	**24.8**	**29.0**	**22.7**	**28.9**	**23.6**	**26.4**	**30.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-114_SD_0-2_CMP	T-114_SD_2-6_CMP	T-115_SD_0-2_CMP	T-115_SD_2-6_CMP	T-116_SD_0-2_CMP	T-116_SD_2-6_CMP	T-117_SD_0-2_CMP	T-117_SD_2-6_CMP	T-118_SD_0-2_CMP	T-118_SD_2-6_CMP
Location:		T-114	T-114	T-115	T-115	T-116	T-116	T-117	T-117	T-118	T-118
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021
Lab Sample ID:		40230967005	40230967006	40230967007	40230967008	40230967011	40230967012	40230967013	40230967014	40230967015	40230967016
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0686 U	< 0.0671 U	< 0.0726 U	< 0.0771 U	< 0.0753 U	< 0.0661 U	< 0.0700 U	< 0.0684 U	< 0.0687 U	< 0.0722 U
Aroclor 1221	mg/kg	< 0.0686 U	< 0.0671 U	< 0.0726 U	< 0.0771 U	< 0.0753 U	< 0.0661 U	< 0.0700 U	< 0.0684 U	< 0.0687 U	< 0.0722 U
Aroclor 1232	mg/kg	< 0.0686 U	< 0.0671 U	< 0.0726 U	< 0.0771 U	< 0.0753 U	< 0.0661 U	< 0.0700 U	< 0.0684 U	< 0.0687 U	< 0.0722 U
Aroclor 1242	mg/kg	**0.286 J**	**0.329**	**0.292 JN**	**0.259 J**	**0.336**	**0.397**	**0.369 JN**	**0.502**	**0.342 J**	**0.604**
Aroclor 1248	mg/kg	< 0.0686 U	< 0.0671 U	< 0.0726 U	< 0.0771 U	< 0.0753 U	< 0.0661 U	< 0.0700 U	< 0.0684 U	< 0.0687 U	< 0.0722 U
Aroclor 1254	mg/kg	**0.0799**	**0.0939**	**0.107**	**0.0914**	**0.103**	**0.0929**	**0.0931 J**	**0.112**	**0.102**	**0.158**
Aroclor 1260	mg/kg	< 0.0686 U	< 0.0671 U	< 0.0726 U	< 0.0771 U	< 0.0753 U	< 0.0661 U	< 0.0700 U	< 0.0684 U	< 0.0687 U	< 0.0722 U
Total Aroclor PCBs	mg/kg	**0.366 J**	**0.423**	**0.399 J**	**0.351 J**	**0.439**	**0.490**	**0.462 J**	**0.614**	**0.444 J**	**0.762**
General Chemistry											
Total Organic Carbon	mg/kg	**10,800**	**11,200**	**18,500**	**24,100**	**12,500**	**7,730**	**11,000**	**11,400**	**10,400**	**13,100**
Percent Moisture	%	**27.3**	**25.6**	**31.3**	**35.2**	**33.6**	**24.4**	**28.8**	**26.7**	**27.2**	**30.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-119_SD_0-2_CMP	T-119_SD_2-6_CMP	T-120_SD_0-2_CMP	T-120_SD_2-6_CMP	T-121_SD_0-2_CMP	T-121_SD_0-2_CMP_TRP_1	T-121_SD_0-2_CMP_TRP_2	T-121_SD_2-6_CMP
Location:		T-119	T-119	T-120	T-120	T-121	T-121	T-121	T-121
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021
Lab Sample ID:		40231262001	40231262002	40231262003	40231262004	40231262007	40231262009	40231262011	40231262008
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0714 U	< 0.0676 U	< 0.0638 U	< 0.0623 U	< 0.0670 U	< 0.0676 U	< 0.0682 U	< 0.0659 U
Aroclor 1221	mg/kg	< 0.0714 U	< 0.0676 U	< 0.0638 U	< 0.0623 U	< 0.0670 U	< 0.0676 U	< 0.0682 U	< 0.0659 U
Aroclor 1232	mg/kg	< 0.0714 U	< 0.0676 U	< 0.0638 U	< 0.0623 U	< 0.0670 U	< 0.0676 U	< 0.0682 U	< 0.0659 U
Aroclor 1242	mg/kg	**0.230 J**	**0.213**	**0.144 JN**	**0.110 J**	**0.224 J**	**0.212 JN**	**0.218 JN**	**0.251**
Aroclor 1248	mg/kg	< 0.0714 U	< 0.0676 U	< 0.0638 U	< 0.0623 U	< 0.0670 U	< 0.0676 U	< 0.0682 U	< 0.0659 U
Aroclor 1254	mg/kg	**0.0624 J**	**0.0534 J**	**0.0276 J**	< 0.0623 U	**0.0523 J**	**0.0585 J**	**0.0491 J**	**0.0593 J**
Aroclor 1260	mg/kg	< 0.0714 U	< 0.0676 U	< 0.0638 U	< 0.0623 U	< 0.0670 U	< 0.0676 U	< 0.0682 U	< 0.0659 U
Total Aroclor PCBs	mg/kg	**0.292 J**	**0.266 J**	**0.172 J**	**0.110 J**	**0.276 J**	**0.270 J**	**0.267 J**	**0.310 J**
General Chemistry									
Total Organic Carbon	mg/kg	**8,300**	**9,560**	**5,670 J**	**2,640 J**	**9,040**	**10,500 J**	**7,490**	**4,800**
Percent Moisture	%	**30.2**	**25.9**	**21.9**	**19.9**	**25.4**	**26.3**	**26.8**	**24.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-121_SD_2-6_CMP_TRP_1	T-121_SD_2-6_CMP_TRP_2	T-122_SD_0-2_CMP	T-122_SD_2-6_CMP	T-123_SD_0-2_CMP	T-123_SD_2-6_CMP	T-124_SD_0-2_CMP	T-124_SD_2-6_CMP	T-125_SD_0-2_CMP
Location:		T-121	T-121	T-122	T-122	T-123	T-123	T-124	T-124	T-125
Sample Depth Range (inches)		2-6	2-6	2-6	0-2	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021
Lab Sample ID:		40231262010	40231262012	40231262014	40231262013	40231262015	40231262016	40231262017	40231262018	40231262019
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0671 U	< 0.0657 U	< 0.0694 U	< 0.0662 U	< 0.0728 U	< 0.0693 U	< 0.0722 U	< 0.0705 U	< 0.0740 U
Aroclor 1221	mg/kg	< 0.0671 U	< 0.0657 U	< 0.0694 U	< 0.0662 U	< 0.0728 U	< 0.0693 U	< 0.0722 U	< 0.0705 U	< 0.0740 U
Aroclor 1232	mg/kg	< 0.0671 U	< 0.0657 U	< 0.0694 U	< 0.0662 U	< 0.0728 U	< 0.0693 U	< 0.0722 U	< 0.0705 U	< 0.0740 U
Aroclor 1242	mg/kg	**0.265 J**	**0.298 J**	**0.147 J**	**0.265**	**0.191 J**	**0.158 JN**	**0.307 J**	**0.299 JN**	**0.154 J**
Aroclor 1248	mg/kg	< 0.0671 U	< 0.0657 U	< 0.0694 U	< 0.0662 U	< 0.0728 U	< 0.0693 U	< 0.0722 U	< 0.0705 U	< 0.0740 U
Aroclor 1254	mg/kg	**0.0647 J**	**0.0569 J**	**0.0538 J**	**0.0741 J**	**0.0535 J**	**0.0472 J**	**0.0944**	**0.0896**	**0.0463 J**
Aroclor 1260	mg/kg	< 0.0671 U	< 0.0657 U	< 0.0694 U	< 0.0662 U	< 0.0728 U	< 0.0693 U	< 0.0722 U	< 0.0705 U	< 0.0740 U
Total Aroclor PCBs	mg/kg	**0.330 J**	**0.355 J**	**0.200 J**	**0.339 J**	**0.245 J**	**0.205 J**	**0.402 J**	**0.389 J**	**0.201 J**
General Chemistry										
Total Organic Carbon	mg/kg	**10,600**	**6,120**	**8,280**	**7,810**	**5,760**	**9,470**	**14,500**	**12,500**	**10,900**
Percent Moisture	%	**25.6**	**24.0**	**27.8**	**24.3**	**31.4**	**28.0**	**30.9**	**29.3**	**32.6**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-125_SD_2-6_CMP	T-126_SD_0-2_CMP	T-126_SD_2-6_CMP	T-127_SD_0-2_CMP	T-127_SD_2-6_CMP	T-128_SD_0-2_CMP	T-128_SD_2-6_CMP	T-129_SD_0-2_CMP	T-129_SD_2-6_CMP	T-130_SD_0-2_CMP
Location:		T-125	T-126	T-126	T-127	T-127	T-128	T-128	T-129	T-129	T-130
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021
Lab Sample ID:		40231262020	40231261003	40231261004	40231261005	40231261006	40231261007	40231261008	40231261009	40231261010	40231261011
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0684 U	< 0.0761 U	< 0.0713 U	< 0.0681 U	< 0.0642 U	< 0.0631 U	< 0.0664 U	< 0.0683 U	< 0.0663 U	< 0.0713 U
Aroclor 1221	mg/kg	< 0.0684 U	< 0.0761 U	< 0.0713 U	< 0.0681 U	< 0.0642 U	< 0.0631 U	< 0.0664 U	< 0.0683 U	< 0.0663 U	< 0.0713 U
Aroclor 1232	mg/kg	< 0.0684 U	< 0.0761 U	< 0.0713 U	< 0.0681 U	< 0.0642 U	< 0.0631 U	< 0.0664 U	< 0.0683 U	< 0.0663 U	< 0.0713 U
Aroclor 1242	mg/kg	**0.393**	**0.238 J**	**0.328**	**0.283**	**0.145**	**0.242**	**0.248**	**0.143 JN**	**0.144**	**0.296 J**
Aroclor 1248	mg/kg	< 0.0684 U	< 0.0761 U	< 0.0713 U	< 0.0681 U	< 0.0642 U	< 0.0631 U	< 0.0664 U	< 0.0683 U	< 0.0663 U	< 0.0713 U
Aroclor 1254	mg/kg	**0.0867**	**0.0730 J**	**0.0697 J**	**0.0622 J**	**0.0381 J**	**0.0540 J**	**0.0602 J**	**0.0537 J**	**0.0306 J**	**0.0689 J**
Aroclor 1260	mg/kg	< 0.0684 U	< 0.0761 U	< 0.0713 U	< 0.0681 U	< 0.0642 U	< 0.0631 U	< 0.0664 U	< 0.0683 U	< 0.0663 U	< 0.0713 U
Total Aroclor PCBs	mg/kg	**0.480**	**0.311 J**	**0.397 J**	**0.345 J**	**0.183 J**	**0.296 J**	**0.308 J**	**0.197 J**	**0.175 J**	**0.364 J**
General Chemistry											
Total Organic Carbon	mg/kg	**10,500**	**13,700**	**8,280**	**8,930**	**6,510**	**7,760**	**7,450**	**12,600**	**13,600**	**7,920**
Percent Moisture	%	**27.1**	**34.4**	**29.9**	**26.5**	**22.1**	**21.1**	**24.9**	**27.0**	**24.7**	**29.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-130_SD_0-2_CMP_DUP	T-130_SD_2-6_CMP	T-130_SD_2-6_CMP_DUP	T-131_SD_0-2_CMP	T-131_SD_2-6_CMP	T-132_SD_0-2_CMP	T-132_SD_2-6_CMP	T-133_SD_0-2_CMP	T-133_SD_2-6_CMP
Location:		T-130	T-130	T-130	T-131	T-131	T-132	T-132	T-133	T-133
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/4/2021	8/4/2021
Lab Sample ID:		40231261013	40231261012	40231261014	40231261017	40231261018	40231261019	40231261020	40231260001	40231260002
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0654 U	< 0.0690 U	< 0.0709 U	< 0.0721 U	< 0.0679 U	< 0.0655 U	< 0.0686 U	< 0.0652 U	< 0.0681 U
Aroclor 1221	mg/kg	< 0.0654 U	< 0.0690 U	< 0.0709 U	< 0.0721 U	< 0.0679 U	< 0.0655 U	< 0.0686 U	< 0.0652 U	< 0.0681 U
Aroclor 1232	mg/kg	< 0.0654 U	< 0.0690 U	< 0.0709 U	< 0.0721 U	< 0.0679 U	< 0.0655 U	< 0.0686 U	< 0.0652 U	< 0.0681 U
Aroclor 1242	mg/kg	**0.214 J**	**0.198 J**	**0.162 J**	**0.167 J**	**0.179**	**0.194**	**0.350**	**0.196 J**	**0.217 J**
Aroclor 1248	mg/kg	< 0.0654 U	< 0.0690 U	< 0.0709 U	< 0.0721 U	< 0.0679 U	< 0.0655 U	< 0.0686 U	< 0.0652 U	< 0.0681 U
Aroclor 1254	mg/kg	**0.0529 J**	**0.0454 J**	**0.0442 J**	**0.0436 J**	**0.0463 J**	**0.0407 J**	**0.0654 J**	**0.0452 J**	**0.0423 J**
Aroclor 1260	mg/kg	< 0.0654 U	< 0.0690 U	< 0.0709 U	< 0.0721 U	< 0.0679 U	< 0.0655 U	< 0.0686 U	< 0.0652 U	< 0.0681 U
Total Aroclor PCBs	mg/kg	**0.267 J**	**0.244 J**	**0.206 J**	**0.211 J**	**0.225 J**	**0.234 J**	**0.415 J**	**0.241 J**	**0.259 J**
General Chemistry										
Total Organic Carbon	mg/kg	**6,920**	**15,300**	**11,100**	**9,930**	**10,400**	**6,300**	**7,790**	**5,590**	**15,200**
Percent Moisture	%	**23.8**	**27.3**	**29.5**	**30.7**	**26.4**	**23.9**	**27.1**	**23.6**	**26.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		**T-134_SD_0-2_CMP**	**T-134_SD_2-6_CMP**	**T-135_SD_0-2_CMP**	**T-135_SD_2-6_CMP**	**T-136_SD_0-2_CMP**	**T-136_SD_2-6_CMP**	**T-137_SD_0-2_CMP**	**T-137_SD_2-6_CMP**	**T-138_SD_0-2_CMP**	**T-138_SD_2-6_CMP**
Location:		**T-134**	**T-134**	**T-135**	**T-135**	**T-136**	**T-136**	**T-137**	**T-137**	**T-138**	**T-138**
Sample Depth Range (inches)		**0-2**	**2-6**	**0-2**	**2-6**	**0-2**	**2-6**	**0-2**	**2-6**	**0-2**	**2-6**
Sample Date:		**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**	**8/4/2021**
Lab Sample ID:		**40231260003**	**40231260004**	**40231260005**	**40231260006**	**40231260009**	**40231260010**	**40231260011**	**40231260012**	**40231260013**	**40231260014**
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0712 U	< 0.0710 U	< 0.0653 U	< 0.0654 U	< 0.0619 U	< 0.0636 U	< 0.0687 U	< 0.0646 U	< 0.0690 U	< 0.0705 U
Aroclor 1221	mg/kg	< 0.0712 U	< 0.0710 U	< 0.0653 U	< 0.0654 U	< 0.0619 U	< 0.0636 U	< 0.0687 U	< 0.0646 U	< 0.0690 U	< 0.0705 U
Aroclor 1232	mg/kg	< 0.0712 U	< 0.0710 U	< 0.0653 U	< 0.0654 U	< 0.0619 U	< 0.0636 U	< 0.0687 U	< 0.0646 U	< 0.0690 U	< 0.0705 U
Aroclor 1242	mg/kg	**0.360 J**	**0.347 JN**	**0.209 JN**	**0.323**	**0.228**	**0.353**	**0.404 J**	**0.240 J**	**0.300**	**0.307 J**
Aroclor 1248	mg/kg	< 0.0712 U	< 0.0710 U	< 0.0653 U	< 0.0654 U	< 0.0619 U	< 0.0636 U	< 0.0687 U	< 0.0646 U	< 0.0690 U	< 0.0705 U
Aroclor 1254	mg/kg	**0.0905**	**0.0905**	**0.0498 J**	**0.0669**	**0.0516 J**	**0.0886**	**0.0770**	**0.0414 J**	**0.0711**	**0.0817**
Aroclor 1260	mg/kg	< 0.0712 U	< 0.0710 U	< 0.0653 U	< 0.0654 U	< 0.0619 U	< 0.0636 U	< 0.0687 U	< 0.0646 U	< 0.0690 U	< 0.0705 U
Total Aroclor PCBs	mg/kg	**0.451 J**	**0.437 J**	**0.258 J**	**0.390**	**0.280 J**	**0.442**	**0.481 J**	**0.281 J**	**0.371**	**0.388 J**
General Chemistry											
Total Organic Carbon	mg/kg	**11,400**	**13,300**	**6,410**	**4,990**	**7,390**	**8,440**	**8,780**	**10,100**	**3,050**	**6,760**
Percent Moisture	%	**29.8**	**29.4**	**23.5**	**23.3**	**19.0**	**21.6**	**27.3**	**22.7**	**27.3**	**28.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-139_SD_0-2_CMP	T-139_SD_2-6_CMP	T-140_SD_0-2_CMP	T-140_SD_2-6_CMP	T-141_SD_0-2_CMP	T-141_SD_0-2_CMP_TRP_1	T-141_SD_0-2_CMP_TRP_2	T-141_SD_2-6_CMP
Location:		T-139	T-139	T-140	T-140	T-141	T-141	T-141	T-141
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		8/4/2021	8/4/2021	8/4/2021	8/4/2021	8/4/2021	8/4/2021	8/4/2021	8/4/2021
Lab Sample ID:		40231260015	40231260016	40231260017	40231260018	40231260021	40231260023	40231260025	40231260022
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0616 U	< 0.0624 U	< 0.0746 U	< 0.0868 U	< 0.0720 U	< 0.0665 U	< 0.0717 U	< 0.0720 U
Aroclor 1221	mg/kg	< 0.0616 U	< 0.0624 U	< 0.0746 U	< 0.0868 U	< 0.0720 U	< 0.0665 U	< 0.0717 U	< 0.0720 U
Aroclor 1232	mg/kg	< 0.0616 U	< 0.0624 U	< 0.0746 U	< 0.0868 U	< 0.0720 U	< 0.0665 U	< 0.0717 U	< 0.0720 U
Aroclor 1242	mg/kg	**0.102 J**	**0.208**	**0.277**	**0.273**	**0.355**	**0.333**	**0.267**	**0.352 J**
Aroclor 1248	mg/kg	< 0.0616 U	< 0.0624 U	< 0.0746 U	< 0.0868 U	< 0.0720 U	< 0.0665 U	< 0.0717 U	< 0.0720 U
Aroclor 1254	mg/kg	**0.0215 J**	**0.0469 J**	**0.0438 J**	**0.0356 J**	**0.117**	**0.0847**	**0.0684 J**	**0.103**
Aroclor 1260	mg/kg	< 0.0616 U	< 0.0624 U	< 0.0746 U	< 0.0868 U	< 0.0720 U	< 0.0665 U	< 0.0717 U	< 0.0720 U
Total Aroclor PCBs	mg/kg	**0.124 J**	**0.255 J**	**0.321 J**	**0.309 J**	**0.473**	**0.418**	**0.336 J**	**0.455 J**
General Chemistry									
Total Organic Carbon	mg/kg	**3,300**	**4,160**	**18,000 J**	**23,100**	**10,100**	**12,700**	**5,850**	**16,400**
Percent Moisture	%	**19.1**	**20.0**	**33.0**	**42.4**	**30.8**	**24.9**	**30.5**	**30.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-141_SD_2-6_CMP_TRP_1	T-141_SD_2-6_CMP_TRP_2	T-142_SD_0-2_CMP	T-142_SD_2-6_CMP	T-143_SD_0-2_CMP	T-143_SD_2-6_CMP	T-144_SD_0-2_CMP	T-144_SD_2-6_CMP	T-145_SD_0-2_CMP
Location:		T-141	T-141	T-142	T-142	T-143	T-143	T-144	T-144	T-145
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/4/2021	8/4/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021
Lab Sample ID:		40231260024	40231260026	40231455001	40231455002	40231455003	40231455004	40231455005	40231455006	40231455007
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0663 U	< 0.0663 U	< 0.0626 U	< 0.0661 U	< 0.0696 U	< 0.0725 U	< 0.0676 U	< 0.0627 U	< 0.0631 U
Aroclor 1221	mg/kg	< 0.0663 U	< 0.0663 U	< 0.0626 U	< 0.0661 U	< 0.0696 U	< 0.0725 U	< 0.0676 U	< 0.0627 U	< 0.0631 U
Aroclor 1232	mg/kg	< 0.0663 U	< 0.0663 U	< 0.0626 U	< 0.0661 U	< 0.0696 U	< 0.0725 U	< 0.0676 U	< 0.0627 U	< 0.0631 U
Aroclor 1242	mg/kg	**0.280 J**	**0.389**	**0.143**	**0.217**	**0.145**	**0.244**	**0.375**	**0.465**	**0.180**
Aroclor 1248	mg/kg	< 0.0663 U	< 0.0663 U	< 0.0626 U	< 0.0661 U	< 0.0696 U	< 0.0725 U	< 0.0676 U	< 0.0627 U	< 0.0631 U
Aroclor 1254	mg/kg	**0.0697**	**0.0792**	**0.0312 J**	**0.0599 J**	**0.0323 J**	**0.0464 J**	**0.0733**	**0.0665**	**0.0426 J**
Aroclor 1260	mg/kg	< 0.0663 U	< 0.0663 U	< 0.0626 U	< 0.0661 U	< 0.0696 U	< 0.0725 U	< 0.0676 U	< 0.0627 U	< 0.0631 U
Total Aroclor PCBs	mg/kg	**0.349 J**	**0.469**	**0.174 J**	**0.276 J**	**0.177 J**	**0.290 J**	**0.448**	**0.532**	**0.223 J**
General Chemistry										
Total Organic Carbon	mg/kg	**5,650**	**7,020**	**2,920**	**6,440 J**	**11,800**	**14,200**	**7,230**	**3,600**	**4,670**
Percent Moisture	%	**24.8**	**24.8**	**20.2**	**24.5**	**27.9**	**30.9**	**26.3**	**20.6**	**20.9**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-145_SD_2-6_CMP	T-146_SD_0-2_CMP	T-146_SD_2-6_CMP	T-147_SD_0-2_CMP	T-147_SD_2-6_CMP	T-148_SD_0-2_CMP	T-148_SD_2-6_CMP	T-149_SD_0-2_CMP	T-149_SD_2-6_CMP	T-150_SD_0-2_CMP
Location:		T-145	T-146	T-146	T-147	T-147	T-148	T-148	T-149	T-149	T-150
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021
Lab Sample ID:		40231455008	40231455011	40231455012	40231455013	40231455014	40231455015	40231455016	40231455017	40231455018	40231455019
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0646 U	< 0.0668 U	< 0.0661 U	< 0.0670 U	< 0.0662 U	< 0.0612 U	< 0.0623 U	< 0.0626 U	< 0.0608 U	< 0.0636 U
Aroclor 1221	mg/kg	< 0.0646 U	< 0.0668 U	< 0.0661 U	< 0.0670 U	< 0.0662 U	< 0.0612 U	< 0.0623 U	< 0.0626 U	< 0.0608 U	< 0.0636 U
Aroclor 1232	mg/kg	< 0.0646 U	< 0.0668 U	< 0.0661 U	< 0.0670 U	< 0.0662 U	< 0.0612 U	< 0.0623 U	< 0.0626 U	< 0.0608 U	< 0.0636 U
Aroclor 1242	mg/kg	**0.516**	**0.194 J**	**0.447**	**0.262**	**0.241 J**	**0.247**	**0.607**	**0.711**	**0.119**	**0.128**
Aroclor 1248	mg/kg	< 0.0646 U	< 0.0668 U	< 0.0661 U	< 0.0670 U	< 0.0662 U	< 0.0612 U	< 0.0623 U	< 0.0626 U	< 0.0608 U	< 0.0636 U
Aroclor 1254	mg/kg	**0.0668**	**0.0619 J**	**0.102**	**0.0727**	**0.0768**	**0.0371 J**	**0.0915**	**0.0733**	**0.0310 J**	**0.0314 J**
Aroclor 1260	mg/kg	< 0.0646 U	< 0.0668 U	< 0.0661 U	< 0.0670 U	< 0.0662 U	< 0.0612 U	< 0.0623 U	< 0.0626 U	< 0.0608 U	< 0.0636 U
Total Aroclor PCBs	mg/kg	**0.582**	**0.256 J**	**0.548**	**0.335**	**0.317 J**	**0.284 J**	**0.698**	**0.784**	**0.150 J**	**0.159 J**
General Chemistry											
Total Organic Carbon	mg/kg	**6,470**	**7,680**	**8,730**	**7,330**	**5,610**	**3,620**	**4,610**	**3,770**	**2,480**	**2,170**
Percent Moisture	%	**22.7**	**25.3**	**24.5**	**25.4**	**24.2**	**18.5**	**19.9**	**20.1**	**18.0**	**21.6**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-150_SD_0-2_CMP_DUP	T-150_SD_2-6_CMP	T-150_SD_2-6_CMP_DUP	T-151_SD_0-2_CMP	T-151_SD_2-6_CMP	T-152_SD_0-2_CMP	T-152_SD_2-6_CMP	T-153_SD_0-2_CMP	T-153_SD_2-6_CMP
Location:		T-150	T-150	T-150	T-151	T-151	T-152	T-152	T-153	T-153
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/9/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021
Lab Sample ID:		40231469001	40231455020	40231469002	40231469005	40231469006	40231469007	40231469008	40231469009	40231469010
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0615 U	< 0.0637 U	< 0.0633 U	< 0.0636 U	< 0.0656 U	< 0.0641 U	< 0.0647 U	< 0.0631 U	< 0.0634 U
Aroclor 1221	mg/kg	< 0.0615 U	< 0.0637 U	< 0.0633 U	< 0.0636 U	< 0.0656 U	< 0.0641 U	< 0.0647 U	< 0.0631 U	< 0.0634 U
Aroclor 1232	mg/kg	< 0.0615 U	< 0.0637 U	< 0.0633 U	< 0.0636 U	< 0.0656 U	< 0.0641 U	< 0.0647 U	< 0.0631 U	< 0.0634 U
Aroclor 1242	mg/kg	**0.163**	**0.185**	**0.188**	**0.147**	**0.234 J**	**0.306**	**0.513**	**0.229**	**0.279**
Aroclor 1248	mg/kg	< 0.0615 U	< 0.0637 U	< 0.0633 U	< 0.0636 U	< 0.0656 U	< 0.0641 U	< 0.0647 U	< 0.0631 U	< 0.0634 U
Aroclor 1254	mg/kg	**0.0350 J**	**0.0504 J**	**0.0490 J**	**0.0402 J**	**0.0540 J**	**0.0614 J**	**0.101**	**0.0624 J**	**0.0670**
Aroclor 1260	mg/kg	< 0.0615 U	< 0.0637 U	< 0.0633 U	< 0.0636 U	< 0.0656 U	< 0.0641 U	< 0.0647 U	< 0.0631 U	< 0.0634 U
Total Aroclor PCBs	mg/kg	**0.198 J**	**0.235 J**	**0.237 J**	**0.187 J**	**0.288 J**	**0.367 J**	**0.614**	**0.291 J**	**0.346**
General Chemistry										
Total Organic Carbon	mg/kg	**2,580**	**4,820**	**4,370**	**5,030**	**5,020**	**5,100**	**3,720**	**7,230 J**	**6,370**
Percent Moisture	%	**18.9**	**21.7**	**21.1**	**21.3**	**23.5**	**22.3**	**22.8**	**21.0**	**21.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-154_SD_0-2_CMP	T-154_SD_2-6_CMP	T-155_SD_0-2_CMP	T-155_SD_2-6_CMP	T-156_SD_0-2_CMP	T-156_SD_2-6_CMP	T-157_SD_0-2_CMP	T-157_SD_2-6_CMP	T-158_SD_0-2_CMP	T-158_SD_2-6_CMP
Location:		T-154	T-154	T-155	T-155	T-156	T-156	T-157	T-157	T-158	T-158
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021
Lab Sample ID:		40231469011	40231469012	40231469013	40231469014	40231469017	40231469018	40231469019	40231469020	40231452001	40231452002
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0664 U	< 0.0659 U	< 0.0642 U	< 0.0614 U	< 0.0691 U	< 0.0672 U	< 0.0628 U	< 0.0655 U	< 0.0615 U	< 0.0629 U
Aroclor 1221	mg/kg	< 0.0664 U	< 0.0659 U	< 0.0642 U	< 0.0614 U	< 0.0691 U	< 0.0672 U	< 0.0628 U	< 0.0655 U	< 0.0615 U	< 0.0629 U
Aroclor 1232	mg/kg	< 0.0664 U	< 0.0659 U	< 0.0642 U	< 0.0614 U	< 0.0691 U	< 0.0672 U	< 0.0628 U	< 0.0655 U	< 0.0615 U	< 0.0629 U
Aroclor 1242	mg/kg	**0.217**	**0.160**	**0.235 J**	**0.313**	**0.202 J**	**0.217 JN**	**0.218**	**0.383**	**0.113**	**0.138 J**
Aroclor 1248	mg/kg	< 0.0664 U	< 0.0659 U	< 0.0642 U	< 0.0614 U	< 0.0691 U	< 0.0672 U	< 0.0628 U	< 0.0655 U	< 0.0615 U	< 0.0629 U
Aroclor 1254	mg/kg	**0.0592 J**	**0.0390 J**	**0.0615 J**	**0.0812**	**0.0540 J**	**0.0500 J**	**0.0482 J**	**0.0594 J**	**0.0209 J**	**0.0323 J**
Aroclor 1260	mg/kg	< 0.0664 U	< 0.0659 U	< 0.0642 U	< 0.0614 U	< 0.0691 U	< 0.0672 U	< 0.0628 U	< 0.0655 U	< 0.0615 U	< 0.0629 U
Total Aroclor PCBs	mg/kg	**0.276 J**	**0.199 J**	**0.296 J**	**0.395**	**0.256 J**	**0.267 J**	**0.266 J**	**0.442 J**	**0.133 J**	**0.171 J**
General Chemistry											
Total Organic Carbon	mg/kg	**5,190**	**8,020**	**4,230**	**6,040**	**9,810**	**9,970**	**4,870**	**8,060**	**2,650**	**4,440**
Percent Moisture	%	**24.5**	**24.3**	**22.4**	**18.7**	**27.5**	**25.5**	**20.6**	**23.7**	**19.0**	**20.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-159_SD_0-2_CMP	T-159_SD_2-6_CMP	T-160_SD_0-2_CMP	T-160_SD_2-6_CMP	T-161_SD_0-2_CMP	T-161_SD_0-2_CMP_TRP_1	T-161_SD_0-2_CMP_TRP_2	T-161_SD_2-6_CMP
Location:		T-159	T-159	T-160	T-160	T-161	T-161	T-161	T-161
Sample Depth Range (inches):		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021
Lab Sample ID:		40231452003	40231452004	40231452005	40231452006	40231452009	40231452011	40231452013	40231452010
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0601 U	< 0.0685 U	< 0.0645 U	< 0.0648 U	< 0.0635 U	< 0.0603 U	< 0.0600 U	< 0.0604 U
Aroclor 1221	mg/kg	< 0.0601 U	< 0.0685 U	< 0.0645 U	< 0.0648 U	< 0.0635 U	< 0.0603 U	< 0.0600 U	< 0.0604 U
Aroclor 1232	mg/kg	< 0.0601 U	< 0.0685 U	< 0.0645 U	< 0.0648 U	< 0.0635 U	< 0.0603 U	< 0.0600 U	< 0.0604 U
Aroclor 1242	mg/kg	**0.0830**	**0.123 J**	**0.141**	**0.149**	**0.0901 JN**	**0.201**	**0.170**	**0.169**
Aroclor 1248	mg/kg	< 0.0601 U	< 0.0685 U	< 0.0645 U	< 0.0648 U	< 0.0635 U	< 0.0603 U	< 0.0600 U	< 0.0604 U
Aroclor 1254	mg/kg	< 0.0601 U	**0.0274 J**	**0.0294 J**	**0.0266 J**	< 0.0635 U	**0.0314 J**	**0.0424 J**	**0.0280 J**
Aroclor 1260	mg/kg	< 0.0601 U	< 0.0685 U	< 0.0645 U	< 0.0648 U	< 0.0635 U	< 0.0603 U	< 0.0600 U	< 0.0604 U
Total Aroclor PCBs	mg/kg	**0.0830**	**0.151 J**	**0.170 J**	**0.176 J**	**0.0901 J**	**0.233 J**	**0.213 J**	**0.197 J**
General Chemistry									
Total Organic Carbon	mg/kg	**2,760**	**16,200**	**2,740**	**5,320 J**	**6,170**	**7,800**	**3,230**	**4,690**
Percent Moisture	%	**17.0**	**27.0**	**22.5**	**22.8**	**21.1**	**17.0**	**16.6**	**17.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-161_SD_2-6_CMP_TRP_1	T-161_SD_2-6_CMP_TRP_2	T-162_SD_0-2_CMP	T-162_SD_2-6_CMP	T-163_SD_0-2_CMP	T-163_SD_2-6_CMP	T-164_SD_0-2_CMP	T-164_SD_2-6_CMP	T-165_SD_0-2_CMP
Location:		T-161	T-161	T-162	T-162	T-163	T-163	T-164	T-164	T-165
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/10/2021	8/10/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021
Lab Sample ID:		40231452012	40231452014	40231642001	40231642002	40231642003	40231642004	40231642005	40231642006	40231642007
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0616 U	< 0.0611 U	< 0.0617 U	< 0.0615 U	< 0.0630 U	< 0.0721 U	< 0.0582 U	< 0.0606 U	< 0.0687 U
Aroclor 1221	mg/kg	< 0.0616 U	< 0.0611 U	< 0.0617 U	< 0.0615 U	< 0.0630 U	< 0.0721 U	< 0.0582 U	< 0.0606 U	< 0.0687 U
Aroclor 1232	mg/kg	< 0.0616 U	< 0.0611 U	< 0.0617 U	< 0.0615 U	< 0.0630 U	< 0.0721 U	< 0.0582 U	< 0.0606 U	< 0.0687 U
Aroclor 1242	mg/kg	**0.195**	**0.183**	**0.152 J**	**0.542**	**0.0858 JN**	**0.112 J**	**0.168**	**0.162**	**0.207**
Aroclor 1248	mg/kg	< 0.0616 U	< 0.0611 U	< 0.0617 U	< 0.0615 U	< 0.0630 U	< 0.0721 U	< 0.0582 U	< 0.0606 U	< 0.0687 U
Aroclor 1254	mg/kg	**0.0437 J**	**0.0433 J**	**0.0278 J**	**0.0422 J**	**0.0228 J**	**0.0321 J**	**0.0401 J**	**0.0283 J**	**0.0617 J**
Aroclor 1260	mg/kg	< 0.0616 U	< 0.0611 U	< 0.0617 U	< 0.0615 U	< 0.0630 U	< 0.0721 U	< 0.0582 U	< 0.0606 U	< 0.0687 U
Total Aroclor PCBs	mg/kg	**0.239 J**	**0.226 J**	**0.180 J**	**0.584 J**	**0.109 J**	**0.145 J**	**0.208 J**	**0.190 J**	**0.269 J**
General Chemistry										
Total Organic Carbon	mg/kg	**4,970**	**2,000**	**2,300**	**2,560**	**5,670**	**10,700**	**5,050**	**4,390**	**9,240**
Percent Moisture	%	**18.8**	**18.1**	**18.9**	**18.9**	**20.4**	**30.8**	**14.3**	**17.3**	**27.2**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-165_SD_2-6_CMP	T-166_SD_0-2_CMP	T-166_SD_2-6_CMP	T-167_SD_0-2_CMP	T-167_SD_2-6_CMP	T-168_SD_0-2_CMP	T-168_SD_2-6_CMP	T-169_SD_0-2_CMP	T-169_SD_2-6_CMP	T-170_SD_0-2_CMP
Location:		T-165	T-166	T-166	T-167	T-167	T-168	T-168	T-169	T-169	T-170
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021
Lab Sample ID:		40231642008	40231642011	40231642012	40231642013	40231642014	40231642015	40231642016	40231642017	40231642018	40231642019
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0640 U	< 0.0611 U	< 0.0637 U	< 0.0669 U	< 0.0652 U	< 0.0634 U	< 0.0623 U	< 0.0598 U	< 0.0606 U	< 0.0655 U
Aroclor 1221	mg/kg	< 0.0640 U	< 0.0611 U	< 0.0637 U	< 0.0669 U	< 0.0652 U	< 0.0634 U	< 0.0623 U	< 0.0598 U	< 0.0606 U	< 0.0655 U
Aroclor 1232	mg/kg	< 0.0640 U	< 0.0611 U	< 0.0637 U	< 0.0669 U	< 0.0652 U	< 0.0634 U	< 0.0623 U	< 0.0598 U	< 0.0606 U	< 0.0655 U
Aroclor 1242	mg/kg	**0.124 J**	**0.155**	**0.151**	**0.124**	**0.469**	**0.170**	**0.188**	**0.0806 JN**	**0.0822**	**0.248**
Aroclor 1248	mg/kg	< 0.0640 U	< 0.0611 U	< 0.0637 U	< 0.0669 U	< 0.0652 U	< 0.0634 U	< 0.0623 U	< 0.0598 U	< 0.0606 U	< 0.0655 U
Aroclor 1254	mg/kg	**0.0298 J**	**0.0408 J**	**0.0358 J**	**0.0352 J**	**0.0596 J**	**0.0375 J**	**0.0370 J**	**0.0188 J**	< 0.0606 U	**0.0708**
Aroclor 1260	mg/kg	< 0.0640 U	< 0.0611 U	< 0.0637 U	< 0.0669 U	< 0.0652 U	< 0.0634 U	< 0.0623 U	< 0.0598 U	< 0.0606 U	< 0.0655 U
Total Aroclor PCBs	mg/kg	**0.153 J**	**0.196 J**	**0.186 J**	**0.159 J**	**0.529 J**	**0.207 J**	**0.225 J**	**0.0994 J**	**0.0822**	**0.318**
General Chemistry											
Total Organic Carbon	mg/kg	**6,450**	**4,640**	**11,900 J**	**8,930**	**6,570**	**2,710**	**6,890**	**2,970**	**6,570**	**10,900 J**
Percent Moisture	%	**22.1**	**18.2**	**21.7**	**25.4**	**23.2**	**21.0**	**19.8**	**16.2**	**17.8**	**23.8**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-170_SD_0-2_CMP_DUP	T-170_SD_2-6_CMP	T-170_SD_2-6_CMP_DUP	T-171_SD_0-2_CMP	T-171_SD_2-6_CMP	T-172_SD_0-2_CMP	T-172_SD_2-6_CMP	T-173_SD_0-2_CMP	T-173_SD_2-6_CMP
Location:		T-170	T-170	T-170	T-171	T-171	T-172	T-172	T-173	T-173
Sample Depth Range (inches)		0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021
Lab Sample ID:		40231861001	40231642020	40231861002	40231861005	40231861006	40231861007	40231861008	40231861009	40231861010
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0695 U	< 0.0729 U	< 0.0723 U	< 0.0682 U	< 0.0707 U	< 0.0661 U	< 0.0744 U	< 0.0716 U	< 0.0708 U
Aroclor 1221	mg/kg	< 0.0695 U	< 0.0729 U	< 0.0723 U	< 0.0682 U	< 0.0707 U	< 0.0661 U	< 0.0744 U	< 0.0716 U	< 0.0708 U
Aroclor 1232	mg/kg	< 0.0695 U	< 0.0729 U	< 0.0723 U	< 0.0682 U	< 0.0707 U	< 0.0661 U	< 0.0744 U	< 0.0716 U	< 0.0708 U
Aroclor 1242	mg/kg	**0.219 J**	**0.220 J**	**0.216**	**0.460**	**0.413**	**0.153**	**0.196**	**0.179**	**0.141 J**
Aroclor 1248	mg/kg	< 0.0695 U	< 0.0729 U	< 0.0723 U	< 0.0682 U	< 0.0707 U	< 0.0661 U	< 0.0744 U	< 0.0716 U	< 0.0708 U
Aroclor 1254	mg/kg	**0.0607 J**	**0.0455 J**	**0.0426 J**	**0.0881**	**0.0836**	**0.0318 J**	**0.0386 J**	**0.0398 J**	**0.0268 J**
Aroclor 1260	mg/kg	< 0.0695 U	< 0.0729 U	< 0.0723 U	< 0.0682 U	< 0.0707 U	< 0.0661 U	< 0.0744 U	< 0.0716 U	< 0.0708 U
Total Aroclor PCBs	mg/kg	**0.279 J**	**0.265 J**	**0.259 J**	**0.549**	**0.497**	**0.185**	**0.234**	**0.219 J**	**0.167 J**
General Chemistry										
Total Organic Carbon	mg/kg	**6,030 J**	**8,750 J**	**17,900 J**	**8,040**	**12,700**	**11,400**	**16,300**	**14,300**	**13,500**
Percent Moisture	%	**28.1**	**31.5**	**30.7**	**26.7**	**29.3**	**24.1**	**32.8**	**30.1**	**29.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-174_SD_0-2_CMP	T-174_SD_2-6_CMP	T-175_SD_0-2_CMP	T-175_SD_2-6_CMP	T-176_SD_0-2_CMP	T-176_SD_2-6_CMP	T-177_SD_0-2_CMP	T-177_SD_2-6_CMP	T-178_SD_0-2_CMP	T-178_SD_2-6_CMP
Location:		T-174	T-174	T-175	T-175	T-176	T-176	T-177	T-177	T-178	T-178
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/11/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021
Lab Sample ID:		40231861011	40231861012	40231861013	40231861014	40231861017	40231861018	40231649001	40231649002	40231649003	40231649004
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0665 U	< 0.0680 U	< 0.0706 U	< 0.0805 U	< 0.0679 U	< 0.0721 U	< 0.0684 U	< 0.0723 U	< 0.0668 U	< 0.0679 U
Aroclor 1221	mg/kg	< 0.0665 U	< 0.0680 U	< 0.0706 U	< 0.0805 U	< 0.0679 U	< 0.0721 U	< 0.0684 U	< 0.0723 U	< 0.0668 U	< 0.0679 U
Aroclor 1232	mg/kg	< 0.0665 U	< 0.0680 U	< 0.0706 U	< 0.0805 U	< 0.0679 U	< 0.0721 U	< 0.0684 U	< 0.0723 U	< 0.0668 U	< 0.0679 U
Aroclor 1242	mg/kg	**0.191**	**0.118 J**	**0.142**	**0.0771 J**	**0.263**	**0.338 J**	**0.368**	**0.378**	**0.205**	**0.404**
Aroclor 1248	mg/kg	< 0.0665 U	< 0.0680 U	< 0.0706 U	< 0.0805 U	< 0.0679 U	< 0.0721 U	< 0.0684 U	< 0.0723 U	< 0.0668 U	< 0.0679 U
Aroclor 1254	mg/kg	**0.0474 J**	< 0.0680 U	< 0.0706 U	< 0.0805 U	**0.0615 J**	**0.0851**	**0.0543 J**	**0.111**	**0.0452 J**	**0.0783**
Aroclor 1260	mg/kg	< 0.0665 U	< 0.0680 U	< 0.0706 U	< 0.0805 U	< 0.0679 U	< 0.0721 U	< 0.0684 U	< 0.0723 U	< 0.0668 U	< 0.0679 U
Total Aroclor PCBs	mg/kg	**0.238**	**0.118 J**	**0.142**	**0.0771 J**	**0.324 J**	**0.423 J**	**0.422 J**	**0.488**	**0.251 J**	**0.482**
General Chemistry											
Total Organic Carbon	mg/kg	**6,400**	**8,390**	**11,500**	**37,400**	**8,800**	**12,300**	**6,030**	**11,400**	**4,080**	**8,080**
Percent Moisture	%	**24.9**	**26.7**	**29.4**	**37.9**	**26.1**	**30.8**	**26.8**	**30.8**	**25.3**	**26.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-179_SD_0-2_CMP	T-179_SD_2-6_CMP	T-180_SD_0-2_CMP	T-180_SD_2-6_CMP	T-181_SD_0-2_CMP	T-181_SD_0-2_CMP_TRP_1	T-181_SD_0-2_CMP_TRP_2	T-181_SD_2-6_CMP
Location:		T-179	T-179	T-180	T-180	T-181	T-181	T-181	T-181
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	0-2	0-2	2-6
Sample Date:		8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021
Lab Sample ID:		40231649005	40231649006	40231649007	40231649008	40231649013	40231649015	40231649017	40231649014
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0631 U	< 0.0664 U	< 0.0638 U	< 0.0656 U	< 0.0653 U	< 0.0669 U	< 0.0716 U	< 0.0692 U
Aroclor 1221	mg/kg	< 0.0631 U	< 0.0664 U	< 0.0638 U	< 0.0656 U	< 0.0653 U	< 0.0669 U	< 0.0716 U	< 0.0692 U
Aroclor 1232	mg/kg	< 0.0631 U	< 0.0664 U	< 0.0638 U	< 0.0656 U	< 0.0653 U	< 0.0669 U	< 0.0716 U	< 0.0692 U
Aroclor 1242	mg/kg	**0.291**	**0.385**	**0.610**	**0.386**	**0.302**	**0.217 J**	**0.296**	**0.441**
Aroclor 1248	mg/kg	< 0.0631 U	< 0.0664 U	< 0.0638 U	< 0.0656 U	< 0.0653 U	< 0.0669 U	< 0.0716 U	< 0.0692 U
Aroclor 1254	mg/kg	**0.0908**	**0.0733**	**0.157**	**0.118 J**	**0.0732**	**0.0568 J**	**0.0881**	**0.117**
Aroclor 1260	mg/kg	< 0.0631 U	< 0.0664 U	< 0.0638 U	< 0.0656 U	< 0.0653 U	< 0.0669 U	< 0.0716 U	< 0.0692 U
Total Aroclor PCBs	mg/kg	**0.382**	**0.458**	**0.767**	**0.504 J**	**0.375**	**0.273 J**	**0.384**	**0.558**
General Chemistry									
Total Organic Carbon	mg/kg	**4,810**	**10,100**	**2,330 J**	**3,800 J**	**3,180**	**8,110**	**9,150**	**7,960**
Percent Moisture	%	**20.7**	**24.8**	**21.6**	**23.9**	**23.6**	**25.4**	**30.2**	**27.7**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-181_SD_2-6_CMP_TRP_1	T-181_SD_2-6_CMP_TRP_2	T-182_SD_0-2_CMP	T-182_SD_2-6_CMP	T-183_SD_0-2_CMP	T-183_SD_2-6_CMP	T-184_SD_0-2_CMP	T-184_SD_2-6_CMP	T-185_SD_0-2_CMP
Location:		T-181	T-181	T-182	T-182	T-183	T-183	T-184	T-184	T-185
Sample Depth Range (inches)		2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
Sample Date:		8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021	8/12/2021
Lab Sample ID:		40231649016	40231649018	40231649019	40231649020	40231649021	40231649022	40231649023	40231649024	40231696001
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0672 U	< 0.0682 U	< 0.0658 U	< 0.0634 U	< 0.0655 U	< 0.0662 U	< 0.0649 U	< 0.0632 U	< 0.0633 U
Aroclor 1221	mg/kg	< 0.0672 U	< 0.0682 U	< 0.0658 U	< 0.0634 U	< 0.0655 U	< 0.0662 U	< 0.0649 U	< 0.0632 U	< 0.0633 U
Aroclor 1232	mg/kg	< 0.0672 U	< 0.0682 U	< 0.0658 U	< 0.0634 U	< 0.0655 U	< 0.0662 U	< 0.0649 U	< 0.0632 U	< 0.0633 U
Aroclor 1242	mg/kg	**0.319**	**0.357 J**	**0.393**	**0.328**	**0.288 J**	**0.458**	**0.235**	**0.227**	**0.386**
Aroclor 1248	mg/kg	< 0.0672 U	< 0.0682 U	< 0.0658 U	< 0.0634 U	< 0.0655 U	< 0.0662 U	< 0.0649 U	< 0.0632 U	< 0.0633 U
Aroclor 1254	mg/kg	**0.0703**	**0.0840**	**0.0965**	**0.0904**	**0.0780**	**0.177**	**0.0750**	**0.0620 J**	**0.0865**
Aroclor 1260	mg/kg	< 0.0672 U	< 0.0682 U	< 0.0658 U	< 0.0634 U	< 0.0655 U	< 0.0662 U	< 0.0649 U	< 0.0632 U	< 0.0633 U
Total Aroclor PCBs	mg/kg	**0.389**	**0.441 J**	**0.490**	**0.418**	**0.366 J**	**0.635**	**0.310**	**0.289 J**	**0.472**
General Chemistry										
Total Organic Carbon	mg/kg	**6,750**	**7,250**	**4,400**	**8,330**	**4,290**	**6,890 J**	**3,710**	**5,720**	**5,630**
Percent Moisture	%	**25.5**	**26.7**	**23.9**	**21.2**	**23.9**	**24.5**	**23.0**	**21.0**	**21.0**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

	Sample ID:	T-185_SD_2-6_CMP	T-186_SD_0-2_CMP	T-186_SD_2-6_CMP	T-187_SD_0-2_CMP	T-187_SD_2-6_CMP	T-188_SD_0-2_CMP	T-188_SD_2-6_CMP	T-189_SD_0-2_CMP	T-189_SD_2-6_CMP	T-190_SD_0-2_CMP
	Location:	T-185	T-186	T-186	T-187	T-187	T-188	T-188	T-189	T-189	T-190
	Sample Depth Range (inches)	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2
	Sample Date:	8/12/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021
	Lab Sample ID:	40231696002	40231696007	40231696008	40231696009	40231696010	40231696011	40231696012	40231696013	40231693001	40231693002
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0637 U	< 0.0628 U	< 0.0641 U	< 0.0651 U	< 0.0686 U	< 0.0634 U	< 0.0630 U	< 0.0630 U	< 0.0644 U	< 0.0645 U
Aroclor 1221	mg/kg	< 0.0637 U	< 0.0628 U	< 0.0641 U	< 0.0651 U	< 0.0686 U	< 0.0634 U	< 0.0630 U	< 0.0630 U	< 0.0644 U	< 0.0645 U
Aroclor 1232	mg/kg	< 0.0637 U	< 0.0628 U	< 0.0641 U	< 0.0651 U	< 0.0686 U	< 0.0634 U	< 0.0630 U	< 0.0630 U	< 0.0644 U	< 0.0645 U
Aroclor 1242	mg/kg	**0.218**	**0.199**	**0.250**	**0.233**	**0.316**	**0.295**	**0.402**	**0.454**	**0.616**	**0.495 J**
Aroclor 1248	mg/kg	< 0.0637 U	< 0.0628 U	< 0.0641 U	< 0.0651 U	< 0.0686 U	< 0.0634 U	< 0.0630 U	< 0.0630 U	< 0.0644 U	< 0.0645 U
Aroclor 1254	mg/kg	**0.0620 J**	**0.0517 J**	**0.0654**	**0.0556 J**	**0.0941**	**0.0586 J**	**0.0915**	**0.0903**	**0.141**	**0.133**
Aroclor 1260	mg/kg	< 0.0637 U	< 0.0628 U	< 0.0641 U	< 0.0651 U	< 0.0686 U	< 0.0634 U	< 0.0630 U	< 0.0630 U	< 0.0644 U	< 0.0645 U
Total Aroclor PCBs	mg/kg	**0.280 J**	**0.250 J**	**0.316**	**0.289 J**	**0.410**	**0.354 J**	**0.494**	**0.544**	**0.757**	**0.628 J**
General Chemistry											
Total Organic Carbon	mg/kg	**4,570**	**2,830**	**6,250**	**5,300**	**9,780**	**5,840**	**4,140**	**2,800**	**6,030**	**5,120**
Percent Moisture	%	**21.5**	**20.5**	**22.3**	**23.2**	**27.2**	**21.3**	**20.6**	**20.6**	**22.6**	**22.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

	Sample ID:	T-190_SD_0-2_CMP_DUP	T-190_SD_2-6_CMP	T-190_SD_2-6_CMP_DUP	T-191_SD_0-2_CMP	T-191_SD_2-6_CMP	T-192_SD_0-2_CMP	T-192_SD_2-6_CMP	T-193_SD_0-2_CMP	T-193_SD_2-6_CMP
	Location:	T-190	T-190	T-190	T-191	T-191	T-192	T-192	T-193	T-193
	Sample Depth Range (inches)	0-2	2-6	2-6	0-2	2-6	0-2	2-6	0-2	2-6
	Sample Date:	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/13/2021	8/23/2021	8/23/2021
	Lab Sample ID:	40231693004	40231693003	40231693005	40231693010	40231693011	40231693012	40231693013	40232298001	40232298002
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0658 U	< 0.0631 U	< 0.0640 U	< 0.0654 U	< 0.0653 U	< 0.0639 U	< 0.0637 U	< 0.0636 U	< 0.0664 U
Aroclor 1221	mg/kg	< 0.0658 U	< 0.0631 U	< 0.0640 U	< 0.0654 U	< 0.0653 U	< 0.0639 U	< 0.0637 U	< 0.0636 U	< 0.0664 U
Aroclor 1232	mg/kg	< 0.0658 U	< 0.0631 U	< 0.0640 U	< 0.0654 U	< 0.0653 U	< 0.0639 U	< 0.0637 U	< 0.0636 U	< 0.0664 U
Aroclor 1242	mg/kg	**0.274 J**	**0.211**	**0.209**	**0.227**	**0.276**	**0.179 J**	**0.193 J**	**0.409**	**0.443**
Aroclor 1248	mg/kg	< 0.0658 U	< 0.0631 U	< 0.0640 U	< 0.0654 U	< 0.0653 U	< 0.0639 U	< 0.0637 U	< 0.0636 U	< 0.0664 U
Aroclor 1254	mg/kg	**0.0598 J**	**0.0440 J**	**0.0467 J**	**0.0652 J**	**0.0690**	**0.0570 J**	**0.0647**	**0.0591 J**	**0.0529 J**
Aroclor 1260	mg/kg	< 0.0658 U	< 0.0631 U	< 0.0640 U	< 0.0654 U	< 0.0653 U	< 0.0639 U	< 0.0637 U	< 0.0636 U	< 0.0664 U
Total Aroclor PCBs	mg/kg	**0.334 J**	**0.255 J**	**0.256 J**	**0.292 J**	**0.345**	**0.236 J**	**0.258 J**	**0.468 J**	**0.496 J**
General Chemistry										
Total Organic Carbon	mg/kg	**4,080**	**8,080**	**9,550**	**7,070**	**5,460**	**9,350**	**5,280**	**6,970**	**9,690**
Percent Moisture	%	**24.1**	**20.6**	**22.0**	**23.4**	**23.4**	**21.7**	**21.4**	**21.2**	**24.7**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-194_SD_0-2_CMP	T-194_SD_2-6_CMP	T-195_SD_0-2_CMP	T-195_SD_2-6_CMP	T-196_SD_0-2_CMP	T-196_SD_2-6_CMP	T-197_SD_0-2_CMP	T-197_SD_2-6_CMP	T-198_SD_0-2_CMP	T-198_SD_2-6_CMP
Location:		T-194	T-194	T-195	T-195	T-196	T-196	T-197	T-197	T-198	T-198
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021	8/23/2021
Lab Sample ID:		40232298003	40232298004	40232298005	40232298006	40232298011	40232298012	40232298013	40232298014	40232298015	40232298016
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0604 U	< 0.0605 U	< 0.0633 U	< 0.0638 U	< 0.0655 U	< 0.0723 U	< 0.0678 U	< 0.275 U	< 0.0661 U	< 0.0638 U
Aroclor 1221	mg/kg	< 0.0604 U	< 0.0605 U	< 0.0633 U	< 0.0638 U	< 0.0655 U	< 0.0723 U	< 0.0678 U	< 0.275 U	< 0.0661 U	< 0.0638 U
Aroclor 1232	mg/kg	< 0.0604 U	< 0.0605 U	< 0.0633 U	< 0.0638 U	< 0.0655 U	< 0.0723 U	< 0.0678 U	< 0.275 U	< 0.0661 U	< 0.0638 U
Aroclor 1242	mg/kg	**0.692**	**0.215**	**0.365**	**0.476**	**0.754**	**0.725**	**0.496**	**3.61**	**0.272**	**0.433 J**
Aroclor 1248	mg/kg	< 0.0604 U	< 0.0605 U	< 0.0633 U	< 0.0638 U	< 0.0655 U	< 0.0723 U	< 0.0678 U	< 0.275 U	< 0.0661 U	< 0.0638 U
Aroclor 1254	mg/kg	**0.0865 J**	< 0.0605 U	**0.0524 J**	**0.0965 J**	**0.162**	**0.153**	**0.0841 JN**	**0.470 J**	**0.0550 J**	**0.0993**
Aroclor 1260	mg/kg	< 0.0604 U	< 0.0605 U	< 0.0633 U	< 0.0638 U	< 0.0655 U	< 0.0723 U	< 0.0678 U	< 0.275 U	< 0.0661 U	< 0.0638 U
Total Aroclor PCBs	mg/kg	**0.778 J**	**0.215**	**0.417 J**	**0.572 J**	**0.916**	**0.878**	**0.580 J**	**4.08 J**	**0.327 J**	**0.533 J**
General Chemistry											
Total Organic Carbon	mg/kg	**4,230**	**1,360**	**5,950**	**12,400**	**10,700**	**16,200**	**1,470**	**4,410**	**1,450**	**3,030**
Percent Moisture	%	**17.2**	**17.4**	**21.2**	**21.7**	**23.6**	**30.9**	**26.6**	**27.3**	**24.2**	**21.6**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-199_SD_0-2_CMP	T-199_SD_2-6_CMP	T-201_SD_0-2_CMP	T-201_SD_0-2_CMP_TRP_1	T-201_SD_0-2_CMP_TRP_2	T-201_SD_2-6_CMP	T-201_SD_2-6_CMP_TRP_1	T-201_SD_2-6_CMP_TRP_2
Location:		T-199	T-199	T-201	T-201	T-201	T-201	T-201	T-201
Sample Depth Range (inches)		0-2	2-6	0-2	0-2	0-2	2-6	2-6	2-6
Sample Date:		8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021
Lab Sample ID:		40232298017	40232298018	40232298019	40232303005	40232303007	40232298020	40232303006	40232303008
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0746 U	< 0.0723 U	< 0.216 U	< 0.136 U	< 0.0677 U	< 0.0667 U	< 0.0664 U	< 0.0641 U
Aroclor 1221	mg/kg	< 0.0746 U	< 0.0723 U	< 0.216 U	< 0.136 U	< 0.0677 U	< 0.0667 U	< 0.0664 U	< 0.0641 U
Aroclor 1232	mg/kg	< 0.0746 U	< 0.0723 U	< 0.216 U	< 0.136 U	< 0.0677 U	< 0.0667 U	< 0.0664 U	< 0.0641 U
Aroclor 1242	mg/kg	**0.435 J**	**0.347**	**2.85**	**1.92**	**1.24**	**1.10**	**0.769**	**0.972**
Aroclor 1248	mg/kg	< 0.0746 U	< 0.0723 U	< 0.216 U	< 0.136 U	< 0.0677 U	< 0.0667 U	< 0.0664 U	< 0.0641 U
Aroclor 1254	mg/kg	**0.128**	**0.0886**	**0.274**	**0.242 J**	**0.144 J**	**0.160**	**0.133 JN**	**0.110 J**
Aroclor 1260	mg/kg	< 0.0746 U	< 0.0723 U	< 0.216 U	< 0.136 U	< 0.0677 U	< 0.0667 U	< 0.0664 U	< 0.0641 U
Total Aroclor PCBs	mg/kg	**0.563 J**	**0.435**	**3.13**	**2.16 J**	**1.39 J**	**1.26**	**0.902 J**	**1.08 J**
General Chemistry									
Total Organic Carbon	mg/kg	**5,110**	**3,520**	**4,340 J**	**9,070**	**9,330**	**7,040**	**6,750**	**5,850**
Percent Moisture	%	**33.0**	**30.9**	**30.4**	**26.4**	**26.2**	**24.8**	**24.7**	**22.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-202_SD_0-2_CMP	T-202_SD_2-6_CMP	T-203_SD_0-2_CMP	T-203_SD_2-6_CMP	T-204_SD_0-2_CMP	T-204_SD_2-6_CMP	T-205_SD_0-2_CMP	T-205_SD_2-6_CMP	T-206_SD_0-2_CMP	T-206_SD_2-6_CMP
Location:		T-202	T-202	T-203	T-203	T-204	T-204	T-205	T-205	T-206	T-206
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021
Lab Sample ID:		40232303009	40232303010	40232303011	40232303012	40232303013	40232303014	40232303015	40232303016	40232299003	40232299004
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0620 U	< 0.0650 U	< 0.0633 U	< 0.0635 U	< 0.0685 U	< 0.197 U	< 0.0647 U	< 0.0645 U	< 0.0627 U	< 0.0588 U
Aroclor 1221	mg/kg	< 0.0620 U	< 0.0650 U	< 0.0633 U	< 0.0635 U	< 0.0685 U	< 0.197 U	< 0.0647 U	< 0.0645 U	< 0.0627 U	< 0.0588 U
Aroclor 1232	mg/kg	< 0.0620 U	< 0.0650 U	< 0.0633 U	< 0.0635 U	< 0.0685 U	< 0.197 U	< 0.0647 U	< 0.0645 U	< 0.0627 U	< 0.0588 U
Aroclor 1242	mg/kg	**0.338**	**0.461**	**0.479**	**0.767**	**0.703**	**2.55**	**0.223 J**	**0.418**	**1.10 J**	**0.193**
Aroclor 1248	mg/kg	< 0.0620 U	< 0.0650 U	< 0.0633 U	< 0.0635 U	< 0.0685 U	< 0.197 U	< 0.0647 U	< 0.0645 U	< 0.0627 U	< 0.0588 U
Aroclor 1254	mg/kg	**0.0481 J**	**0.0940**	**0.174 J**	**0.112**	**0.110**	< 0.197 U	**0.0358 J**	**0.0655**	**0.217**	**0.0427 J**
Aroclor 1260	mg/kg	< 0.0620 U	< 0.0650 U	< 0.0633 U	< 0.0635 U	< 0.0685 U	< 0.197 U	< 0.0647 U	< 0.0645 U	< 0.0627 U	< 0.0588 U
Total Aroclor PCBs	mg/kg	**0.386 J**	**0.555**	**0.653 J**	**0.879**	**0.812**	**2.55**	**0.258 J**	**0.483**	**1.31 J**	**0.236 J**
General Chemistry											
Total Organic Carbon	mg/kg	**1,970**	**3,850**	**5,180**	**5,730**	**8,090**	**7,440**	**3,400**	**3,020**	**3,980**	**2,220**
Percent Moisture	%	**19.3**	**23.1**	**21.0**	**21.2**	**27.0**	**23.9**	**22.8**	**22.5**	**20.3**	**15.2**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-207_SD_0-2_CMP	T-207_SD_2-6_CMP	T-208_SD_0-2_CMP	T-208_SD_2-6_CMP	T-209_SD_0-2_CMP	T-209_SD_2-6_CMP	T-210_SD_0-2_CMP	T-210_SD_0-2_CMP_DUP	T-210_SD_2-6_CMP
Location:		T-207	T-207	T-208	T-208	T-209	T-209	T-210	T-210	T-210
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	0-2	2-6
Sample Date:		8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021
Lab Sample ID:		40232299001	40232299002	40232299005	40232299006	40232299007	40232299008	40232299009	40232299011	40232299010
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0645 U	< 0.0628 U	< 0.0631 U	< 0.0625 U	< 0.0657 U	< 0.0664 U	< 0.0654 U	< 0.0638 U	< 0.0627 U
Aroclor 1221	mg/kg	< 0.0645 U	< 0.0628 U	< 0.0631 U	< 0.0625 U	< 0.0657 U	< 0.0664 U	< 0.0654 U	< 0.0638 U	< 0.0627 U
Aroclor 1232	mg/kg	< 0.0645 U	< 0.0628 U	< 0.0631 U	< 0.0625 U	< 0.0657 U	< 0.0664 U	< 0.0654 U	< 0.0638 U	< 0.0627 U
Aroclor 1242	mg/kg	**0.127 J**	**0.259 J**	**0.659**	**0.365**	**0.344**	**0.543**	**0.334**	**0.302**	**0.471**
Aroclor 1248	mg/kg	< 0.0645 U	< 0.0628 U	< 0.0631 U	< 0.0625 U	< 0.0657 U	< 0.0664 U	< 0.0654 U	< 0.0638 U	< 0.0627 U
Aroclor 1254	mg/kg	**0.0339 J**	**0.0713**	**0.108**	**0.0885**	**0.0780**	**0.0775**	**0.0728**	**0.0736**	**0.106 J**
Aroclor 1260	mg/kg	< 0.0645 U	< 0.0628 U	< 0.0631 U	< 0.0625 U	< 0.0657 U	< 0.0664 U	< 0.0654 U	< 0.0638 U	< 0.0627 U
Total Aroclor PCBs	mg/kg	**0.161 J**	**0.330 J**	**0.767**	**0.453**	**0.422**	**0.620**	**0.407**	**0.376**	**0.577 J**
General Chemistry										
Total Organic Carbon	mg/kg	**1,530**	**3,210**	**4,820**	**6,620 J**	**4,680 J**	**10,100**	**6,740**	**5,650**	**4,140 J**
Percent Moisture	%	**22.6**	**20.5**	**20.7**	**20.2**	**24.1**	**24.8**	**23.6**	**21.6**	**20.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-210_SD_2-6_CMP_DUP	T-211_SD_0-2_CMP	T-211_SD_2-6_CMP	T-212_SD_0-2_CMP	T-212_SD_2-6_CMP	T-213_SD_0-2_CMP	T-213_SD_2-6_CMP	T-214_SD_0-2_CMP	T-214_SD_2-6_CMP
Location:		T-210	T-211	T-211	T-212	T-212	T-213	T-213	T-214	T-214
Sample Depth Range (inches)		2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/24/2021	8/24/2021	8/24/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021
Lab Sample ID:		40232299012	40232299017	40232299018	40232392001	40232392002	40232392003	40232392004	40232392005	40232392006
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0653 U	< 0.0639 U	< 0.0658 U	< 0.0623 U	< 0.0639 U	< 0.0648 U	< 0.0644 U	< 0.0637 U	< 0.0625 U
Aroclor 1221	mg/kg	< 0.0653 U	< 0.0639 U	< 0.0658 U	< 0.0623 U	< 0.0639 U	< 0.0648 U	< 0.0644 U	< 0.0637 U	< 0.0625 U
Aroclor 1232	mg/kg	< 0.0653 U	< 0.0639 U	< 0.0658 U	< 0.0623 U	< 0.0639 U	< 0.0648 U	< 0.0644 U	< 0.0637 U	< 0.0625 U
Aroclor 1242	mg/kg	**0.430**	**0.599**	**1.06**	**0.361**	**0.600**	**0.390**	**0.481**	**0.247**	**0.202 J**
Aroclor 1248	mg/kg	< 0.0653 U	< 0.0639 U	< 0.0658 U	< 0.0623 U	< 0.0639 U	< 0.0648 U	< 0.0644 U	< 0.0637 U	< 0.0625 U
Aroclor 1254	mg/kg	**0.122**	**0.160**	**0.176 J**	**0.0636 J**	**0.102**	**0.0653**	**0.0945**	**0.0582 J**	**0.0481 J**
Aroclor 1260	mg/kg	< 0.0653 U	< 0.0639 U	< 0.0658 U	< 0.0623 U	< 0.0639 U	< 0.0648 U	< 0.0644 U	< 0.0637 U	< 0.0625 U
Total Aroclor PCBs	mg/kg	**0.552**	**0.760**	**1.24 J**	**0.425**	**0.703**	**0.456**	**0.576**	**0.306 J**	**0.250 J**
General Chemistry										
Total Organic Carbon	mg/kg	**7,660 J**	**8,190**	**1,240**	**3,000 J**	**3,040 J**	**2,290**	**4,130**	**5,150**	**8,750**
Percent Moisture	%	**23.7**	**21.9**	**24.0**	**19.6**	**21.8**	**23.0**	**22.3**	**21.5**	**20.1**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-215_SD_0-2_CMP	T-215_SD_2-6_CMP	T-216_SD_0-2_CMP	T-216_SD_2-6_CMP	T-217_SD_0-2_CMP	T-217_SD_2-6_CMP	T-218_SD_0-2_CMP	T-218_SD_2-6_CMP	T-219_SD_0-2_CMP	T-219_SD_2-6_CMP
Location:		T-215	T-215	T-216	T-216	T-217	T-217	T-218	T-218	T-219	T-219
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021
Lab Sample ID:		40232392007	40232392008	40232392013	40232392014	40232392015	40232392016	40232392017	40232392018	40232392019	40232392020
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0649 U	< 0.0654 U	< 0.0630 U	< 0.0663 U	< 0.0616 U	< 0.0648 U	< 0.0622 U	< 0.0657 U	< 0.0646 U	< 0.0624 U
Aroclor 1221	mg/kg	< 0.0649 U	< 0.0654 U	< 0.0630 U	< 0.0663 U	< 0.0616 U	< 0.0648 U	< 0.0622 U	< 0.0657 U	< 0.0646 U	< 0.0624 U
Aroclor 1232	mg/kg	< 0.0649 U	< 0.0654 U	< 0.0630 U	< 0.0663 U	< 0.0616 U	< 0.0648 U	< 0.0622 U	< 0.0657 U	< 0.0646 U	< 0.0624 U
Aroclor 1242	mg/kg	**0.207**	**0.141 J**	**0.237**	**0.328 J**	**0.282 J**	**0.352**	**0.390**	**0.365 J**	**0.356**	**0.218 JN**
Aroclor 1248	mg/kg	< 0.0649 U	< 0.0654 U	< 0.0630 U	< 0.0663 U	< 0.0616 U	< 0.0648 U	< 0.0622 U	< 0.0657 U	< 0.0646 U	< 0.0624 U
Aroclor 1254	mg/kg	**0.0565 J**	**0.0364 J**	**0.0429 J**	**0.107 J**	**0.0649**	**0.0997**	**0.0489 J**	**0.0862**	**0.0712 J**	**0.0506 J**
Aroclor 1260	mg/kg	< 0.0649 U	< 0.0654 U	< 0.0630 U	< 0.0663 U	< 0.0616 U	< 0.0648 U	< 0.0622 U	< 0.0657 U	< 0.0646 U	< 0.0624 U
Total Aroclor PCBs	mg/kg	**0.263 J**	**0.177 J**	**0.280 J**	**0.435 J**	**0.347 J**	**0.452**	**0.439 J**	**0.451 J**	**0.427 J**	**0.269 J**
General Chemistry											
Total Organic Carbon	mg/kg	**2,120**	**1,900**	**2,740**	**7,310**	**8,390**	**10,800**	**3,000**	**4,780**	**5,030**	**7,040**
Percent Moisture	%	**23.2**	**23.8**	**20.8**	**24.4**	**19.0**	**23.0**	**19.3**	**24.0**	**22.7**	**19.7**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-220_SD_0-2_CMP	T-220_SD_2-6_CMP	T-221_SD_0-2_CMP	T-221_SD_0-2_CMP_TRP_1	T-221_SD_0-2_CMP_TRP_2	T-221_SD_2-6_CMP	T-221_SD_2-6_CMP_TRP_1	T-221_SD_2-6_CMP_TRP_2
Location:		T-220	T-220	T-221	T-221	T-221	T-221	T-221	T-221
Sample Depth Range (inches)		0-2	2-6	0-2	0-2	0-2	2-6	2-6	2-6
Sample Date:		8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021
Lab Sample ID:		40232401001	40232401002	40232401007	40232401009	40232401011	40232401008	40232401010	40232401012
PCB Aroclors									
Aroclor 1016	mg/kg	< 0.0615 U	< 0.0707 U	< 0.0605 U	< 0.123 U	< 0.0633 U	< 0.188 U	< 0.130 U	< 0.0634 U
Aroclor 1221	mg/kg	< 0.0615 U	< 0.0707 U	< 0.0605 U	< 0.123 U	< 0.0633 U	< 0.188 U	< 0.130 U	< 0.0634 U
Aroclor 1232	mg/kg	< 0.0615 U	< 0.0707 U	< 0.0605 U	< 0.123 U	< 0.0633 U	< 0.188 U	< 0.130 U	< 0.0634 U
Aroclor 1242	mg/kg	**0.190**	**0.258**	**0.505 JN**	**1.43**	**0.146**	**1.90 J**	**1.49**	**0.221**
Aroclor 1248	mg/kg	< 0.0615 U	< 0.0707 U	< 0.0605 U	< 0.123 U	< 0.0633 U	< 0.188 U	< 0.130 U	< 0.0634 U
Aroclor 1254	mg/kg	**0.0717**	**0.0466 J**	**0.107 JN**	**0.205**	< 0.0633 U	**0.304 J**	**0.245**	**0.0489 J**
Aroclor 1260	mg/kg	< 0.0615 U	< 0.0707 U	< 0.0605 U	< 0.123 U	< 0.0633 U	< 0.188 U	< 0.130 U	< 0.0634 U
Total Aroclor PCBs	mg/kg	**0.262**	**0.304 J**	**0.612 J**	**1.64**	**0.146**	**2.20 J**	**1.74**	**0.270 J**
General Chemistry									
Total Organic Carbon	mg/kg	**5,970 J**	**7,640 J**	**1,240**	**3,550**	**4,680**	**4,340**	**4,730**	**6,680**
Percent Moisture	%	**18.6**	**29.3**	**17.3**	**18.8**	**21.2**	**20.1**	**23.3**	**21.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

	Sample ID:	T-222_SD_0-2_CMP	T-222_SD_2-6_CMP	T-223_SD_0-2_CMP	T-223_SD_2-6_CMP	T-224_SD_0-2_CMP	T-224_SD_2-6_CMP	T-225_SD_0-2_CMP	T-225_SD_2-6_CMP	T-226_SD_0-2_CMP	T-226_SD_2-6_CMP
	Location:	T-222	T-222	T-223	T-223	T-224	T-224	T-225	T-225	T-226	T-226
	Sample Depth Range (inches)	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
	Sample Date:	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021
	Lab Sample ID:	40232401013	40232401014	40232401015	40232401016	40232401017	40232401018	40232401019	40232401020	40232398005	40232398006
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0608 U	< 0.0594 U	< 0.0622 U	< 0.0638 U	< 0.0579 U	< 0.0646 U	< 0.0648 U	< 0.0634 U	< 0.0624 U	< 0.0605 U
Aroclor 1221	mg/kg	< 0.0608 U	< 0.0594 U	< 0.0622 U	< 0.0638 U	< 0.0579 U	< 0.0646 U	< 0.0648 U	< 0.0634 U	< 0.0624 U	< 0.0605 U
Aroclor 1232	mg/kg	< 0.0608 U	< 0.0594 U	< 0.0622 U	< 0.0638 U	< 0.0579 U	< 0.0646 U	< 0.0648 U	< 0.0634 U	< 0.0624 U	< 0.0605 U
Aroclor 1242	mg/kg	**0.232**	**0.288**	**0.274**	**0.619**	**0.354**	**0.673**	**0.440**	**0.552**	**0.253 J**	**0.288**
Aroclor 1248	mg/kg	< 0.0608 U	< 0.0594 U	< 0.0622 U	< 0.0638 U	< 0.0579 U	< 0.0646 U	< 0.0648 U	< 0.0634 U	< 0.0624 U	< 0.0605 U
Aroclor 1254	mg/kg	**0.0402 J**	**0.0449 J**	< 0.0622 U	**0.0777 J**	**0.0350 J**	**0.0890**	**0.0879**	**0.115 J**	**0.0572 J**	**0.0727**
Aroclor 1260	mg/kg	< 0.0608 U	< 0.0594 U	< 0.0622 U	< 0.0638 U	< 0.0579 U	< 0.0646 U	< 0.0648 U	< 0.0634 U	< 0.0624 U	< 0.0605 U
Total Aroclor PCBs	mg/kg	**0.272 J**	**0.333 J**	**0.274**	**0.696 J**	**0.389**	**0.762**	**0.528**	**0.667 J**	**0.310 J**	**0.360**
General Chemistry											
Total Organic Carbon	mg/kg	**4,760**	**3,120**	**2,180**	**3,980**	**2,660**	**4,850**	**5,600**	**3,290**	**5,420**	**3,570**
Percent Moisture	%	**17.9**	**15.8**	**19.6**	**21.5**	**13.5**	**22.9**	**23.0**	**21.4**	**19.9**	**17.3**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-227_SD_0-2_CMP	T-227_SD_2-6_CMP	T-228_SD_0-2_CMP	T-228_SD_2-6_CMP	T-229_SD_0-2_CMP	T-229_SD_2-6_CMP	T-230_SD_0-2_CMP	T-230_SD_0-2_CMP_DUP	T-230_SD_2-6_CMP
Location:		T-227	T-227	T-228	T-228	T-229	T-229	T-230	T-230	T-230
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	0-2	2-6
Sample Date:		8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021
Lab Sample ID:		40232398007	40232398008	40232398009	40232398010	40232398011	40232398012	40232398013	40232398015	40232398014
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0618 U	< 0.0655 U	< 0.0632 U	< 0.0665 U	< 0.0588 U	< 0.125 U	< 0.0589 U	< 0.0608 U	< 0.0620 U
Aroclor 1221	mg/kg	< 0.0618 U	< 0.0655 U	< 0.0632 U	< 0.0665 U	< 0.0588 U	< 0.125 U	< 0.0589 U	< 0.0608 U	< 0.0620 U
Aroclor 1232	mg/kg	< 0.0618 U	< 0.0655 U	< 0.0632 U	< 0.0665 U	< 0.0588 U	< 0.125 U	< 0.0589 U	< 0.0608 U	< 0.0620 U
Aroclor 1242	mg/kg	**0.366**	**0.172**	**0.349**	**0.700**	**0.579**	**1.70**	**0.326**	**0.418**	**1.00 J**
Aroclor 1248	mg/kg	< 0.0618 U	< 0.0655 U	< 0.0632 U	< 0.0665 U	< 0.0588 U	< 0.125 U	< 0.0589 U	< 0.0608 U	< 0.0620 U
Aroclor 1254	mg/kg	**0.0555 J**	**0.0354 J**	**0.0729 J**	**0.0998**	**0.0640**	**0.233**	**0.0332 J**	**0.0331 J**	**0.106 J**
Aroclor 1260	mg/kg	< 0.0618 U	< 0.0655 U	< 0.0632 U	< 0.0665 U	< 0.0588 U	< 0.125 U	< 0.0589 U	< 0.0608 U	< 0.0620 U
Total Aroclor PCBs	mg/kg	**0.421 J**	**0.207 J**	**0.421 J**	**0.800**	**0.643**	**1.94**	**0.359**	**0.451**	**1.11 J**
General Chemistry										
Total Organic Carbon	mg/kg	**4,690**	**4,820**	**5,470**	**21,700**	**4,090**	**3,740 J**	**1,260 J**	**2,590 J**	**2,080**
Percent Moisture	%	**19.0**	**23.7**	**21.1**	**24.8**	**15.2**	**20.5**	**15.1**	**17.7**	**19.5**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		**T-230_SD_2-6_CMP_DUP**	**T-231_SD_0-2_CMP**	**T-231_SD_2-6_CMP**	**T-232_SD_0-2_CMP**	**T-232_SD_2-6_CMP**	**T-233_SD_0-2_CMP**	**T-233_SD_2-6_CMP**	**T-234_SD_0-2_CMP**	**T-234_SD_2-6_CMP**
Location:		**T-230**	**T-231**	**T-231**	**T-232**	**T-232**	**T-233**	**T-233**	**T-234**	**T-234**
Sample Depth Range (inches)		**2-6**	**0-2**	**2-6**	**0-2**	**2-6**	**0-2**	**2-6**	**0-2**	**2-6**
Sample Date:		**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**	**8/26/2021**
Lab Sample ID:		**40232398016**	**40232457001**	**40232457002**	**40232457003**	**40232457004**	**40232457005**	**40232457006**	**40232457007**	**40232457008**
PCB Aroclors										
Aroclor 1016	mg/kg	< 0.0610 U	< 0.0637 U	< 0.0619 U	< 0.0618 U	< 0.0635 U	< 0.0619 U	< 1.88 UJ	< 0.0627 U	< 0.0615 U
Aroclor 1221	mg/kg	< 0.0610 U	< 0.0637 U	< 0.0619 U	< 0.0618 U	< 0.0635 U	< 0.0619 U	< 1.88 UJ	< 0.0627 U	< 0.0615 U
Aroclor 1232	mg/kg	< 0.0610 U	< 0.0637 U	< 0.0619 U	< 0.0618 U	< 0.0635 U	< 0.0619 U	< 1.88 UJ	< 0.0627 U	< 0.0615 U
Aroclor 1242	mg/kg	**1.07 J**	**0.325**	**0.371**	**0.310**	**0.374**	**0.469**	**19.8 J**	**0.172**	**0.245**
Aroclor 1248	mg/kg	< 0.0610 U	< 0.0637 U	< 0.0619 U	< 0.0618 U	< 0.0635 U	< 0.0619 U	< 1.88 UJ	< 0.0627 U	< 0.0615 U
Aroclor 1254	mg/kg	**0.104**	**0.0426 J**	**0.0953**	< 0.0618 U	**0.0501 J**	< 0.0619 U	**2.23 J**	**0.0195 J**	**0.0525 J**
Aroclor 1260	mg/kg	< 0.0610 U	< 0.0637 U	< 0.0619 U	< 0.0618 U	< 0.0635 U	< 0.0619 U	< 1.88 UJ	< 0.0627 U	< 0.0615 U
Total Aroclor PCBs	mg/kg	**1.18 J**	**0.368 J**	**0.467**	**0.310**	**0.424 J**	**0.469**	**22.0 J**	**0.192 J**	**0.298 J**
General Chemistry										
Total Organic Carbon	mg/kg	**2,540**	**4,720**	**4,540**	**4,320**	**1,180**	**13,600**	**4,900**	**2,750**	**798**
Percent Moisture	%	**17.9**	**21.8**	**19.2**	**18.9**	**21.5**	**19.2**	**20.1**	**20.0**	**18.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-235_SD_0-2_CMP	T-235_SD_2-6_CMP	T-236_SD_0-2_CMP	T-236_SD_2-6_CMP	T-237_SD_0-2_CMP	T-237_SD_2-6_CMP	T-238_SD_0-2_CMP	T-238_SD_2-6_CMP	T-239_SD_0-2_CMP	T-239_SD_2-6_CMP
Location:		T-235	T-235	T-236	T-236	T-237	T-237	T-238	T-238	T-239	T-239
Sample Depth Range (inches)		0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6	0-2	2-6
Sample Date:		8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021	8/26/2021
Lab Sample ID:		40232457009	40232457010	40232457015	40232457016	40232457017	40232457018	40232457019	40232457020	40232457021	40232457022
PCB Aroclors											
Aroclor 1016	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	< 0.0638 U	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Aroclor 1221	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	< 0.0638 U	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Aroclor 1232	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	< 0.0638 U	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Aroclor 1242	mg/kg	**0.129**	**0.0498 J**	**0.0643 JN**	**0.0692 JN**	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Aroclor 1248	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	< 0.0638 U	< 0.0619 U	**0.560**	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Aroclor 1254	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	**0.0230 J**	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	**0.0302 J**	< 0.0635 U
Aroclor 1260	mg/kg	< 0.0618 U	< 0.0637 U	< 0.0623 U	< 0.0638 U	< 0.0619 U	< 0.0616 U	< 0.0614 U	< 0.0617 U	< 0.0607 U	< 0.0635 U
Total Aroclor PCBs	mg/kg	**0.129**	**0.0498 J**	**0.0643 J**	**0.0922 J**	< 0.0619 U	**0.560**	< 0.0614 U	< 0.0617 U	**0.0302 J**	< 0.0635 U
General Chemistry											
Total Organic Carbon	mg/kg	**5,120**	**1,650**	**5,270**	**4,040**	**2,360**	**2,980**	**4,850**	**5,480**	**7,700**	**18,100**
Percent Moisture	%	**19.1**	**21.6**	**20.0**	**21.7**	**19.2**	**18.8**	**18.5**	**18.9**	**17.9**	**21.4**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Sample ID:		T-240_SD_0-2_CMP	T-240_SD_2-6_CMP
Location:		T-240	T-240
Sample Depth Range (inches)		0-2	2-6
Sample Date:		8/26/2021	8/26/2021
Lab Sample ID:		40232459001	40232459002
PCB Aroclors			
Aroclor 1016	mg/kg	< 0.0617 U	< 0.0627 U
Aroclor 1221	mg/kg	< 0.0617 U	< 0.0627 U
Aroclor 1232	mg/kg	< 0.0617 U	< 0.0627 U
Aroclor 1242	mg/kg	< 0.0617 U	< 0.0627 U
Aroclor 1248	mg/kg	< 0.0617 U	< 0.0627 U
Aroclor 1254	mg/kg	**0.0399 J**	< 0.0627 U
Aroclor 1260	mg/kg	< 0.0617 U	< 0.0627 U
Total Aroclor PCBs	mg/kg	**0.0399 J**	< 0.0627 U
General Chemistry			
Total Organic Carbon	mg/kg	**4,620 J**	**6,530 J**
Percent Moisture	%	**19.1**	**20.2**

Table 6-1
Analytical Results for Sediment Samples
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Notes:
1. Total Aroclor PCB is calculated as the sum of all detected Aroclors. If analytical results for all seven PCB Aroclors were non-detect, the total Aroclor PCBs for that sample was reported as the detection limit of the individual PCB Aroclors and was flagged to indicate it as a non-detect total Aroclor PCB result
2. **Bold** indicates a detected concentration.

Qualifiers:
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
N - The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
U - The compound was analyzed for but not detected. The associated value is the compound limit of detection.

Acronyms and Abbreviations:
% = percent
mg/kg = milligram per kilogram
PCB = polychlorinated biphenyl

Table 6-2
Statistical Summary for Sediment Sample Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Dataset	Depth	Analyte	Frequency of Detection	Units	Surface Area	Surface-area Weighted Average Concentration	Minimum	Maximum	Mean	Standard Deviation	10%-tile	25%-tile
Upstream of the Site	0-2	Total PCBs	1/4 (25%)	mg/kg	27,400	NA	<0.0583	0.206	NA	NA	NA	NA
Upstream of the Site	2-6	Total PCBs	0/4 (0%)	mg/kg	27,400	NA	<0.0589	<0.0631	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	Total PCBs	35/37 (94.6%)	mg/kg	156,000	0.367	<0.0614	1.31	0.378	0.251	0.0633	0.262
Near Site between Highway M-59 and Bowen Road	2-6	Total PCBs	34/37 (91.9%)	mg/kg	156,000	1.40	<0.0617	22.0	1.17	3.52	0.0807	0.269
Bowen Road to West Marr Road	0-2	Total PCBs	72/72 (100%)	mg/kg	340,000	0.372	0.0830	3.13	0.372	0.374	0.159	0.210
Bowen Road to West Marr Road	2-6	Total PCBs	72/72 (100%)	mg/kg	340,000	0.422	0.0771	4.08	0.437	0.482	0.167	0.235
West Marr Road to Chase Lake Road	0-2	Total PCBs	98/98 (100%)	mg/kg	579,000	0.551	0.172	3.07	0.540	0.384	0.273	0.335
West Marr Road to Chase Lake Road	2-6	Total PCBs	98/98 (100%)	mg/kg	579,000	0.670	0.110	5.36	0.664	0.650	0.274	0.378
Chase Lake Road to Steinacker Road	0-2	Total PCBs	32/32 (100%)	mg/kg	191,000	0.537	0.256	1.27	0.536	0.244	0.309	0.389
Chase Lake Road to Steinacker Road	2-6	Total PCBs	32/32 (100%)	mg/kg	191,000	0.729	0.247	1.56	0.728	0.352	0.321	0.534
Site-wide (excluding background)	0-2	Total PCBs	237/239 (99.2%)	mg/kg	1,260,000	0.478	<0.0614	3.13	0.464	0.355	0.195	0.280
Site-wide (excluding background)	2-6	Total PCBs	236/239 (98.7%)	mg/kg	1,260,000	0.702	<0.0617	22.0	0.682	1.49	0.204	0.308
Upstream of the Site	0-2	Total Organic Carbon	4/4 (100%)	mg/kg	27,400	NA	2,960	11,400	NA	NA	NA	NA
Upstream of the Site	2-6	Total Organic Carbon	4/4 (100%)	mg/kg	27,400	NA	3,470	10,700	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	Total Organic Carbon	37/37 (100%)	mg/kg	156,000	4,690	1,240	13,600	4,640	2,430	2,160	2,750
Near Site between Highway M-59 and Bowen Road	2-6	Total Organic Carbon	37/37 (100%)	mg/kg	156,000	5,410	798	21,700	5,380	4,280	1,800	3,040
Bowen Road to West Marr Road	0-2	Total Organic Carbon	72/72 (100%)	mg/kg	340,000	5,970	1,450	18,000	6,030	3,230	2,710	3,690
Bowen Road to West Marr Road	2-6	Total Organic Carbon	72/72 (100%)	mg/kg	340,000	8,440	1,360	37,400	8,330	5,370	3,800	4,950
West Marr Road to Chase Lake Road	0-2	Total Organic Carbon	98/98 (100%)	mg/kg	579,000	25,100	4,720	73,700	23,900	14,400	8,190	12,500
West Marr Road to Chase Lake Road	2-6	Total Organic Carbon	98/98 (100%)	mg/kg	579,000	23,300	2,640	65,100	22,400	13,100	8,130	13,100
Chase Lake Road to Steinacker Road	0-2	Total Organic Carbon	32/32 (100%)	mg/kg	191,000	28,500	13,000	64,700	29,100	11,800	17,600	21,400
Chase Lake Road to Steinacker Road	2-6	Total Organic Carbon	32/32 (100%)	mg/kg	191,000	31,800	14,500	55,200	32,300	9,600	19,700	25,800
Site-wide (excluding background)	0-2	Total Organic Carbon	239/239 (100%)	mg/kg	1,260,000	17,900	1,240	73,700	16,200	14,300	2,990	5,120
Site-wide (excluding background)	2-6	Total Organic Carbon	239/239 (100%)	mg/kg	1,260,000	18,400	798	65,100	16,800	13,400	3,840	6,400
Upstream of the Site	0-2	TOC-adjusted Total PCBs	1/4 (25%)	mg/kg-oc	27,400	NA	<5.11	69.6	NA	NA	NA	NA
Upstream of the Site	2-6	TOC-adjusted Total PCBs	0/4 (0%)	mg/kg-oc	27,400	NA	<5.50	<18.2	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	TOC-adjusted Total PCBs	35/37 (94.6%)	mg/kg-oc	156,000	101	<12.7	494	104	94.9	20.2	57.1
Near Site between Highway M-59 and Bowen Road	2-6	TOC-adjusted Total PCBs	34/37 (91.9%)	mg/kg-oc	156,000	334	<3.51	4,490	289	728	26.3	41.9
Bowen Road to West Marr Road	0-2	TOC-adjusted Total PCBs	72/72 (100%)	mg/kg-oc	340,000	82.9	12.3	721	83.0	102	19.4	37.2
Bowen Road to West Marr Road	2-6	TOC-adjusted Total PCBs	72/72 (100%)	mg/kg-oc	340,000	72.2	2.06	925	74.8	113	14.5	31.2
West Marr Road to Chase Lake Road	0-2	TOC-adjusted Total PCBs	98/98 (100%)	mg/kg-oc	579,000	25.8	7.09	116	26.8	15.4	11.8	15.9
West Marr Road to Chase Lake Road	2-6	TOC-adjusted Total PCBs	98/98 (100%)	mg/kg-oc	579,000	32.5	10.3	123	33.5	21.9	13.3	19.0
Chase Lake Road to Steinacker Road	0-2	TOC-adjusted Total PCBs	32/32 (100%)	mg/kg-oc	191,000	20.7	7.98	73.0	20.2	11.7	10.8	14.4
Chase Lake Road to Steinacker Road	2-6	TOC-adjusted Total PCBs	32/32 (100%)	mg/kg-oc	191,000	24.8	6.38	73.2	24.4	14.2	12.0	15.7
Site-wide (excluding background)	0-2	TOC-adjusted Total PCBs	237/239 (99.2%)	mg/kg-oc	1,260,000	49.7	<12.7	721	54.9	75.5	13.3	18.4
Site-wide (excluding background)	2-6	TOC-adjusted Total PCBs	236/239 (98.7%)	mg/kg-oc	1,260,000	79.1	<3.51	4,490	84.4	307	13.4	20.7

Acronyms and Abbreviations:
% = percent
mg/kg = milligram per kilogram
mg/kg-oc = milligram per kilogram organic carbon
NA = not applicable
PCB = polychlorinated biphenyl
TOC = Total Organic Carbon

Table 6-2
Statistical Summary for Sediment Sample Results
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Dataset	Depth	Analyte	Frequency of Detection	Units	50%-tile	75%-tile	80%-tile	85%-tile	90%-tile	95%-tile	99%-tile
Upstream of the Site	0-2	Total PCBs	1/4 (25%)	mg/kg	NA	NA	NA	NA	NA	NA	NA
Upstream of the Site	2-6	Total PCBs	0/4 (0%)	mg/kg	NA	NA	NA	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	Total PCBs	35/37 (94.6%)	mg/kg	0.359	0.439	0.466	0.578	0.690	0.776	1.13
Near Site between Highway M-59 and Bowen Road	2-6	Total PCBs	34/37 (91.9%)	mg/kg	0.452	0.696	0.750	0.986	1.52	2.27	15.0
Bowen Road to West Marr Road	0-2	Total PCBs	72/72 (100%)	mg/kg	0.290	0.428	0.471	0.509	0.578	0.772	1.56
Bowen Road to West Marr Road	2-6	Total PCBs	72/72 (100%)	mg/kg	0.367	0.499	0.533	0.563	0.611	0.811	2.08
West Marr Road to Chase Lake Road	0-2	Total PCBs	98/98 (100%)	mg/kg	0.422	0.612	0.688	0.781	0.929	1.18	1.89
West Marr Road to Chase Lake Road	2-6	Total PCBs	98/98 (100%)	mg/kg	0.502	0.755	0.878	0.913	1.02	1.25	3.42
Chase Lake Road to Steinacker Road	0-2	Total PCBs	32/32 (100%)	mg/kg	0.434	0.626	0.712	0.742	0.855	1.01	1.24
Chase Lake Road to Steinacker Road	2-6	Total PCBs	32/32 (100%)	mg/kg	0.588	0.890	0.993	1.13	1.29	1.42	1.56
Site-wide (excluding background)	0-2	Total PCBs	237/239 (99.2%)	mg/kg	0.388	0.543	0.604	0.687	0.779	1.05	1.64
Site-wide (excluding background)	2-6	Total PCBs	236/239 (98.7%)	mg/kg	0.479	0.674	0.759	0.883	1.02	1.31	3.81
Upstream of the Site	0-2	Total Organic Carbon	4/4 (100%)	mg/kg	NA	NA	NA	NA	NA	NA	NA
Upstream of the Site	2-6	Total Organic Carbon	4/4 (100%)	mg/kg	NA	NA	NA	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	Total Organic Carbon	37/37 (100%)	mg/kg	4,690	5,420	5,570	6,430	7,860	8,230	11,700
Near Site between Highway M-59 and Bowen Road	2-6	Total Organic Carbon	37/37 (100%)	mg/kg	4,140	6,620	7,260	7,560	9,290	12,300	20,400
Bowen Road to West Marr Road	0-2	Total Organic Carbon	72/72 (100%)	mg/kg	5,180	7,460	8,800	9,510	10,600	11,400	15,400
Bowen Road to West Marr Road	2-6	Total Organic Carbon	72/72 (100%)	mg/kg	6,820	10,100	11,300	12,500	14,100	16,200	27,200
West Marr Road to Chase Lake Road	0-2	Total Organic Carbon	98/98 (100%)	mg/kg	19,700	31,800	36,000	38,000	43,500	47,800	71,600
West Marr Road to Chase Lake Road	2-6	Total Organic Carbon	98/98 (100%)	mg/kg	21,500	29,600	29,900	31,000	35,200	48,700	64,100
Chase Lake Road to Steinacker Road	0-2	Total Organic Carbon	32/32 (100%)	mg/kg	25,200	36,400	38,900	42,600	46,900	47,900	59,600
Chase Lake Road to Steinacker Road	2-6	Total Organic Carbon	32/32 (100%)	mg/kg	32,400	38,000	40,800	43,200	44,400	46,200	52,800
Site-wide (excluding background)	0-2	Total Organic Carbon	239/239 (100%)	mg/kg	10,900	24,000	28,100	31,400	37,600	47,000	60,100
Site-wide (excluding background)	2-6	Total Organic Carbon	239/239 (100%)	mg/kg	12,700	25,800	29,100	31,000	33,900	42,800	63,300
Upstream of the Site	0-2	TOC-adjusted Total PCBs	1/4 (25%)	mg/kg-oc	NA	NA	NA	NA	NA	NA	NA
Upstream of the Site	2-6	TOC-adjusted Total PCBs	0/4 (0%)	mg/kg-oc	NA	NA	NA	NA	NA	NA	NA
Near Site between Highway M-59 and Bowen Road	0-2	TOC-adjusted Total PCBs	35/37 (94.6%)	mg/kg-oc	84.9	126	145	153	175	294	434
Near Site between Highway M-59 and Bowen Road	2-6	TOC-adjusted Total PCBs	34/37 (91.9%)	mg/kg-oc	103	203	320	368	512	627	3,230
Bowen Road to West Marr Road	0-2	TOC-adjusted Total PCBs	72/72 (100%)	mg/kg-oc	54.7	83.6	87.8	119	178	216	489
Bowen Road to West Marr Road	2-6	TOC-adjusted Total PCBs	72/72 (100%)	mg/kg-oc	50.5	72.1	91.7	128	151	170	430
West Marr Road to Chase Lake Road	0-2	TOC-adjusted Total PCBs	98/98 (100%)	mg/kg-oc	23.8	33.7	35.2	38.6	40.7	46.2	72.5
West Marr Road to Chase Lake Road	2-6	TOC-adjusted Total PCBs	98/98 (100%)	mg/kg-oc	28.0	41.6	47.8	50.7	56.6	66.2	117
Chase Lake Road to Steinacker Road	0-2	TOC-adjusted Total PCBs	32/32 (100%)	mg/kg-oc	17.5	22.4	24.8	27.6	31.5	32.6	60.6
Chase Lake Road to Steinacker Road	2-6	TOC-adjusted Total PCBs	32/32 (100%)	mg/kg-oc	18.7	30.1	36.1	38.0	41.3	47.9	65.7
Site-wide (excluding background)	0-2	TOC-adjusted Total PCBs	237/239 (99.2%)	mg/kg-oc	32.3	61.7	72.4	85.0	112	162	370
Site-wide (excluding background)	2-6	TOC-adjusted Total PCBs	236/239 (98.7%)	mg/kg-oc	37.1	59.6	68.6	103	140	189	776

Acronyms and Abbreviations:
% = percent
mg/kg = milligram per kilogram
mg/kg-oc = milligram per kilogram organic carbon
NA = not applicable
PCB = polychlorinated biphenyl
TOC = Total Organic Carbon

Table 6-3
Triplicate Sampling Evaluation
2020-2021 Baseline Sampling Data Report
Shiawassee River Superfund Site, Howell, Michigan

Depth Range (inches)	Location ID	Parent Sample Result	Triplicate Sample 1		Triplicate Sample 2		Coefficient of Variation
			Result	Relative Percent Difference	Result	Relative Percent Difference	
Total Organic Carbon (mg/kg)							
0-2	BG-1	11,400	7,360	43.1	7,160	45.7	27.7
	T-001	42,500	24,100	55.3	15,000	95.7	51.5
	T-021	25,400	19,200	27.8	10,600	82.2	40.4
	T-041	36,000	31,900	12.1	34,900	3.10	6.19
	T-061	21,600 J	19,400 J	10.7	16,700 J	25.6	12.8
	T-081	31,400	20,700	41.1	23,100	30.5	22.4
	T-101	17,900	23,900	28.7	20,200	12.1	14.6
	T-121	9,040	10,500 J	14.9	7,490	18.8	16.7
	T-141	10,100	12,700	22.8	5,850	53.3	36.2
	T-161	6,170	7,800	23.3	3,230	62.6	40.4
	T-181	3,180	8,110	87.3	9,150	96.8	46.8
	T-201	4,340 J	9,070	70.5	9,330	73.0	37.1
	T-221	1,240	3,550	96.5	4,680	116	55.5
2-6	BG-1	10,700	2,550	123	5,260	68.2	67.3
	T-001	37,500	28,500	27.3	28,100	28.7	16.9
	T-021	31,700	22,600	33.5	24,900 J	24.0	17.9
	T-041	29,600	27,100	8.82	37,500	23.5	17.3
	T-081	31,600	29,600	6.54	34,900 J	9.92	8.36
	T-101	14,900	12,400	18.3	13,600	9.12	9.17
	T-121	4,800	10,600	75.3	6,120	24.2	42.4
	T-141	16,400	5,650	97.5	7,020	80.1	60.4
	T-161	4,690	4,970	5.80	2,000	80.4	42.2
	T-181	7,960	6,750	16.5	7,250	9.34	8.31
	T-201	7,040	6,750	4.21	5,850	18.5	9.48
	T-221	4,340	4,730	8.60	6,680	42.5	23.9
Total PCBs (mg/kg)							
0-2	BG-1	0.0583 U	0.0556 U	4.74	0.0571 U	2.08	2.37
	T-001	0.438 J	0.373 J	16.0	0.303	36.4	18.2
	T-021	0.719 J	0.526	31.0	0.443	47.5	25.2
	T-041	0.515	0.534	3.62	0.556	7.66	3.84
	T-061	0.693 J	0.958 J	32.1	0.560 J	21.2	27.5
	T-081	0.707	0.692 J	2.14	0.613 J	14.2	7.53
	T-101	0.326	0.552	51.5	0.440	29.8	25.7
	T-121	0.276 J	0.270 J	2.20	0.267 J	3.31	1.69
	T-141	0.473	0.418	12.3	0.336 J	33.9	16.9
	T-161	0.0901 J	0.233 J	88.5	0.213 J	81.1	43.3
	T-181	0.375	0.273 J	31.5	0.384	2.37	17.9
	T-201	3.13	2.16 J	36.7	1.39 J	77.0	39.2
	T-221	0.612 J	1.64	91.3	0.146	123	95.6
2-6	BG-1	0.0589 U	0.0619 U	4.97	0.0592 U	0.508	2.75
	T-001	0.485	0.530 J	8.87	0.288 J	51.0	29.6
	T-021	1.55	1.46 J	5.98	0.907 J	52.3	26.7
	T-041	0.43	0.872	67.9	0.394	8.74	47.1
	T-081	1.02	0.702 J	36.9	0.596	52.5	28.6
	T-101	0.500	0.415	18.6	0.527	5.26	12.2
	T-121	0.310 J	0.330 J	6.25	0.355 J	13.5	6.80
	T-141	0.455 J	0.349 J	26.4	0.469	3.03	15.5
	T-161	0.197 J	0.239 J	19.3	0.226 J	13.7	9.74
	T-181	0.558	0.389	35.7	0.441 J	23.4	18.7
	T-201	1.26	0.902 J	33.1	1.08 J	15.4	16.6
	T-221	2.20 J	1.74	23.4	0.270 J	156	71.8

Qualifiers:
J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
U - The compound was analyzed for but not detected. The associated value is the compound limit of detection.

Acronyms and Abbreviations:
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyl

FIGURES

LEGEND

RIVER CENTERLINE

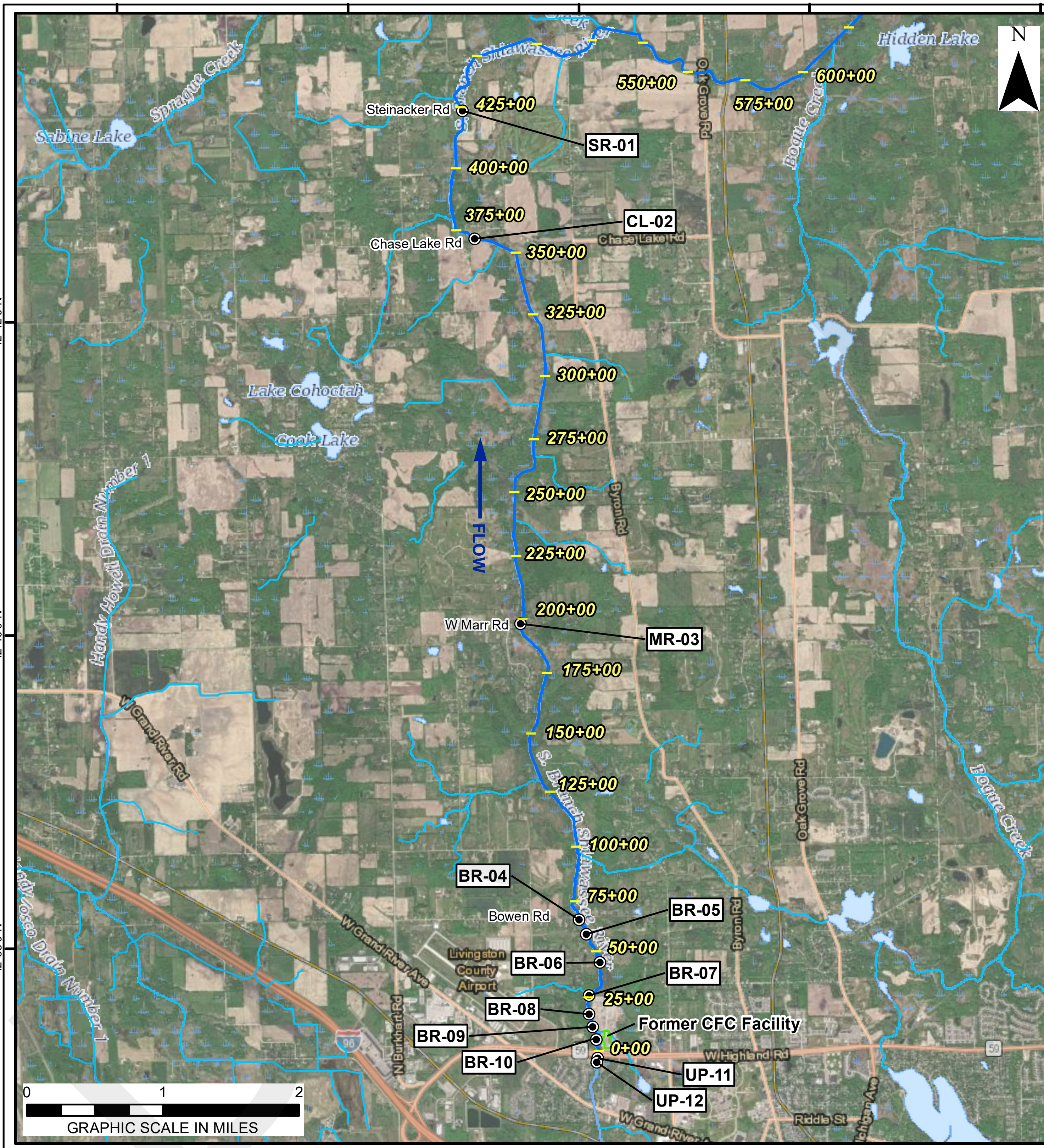
Note:
River centerline provided on January 12, 2021 by CTI and Associates, Inc.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SITE LOCATION

cti ARCADIS

FIGURE
1-1



LEGEND
- SAMPLE LOCATION
- RIVER CENTERLINE
- OTHER STREAMS
- 0+00 RIVER STATIONING (FEET)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.
3. Sampling activities included collecting two rounds of discrete surface water samples during SP3™ sampler deployment and retrieval in September and November 2020, respectively. Time-averaged surface water samples were also collected at each sample location using SP3™ samplers.

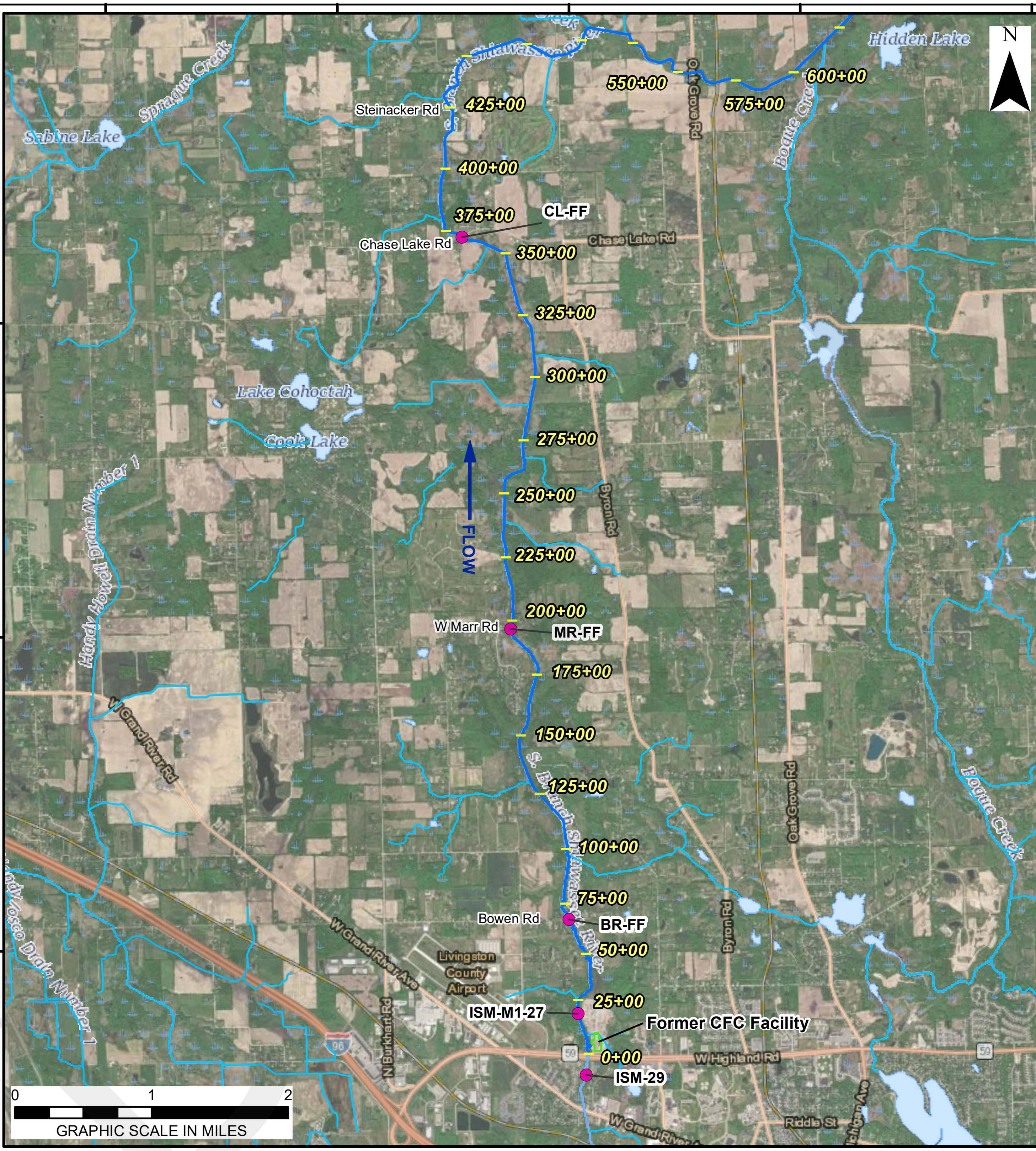
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SP3 AND SURFACE WATER SAMPLE LOCATIONS

cti ARCADIS

FIGURE
2-1

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Fig2-1_SW_SP3_Locations_CTI.mxd 08/03/2022



LEGEND

- FISH SAMPLING LOCATIONS
- RIVER CENTERLINE
- OTHER STREAMS
- 0+00 RIVER STATIONING (FEET)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.
3. Fish collection was completed between 400 feet downstream and 400 feet upstream of the target location (total length of target area was approximately 800 feet).

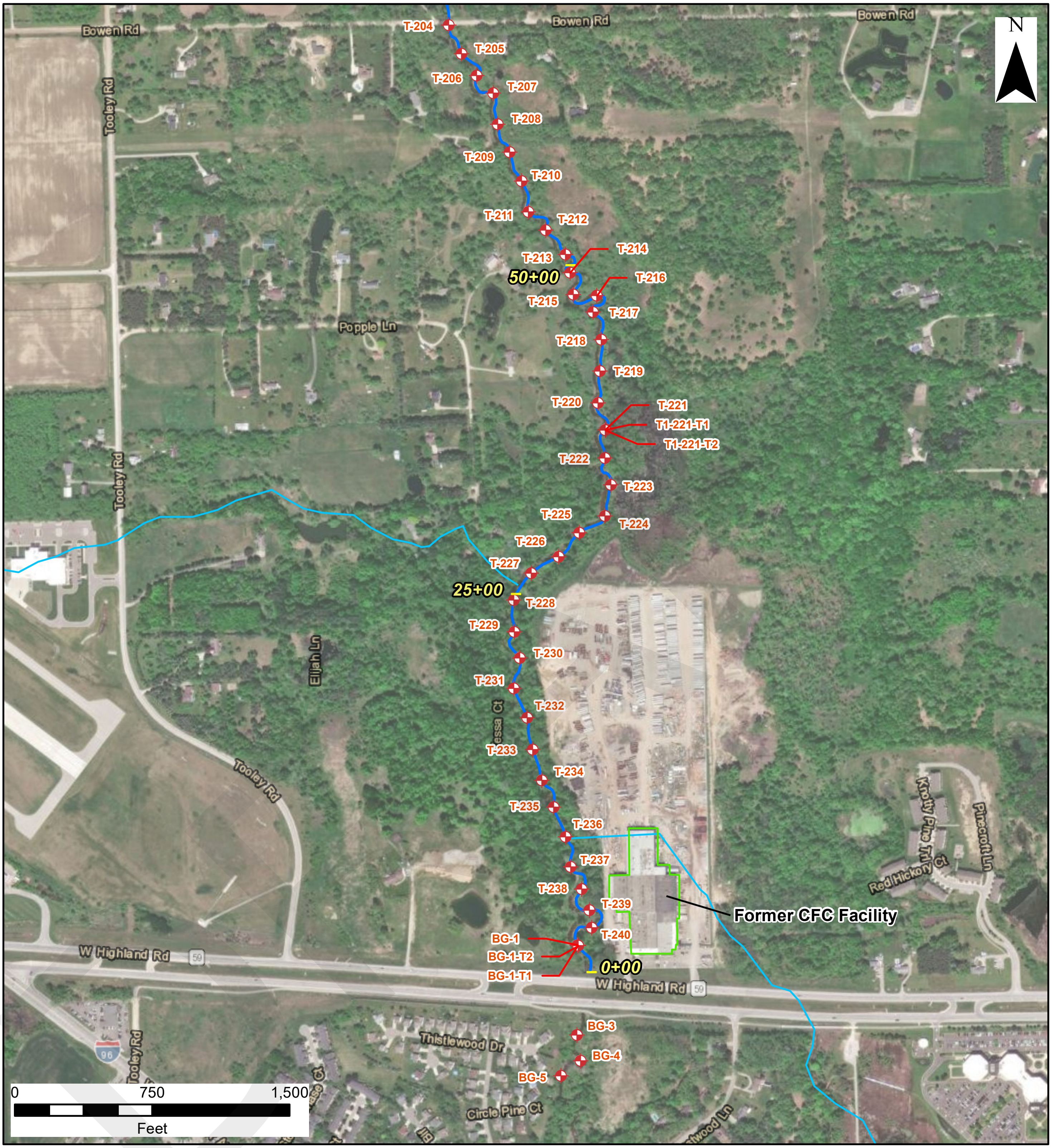
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

FISH TISSUE SAMPLE LOCATIONS

cti ARCADIS

FIGURE
2-2

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Fig2-2_Fish Tissue Sample Locations_CTI.mxd 08/03/2022



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- 0+00 River Stationing (feet)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

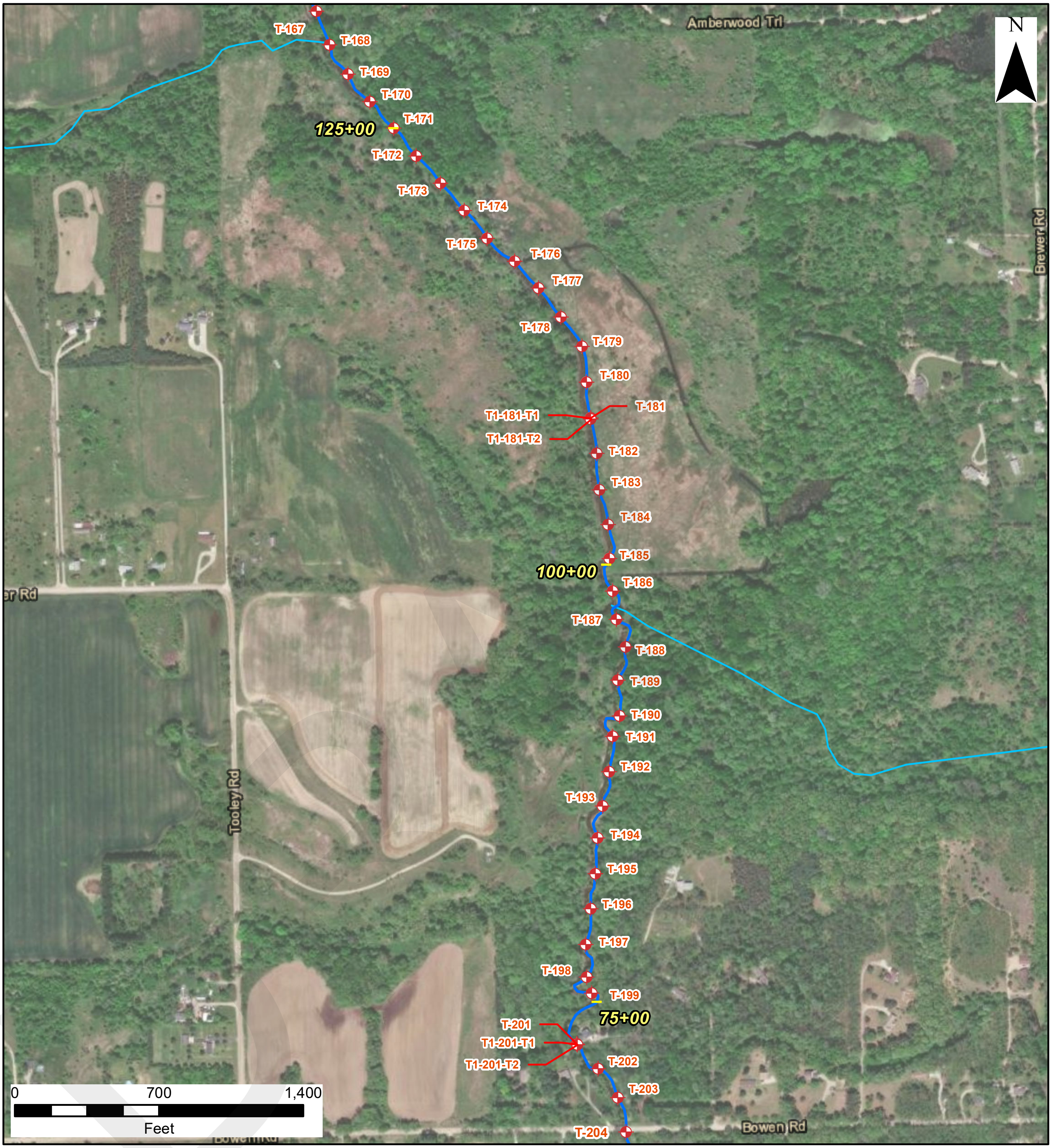
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - HIGHWAY M-59 TO BOWEN ROAD

cti ARCADIS

FIGURE
2-3a

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations only\Fig2-3a_M59_To_Bowen_Road.mxd 11/07/2023



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- 0+00 River Stationing (feet)

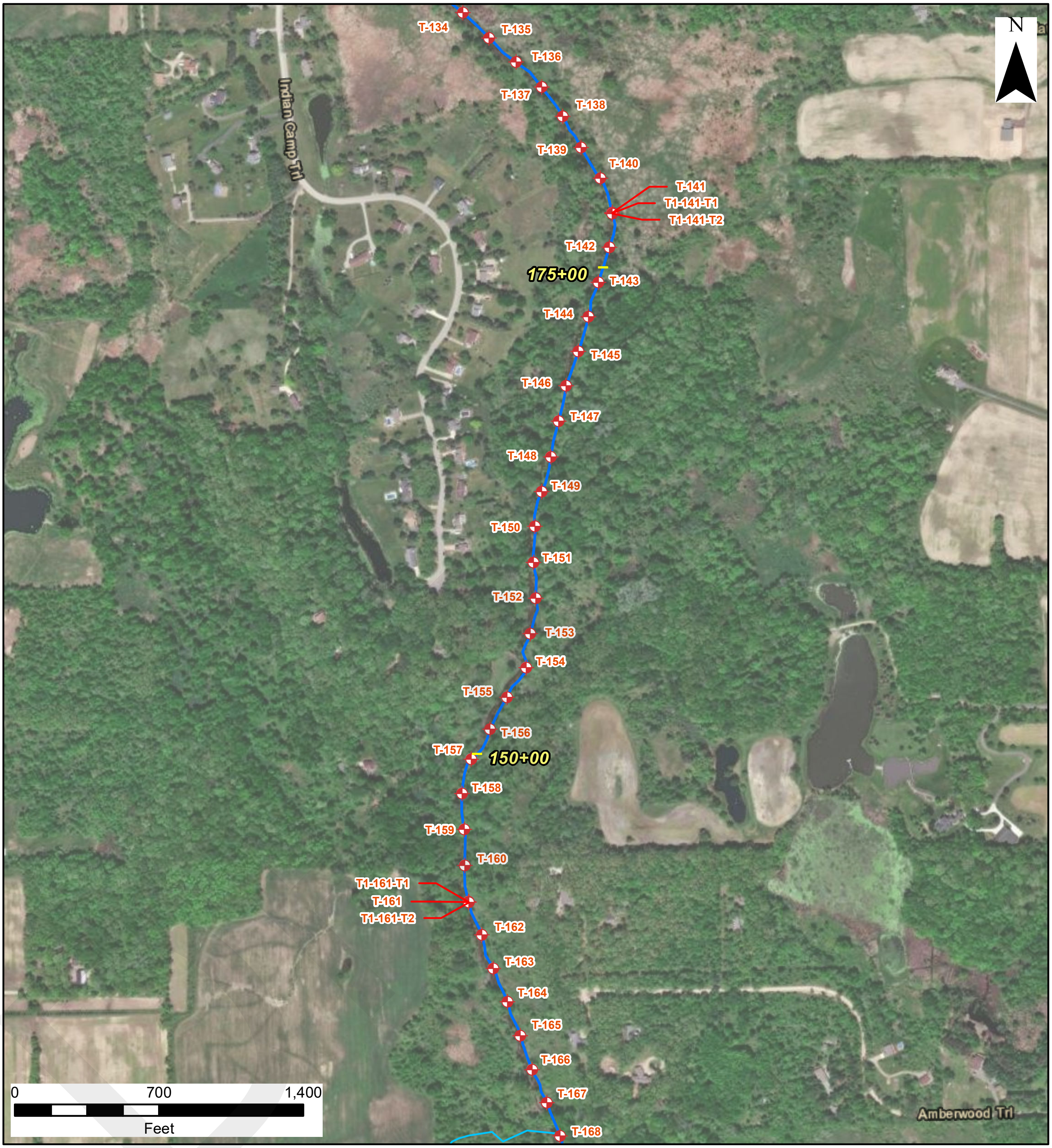
Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - BOWEN ROAD TO WEST BARRON ROAD

cti ARCADIS

FIGURE 2-3b



LEGEND

Sediment Transect Locations

River Centerline

Other Streams

0+00 River Stationing (feet)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

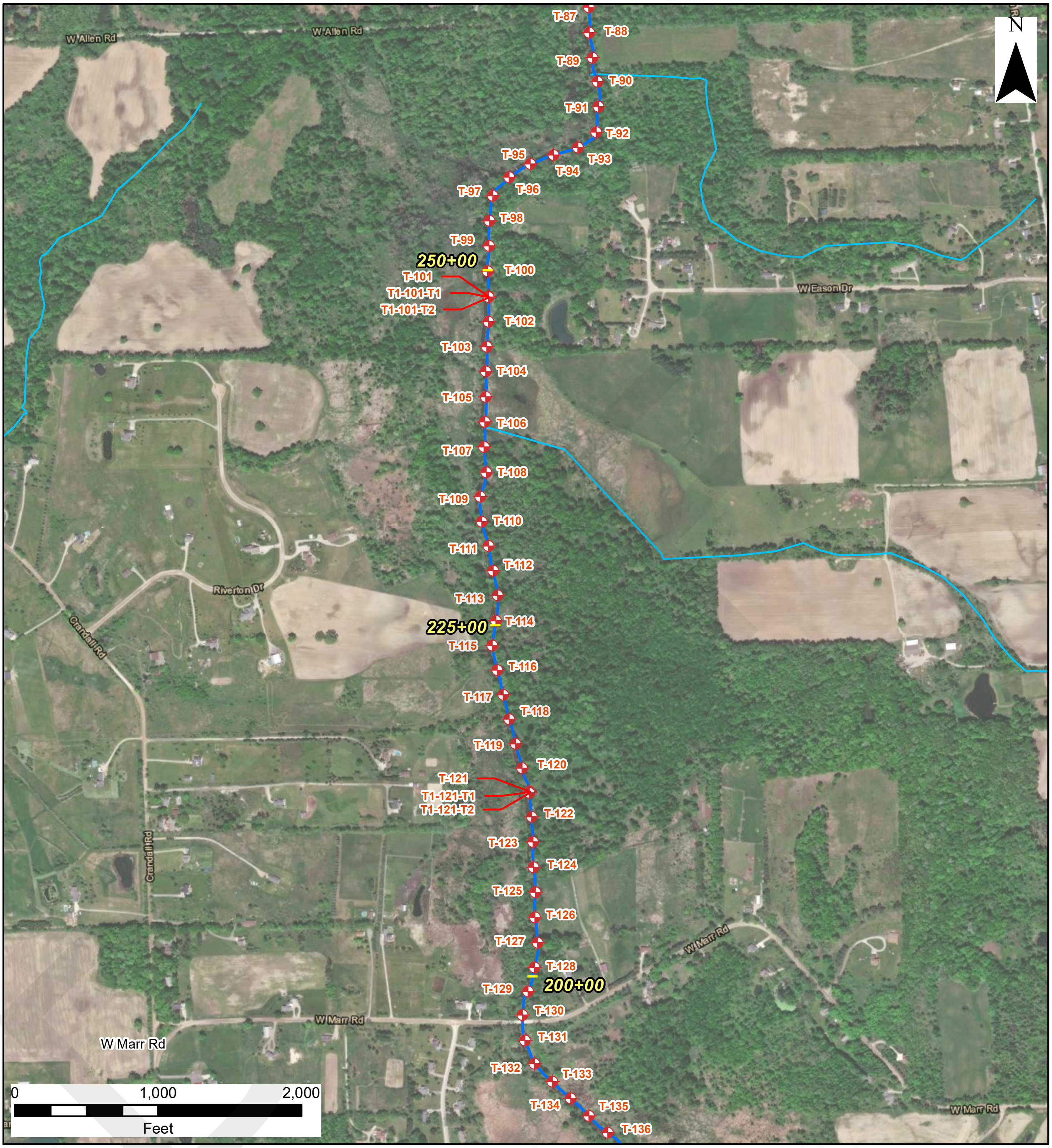
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - WEST BARRON ROAD TO WEST MARR ROAD

cti ARCADIS

FIGURE
2-3c

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations only\Fig2-3c_WBarron_Road_To_WMarr_Road.mxd 11/07/2023



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- 0+00 River Stationing (feet)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

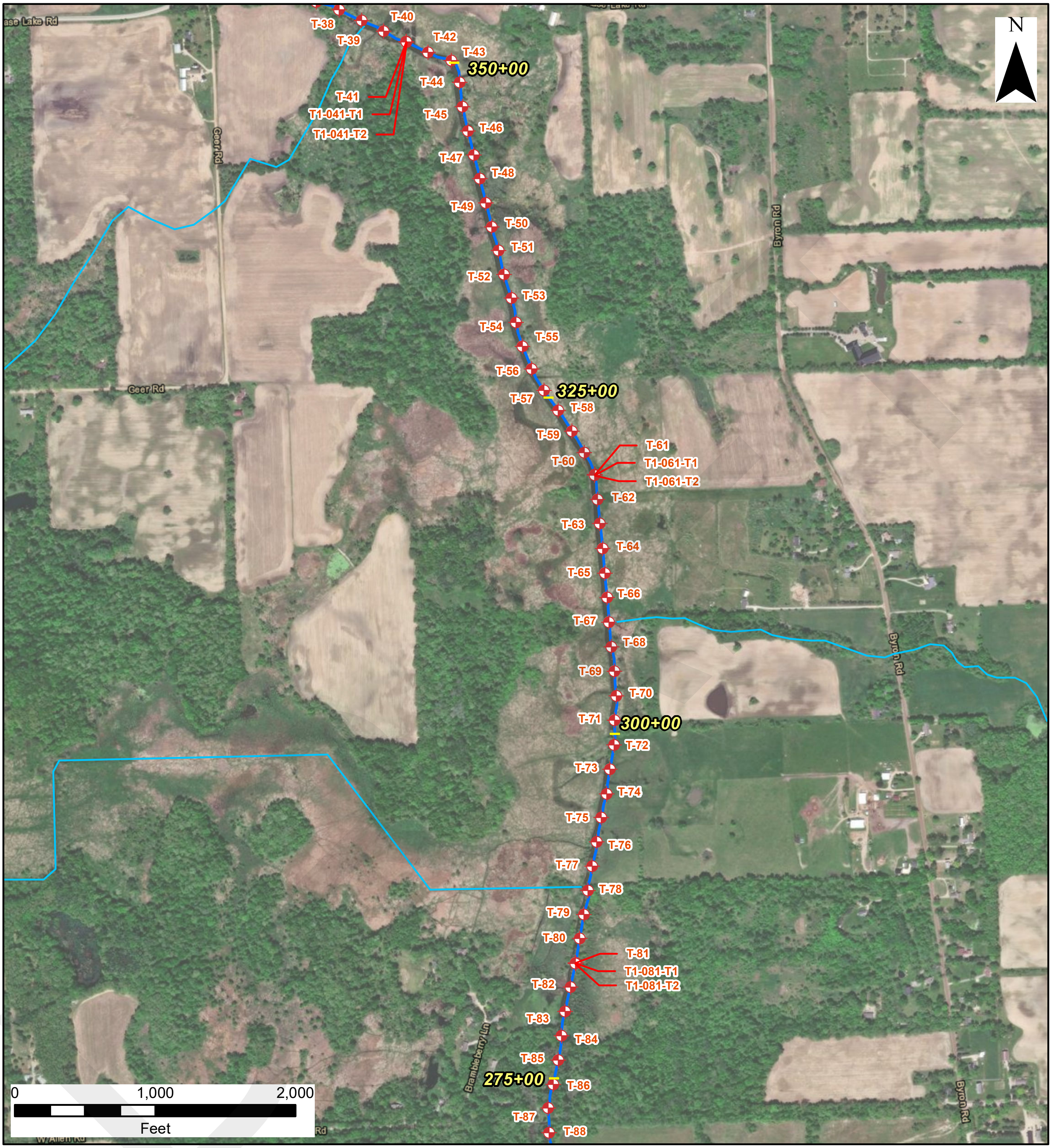
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - WEST MARR ROAD TO WEST ALLEN ROAD

cti ARCADIS

FIGURE
2-3d

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations only\Fig2-3d_WMarr_Road_To_WAllen_Road.mxd 11/07/2023



LEGEND

Sediment Transect Locations

River Centerline

Other Streams

0+00 River Stationing (feet)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

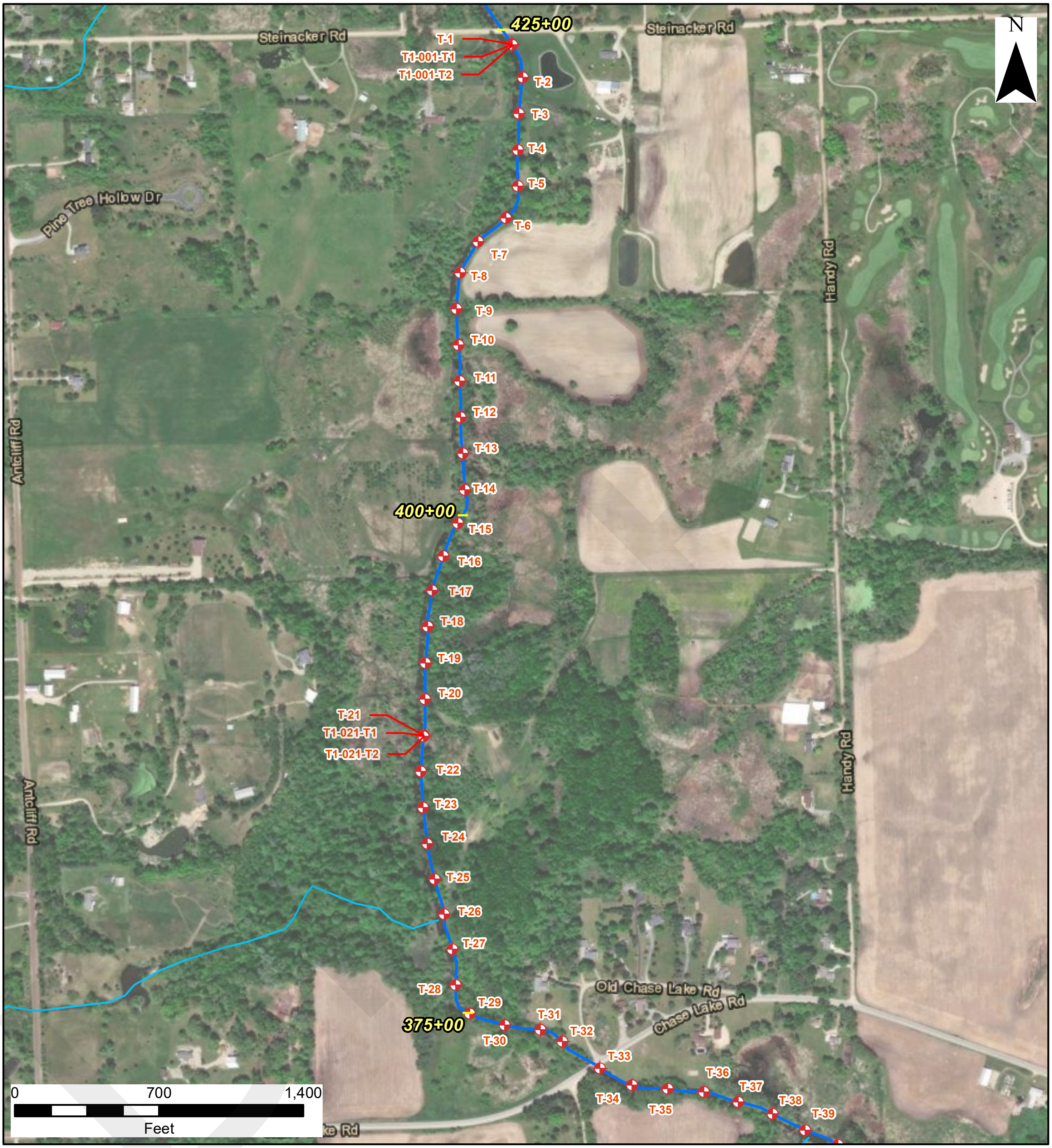
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - WEST ALLEN ROAD TO CHASE LAKE ROAD

cti ARCADIS

FIGURE 2-3e

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations only\Fig2-3e_WAllen_Road_To_Chase_Lake_Road.mxd 11/07/2023



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- 0+00 River Stationing (feet)

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

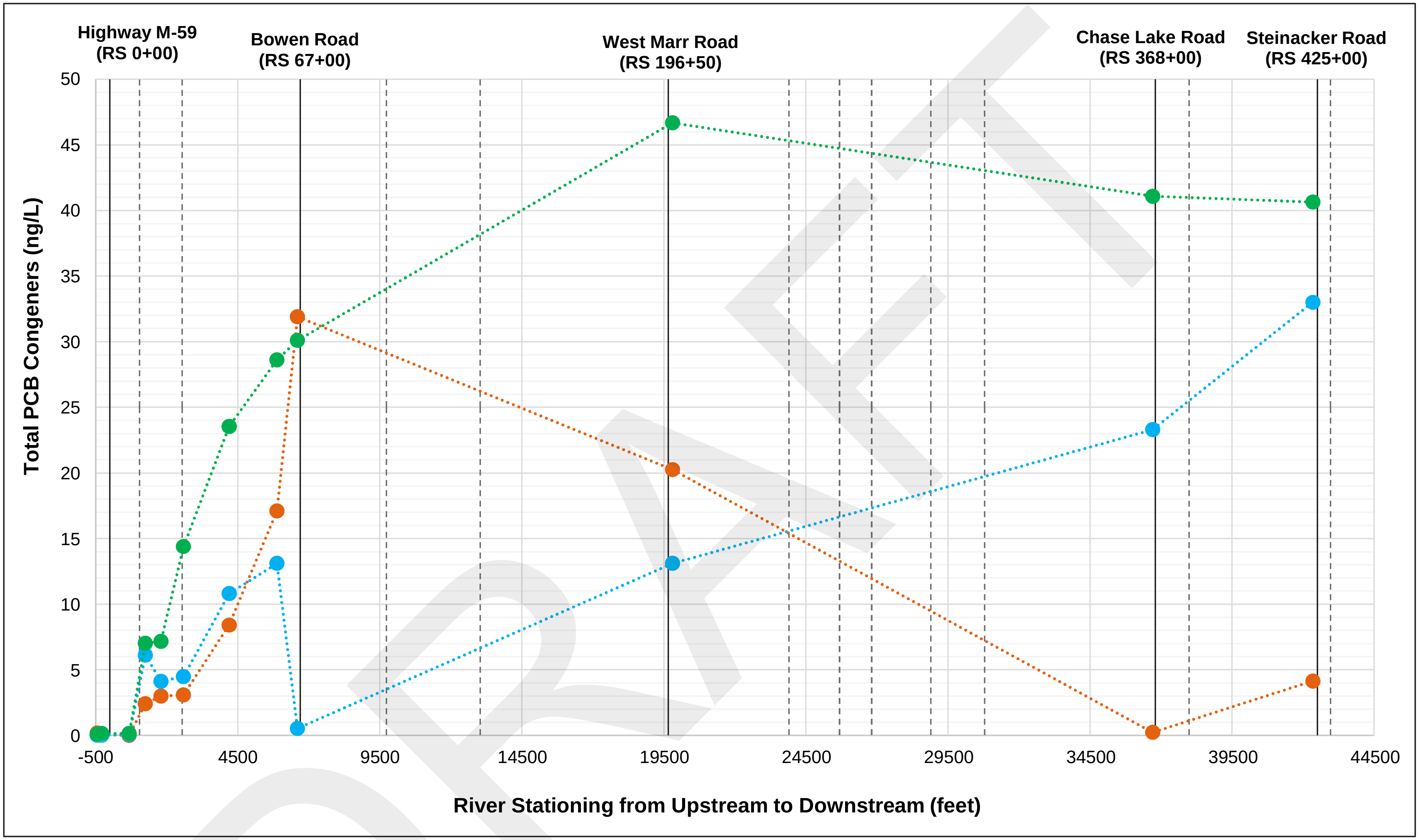
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT TRANSECT LOCATIONS - CHASE LAKE ROAD TO STEINACKER ROAD

cti ARCADIS

FIGURE
2-3f

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations only\Fig2-3f_Chase_Lake_Road_To_Steinacker_Road.mxd 11/07/2023



Legend:

- Calculated Freely Dissolved PCB Concentrations (C_{free})
- Round 1 (September 2020) Discrete Surface Water Dissolved PCB Concentrations
- Round 2 (November 2020) Discrete Surface Water Dissolved PCB Concentrations
- Bridges
- Other Streams

Notes:

1. River stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Locations for other streams obtained from Michigan GIS Open Data portal.
3. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
4. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
5. Time-averaged surface water samples were collected using SP3™ samplers and calculated total PCB C_{free} results for each sampler are plotted.
6. PCB = polychlorinated biphenyl.
7. ng/L = nanograms per liter.

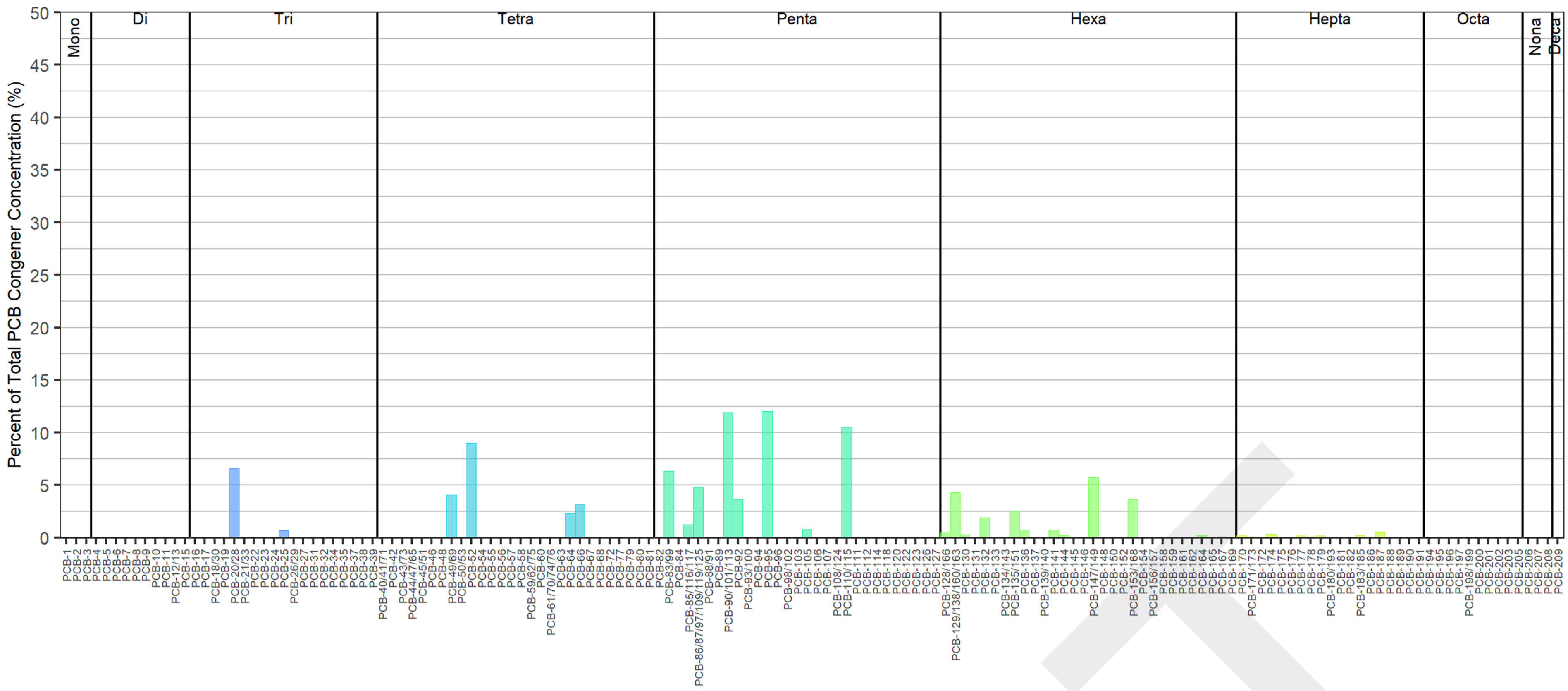
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

TOTAL PCB CONGENERS IN SURFACE WATER SAMPLES

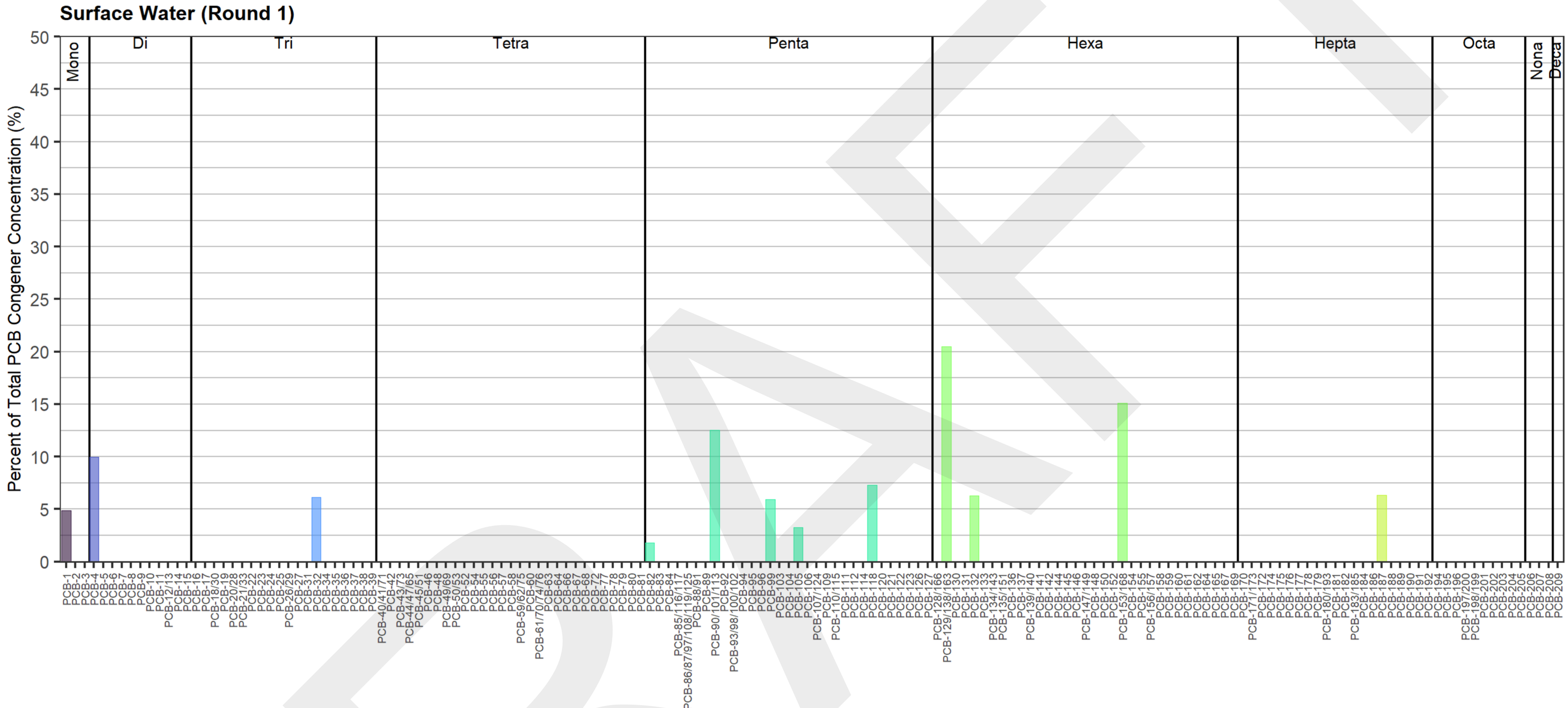
cti ARCADIS

FIGURE
4-1

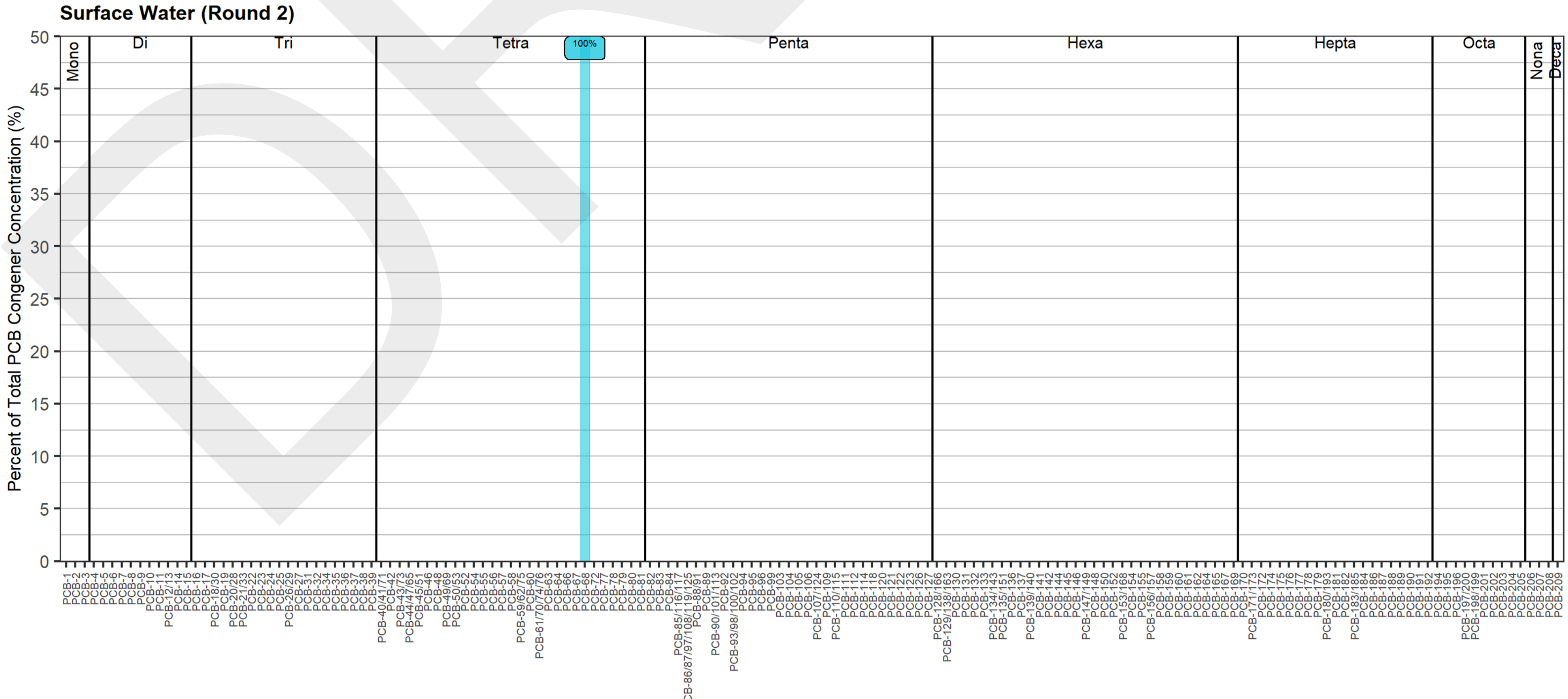
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

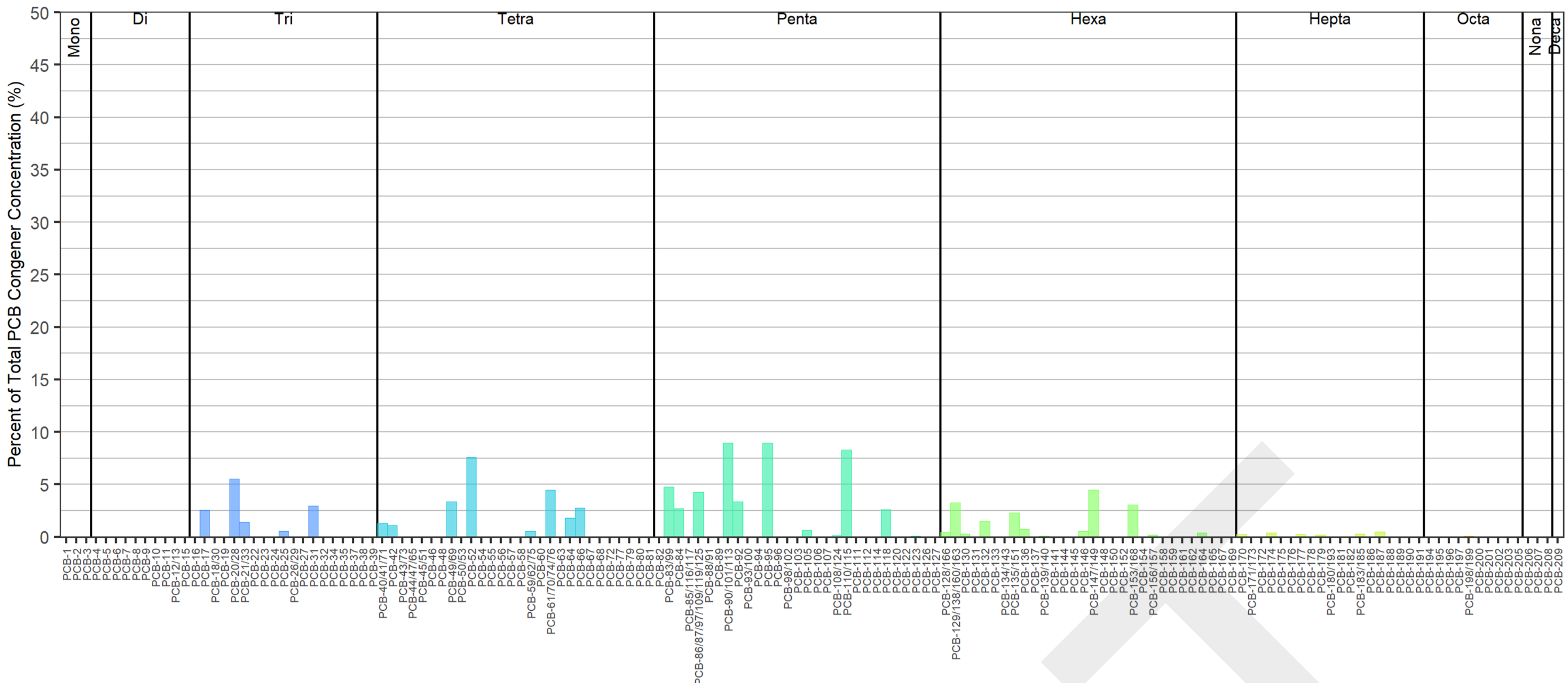
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – UP-12

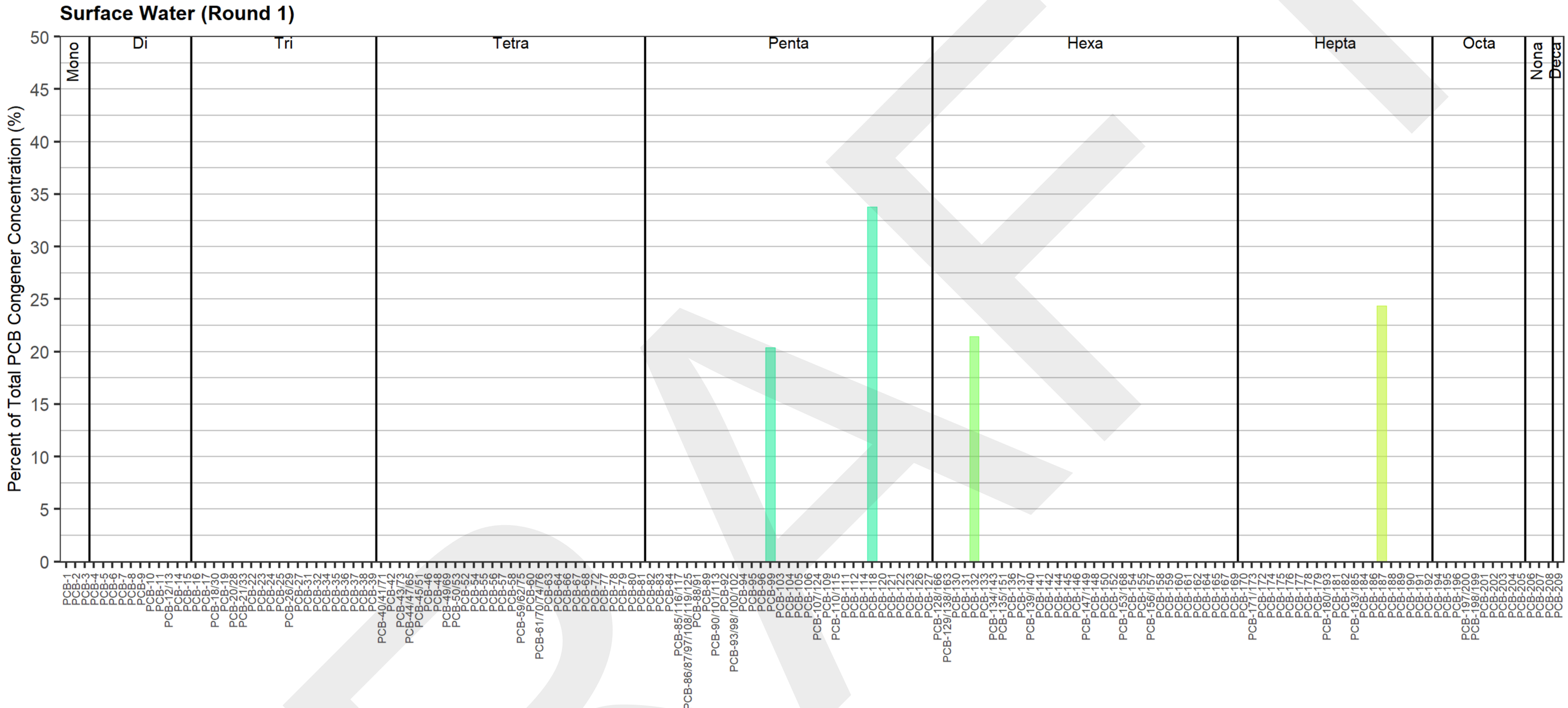
FIGURE
4-2a

11/17/2023 10:59:50 AM

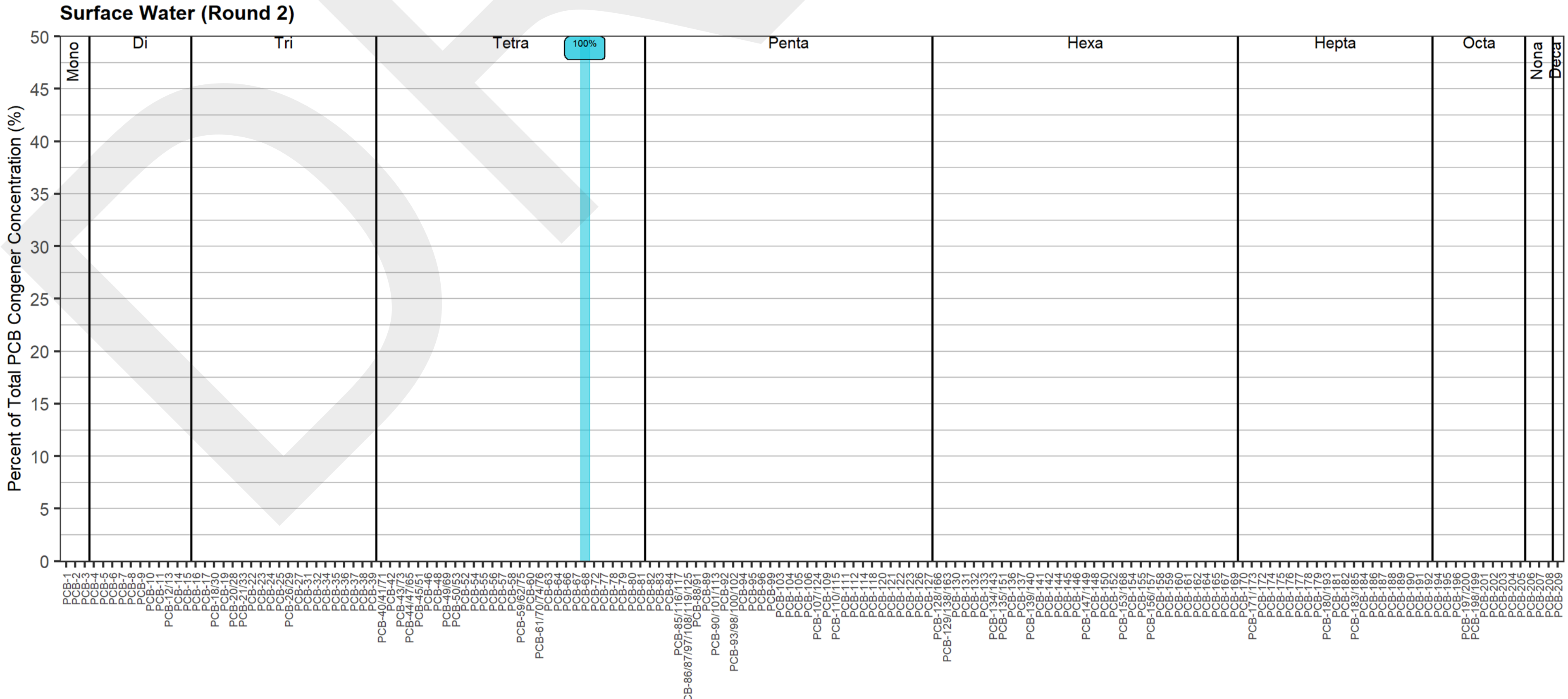
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

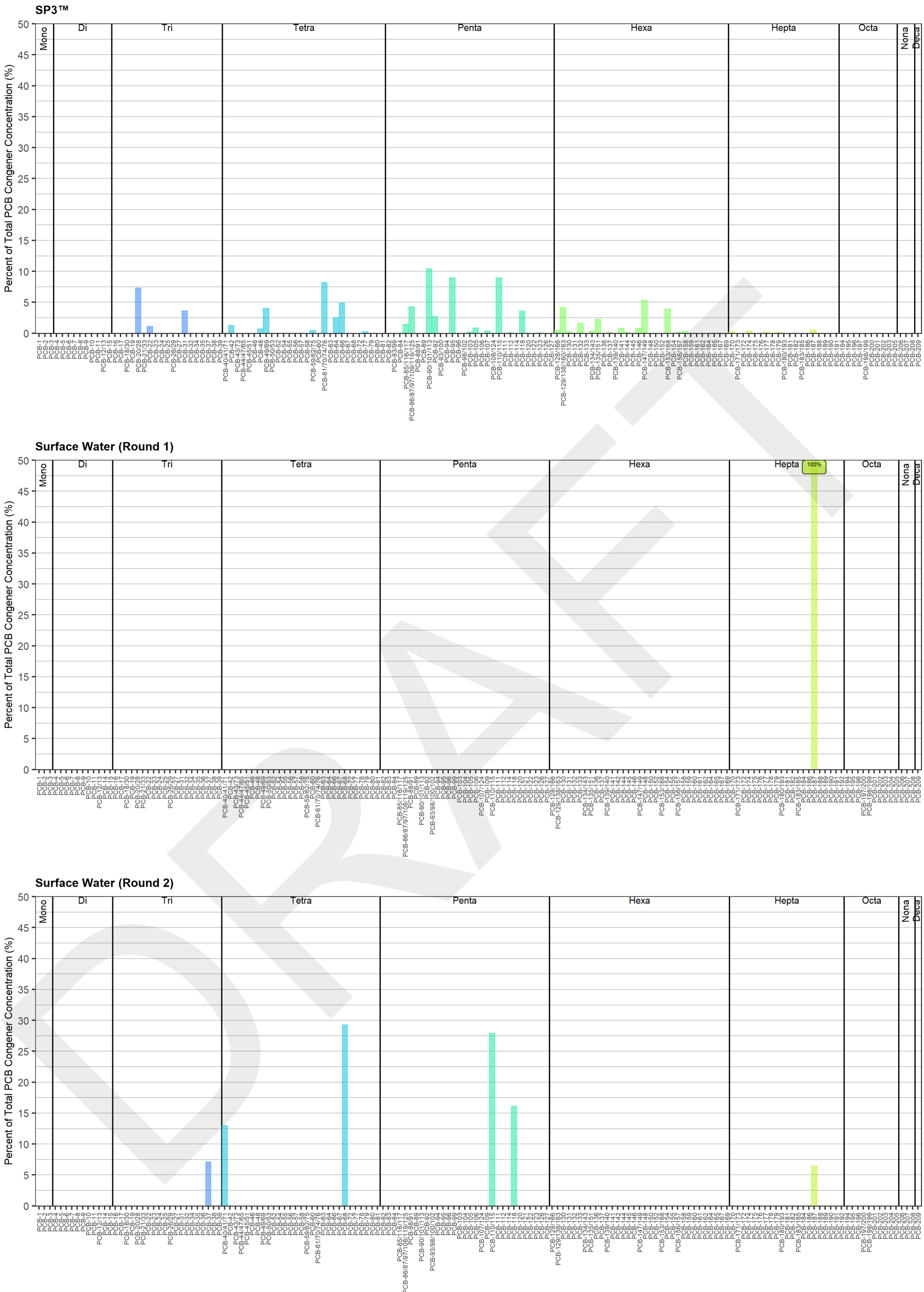
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – UP-11

cti ARCADIS

FIGURE
4-2b

11/17/2023 10:59:52 AM



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-10

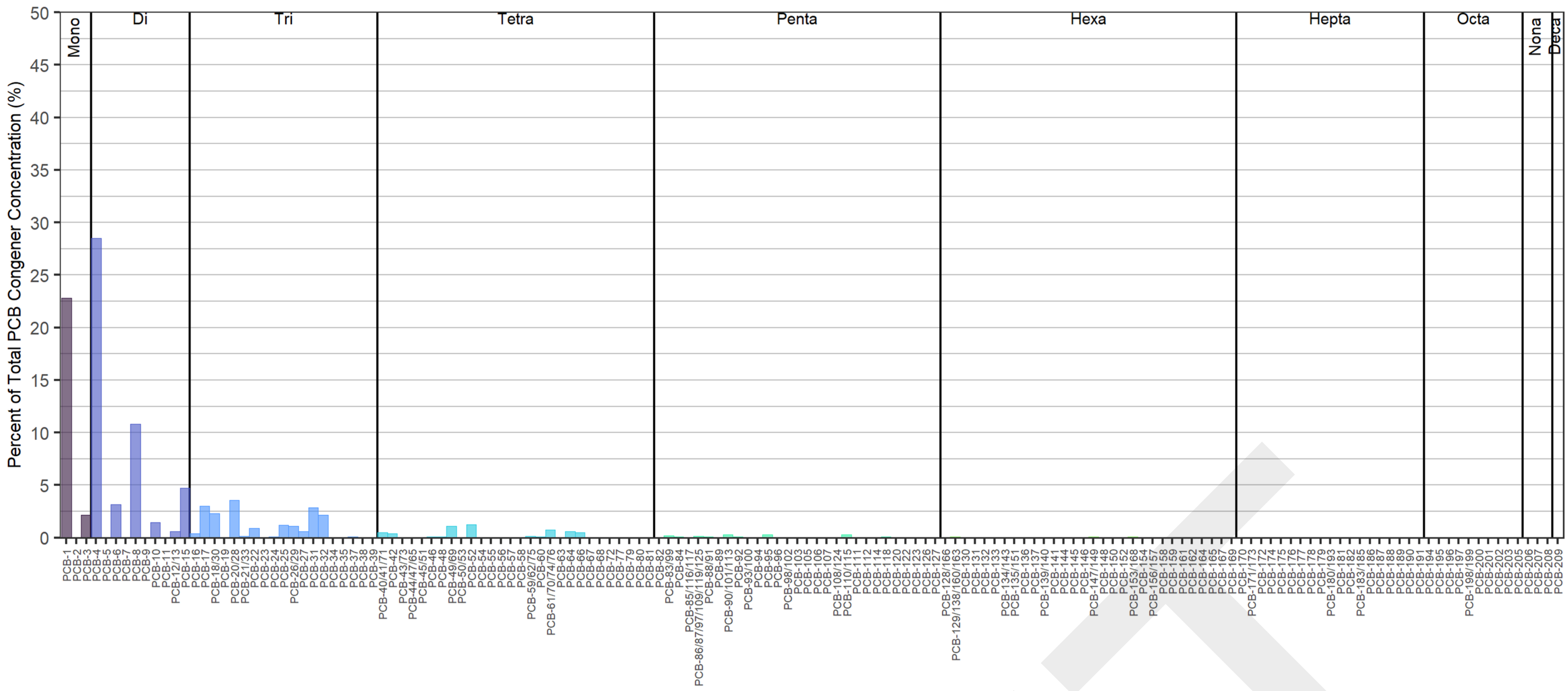
cti ARCADIS

FIGURE
4-2c

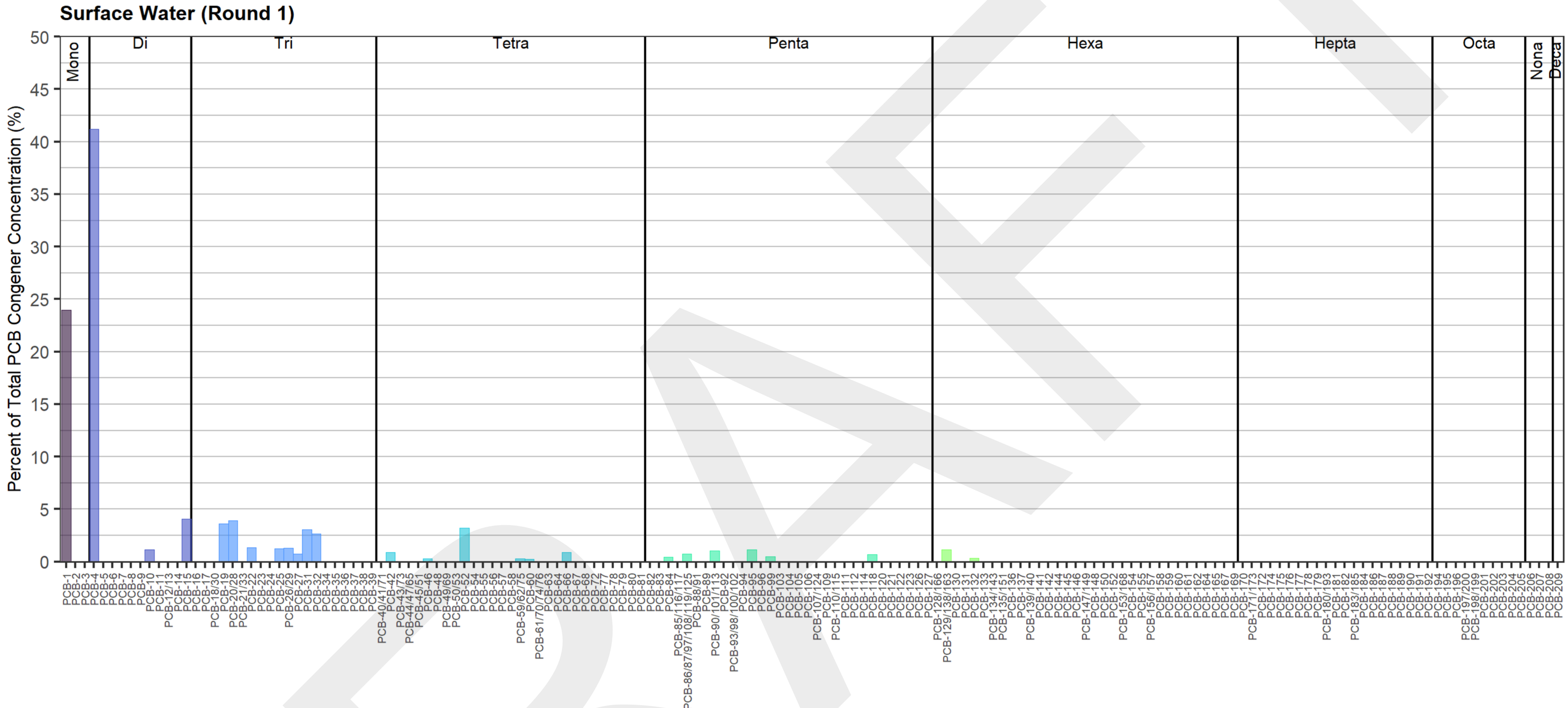
DRAFT

11/17/2023 10:59:55 AM

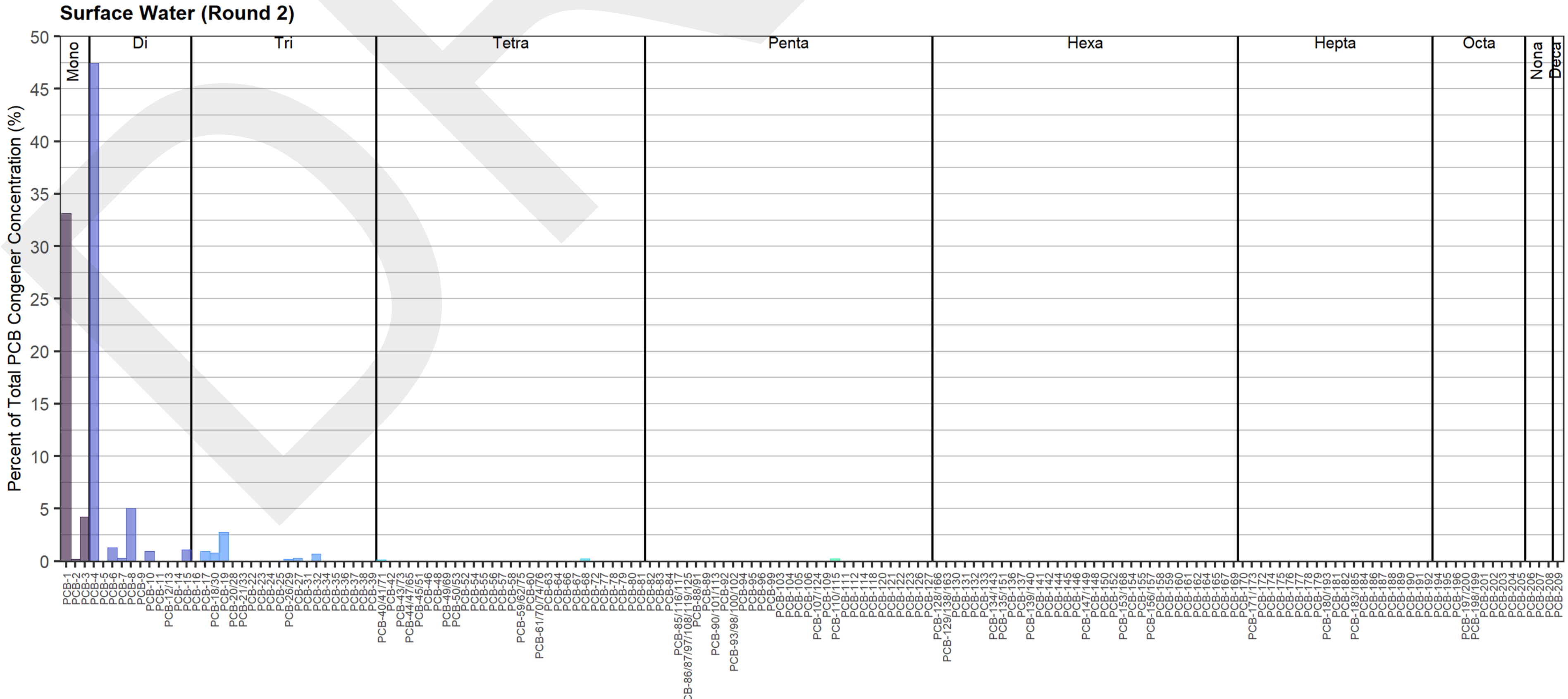
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

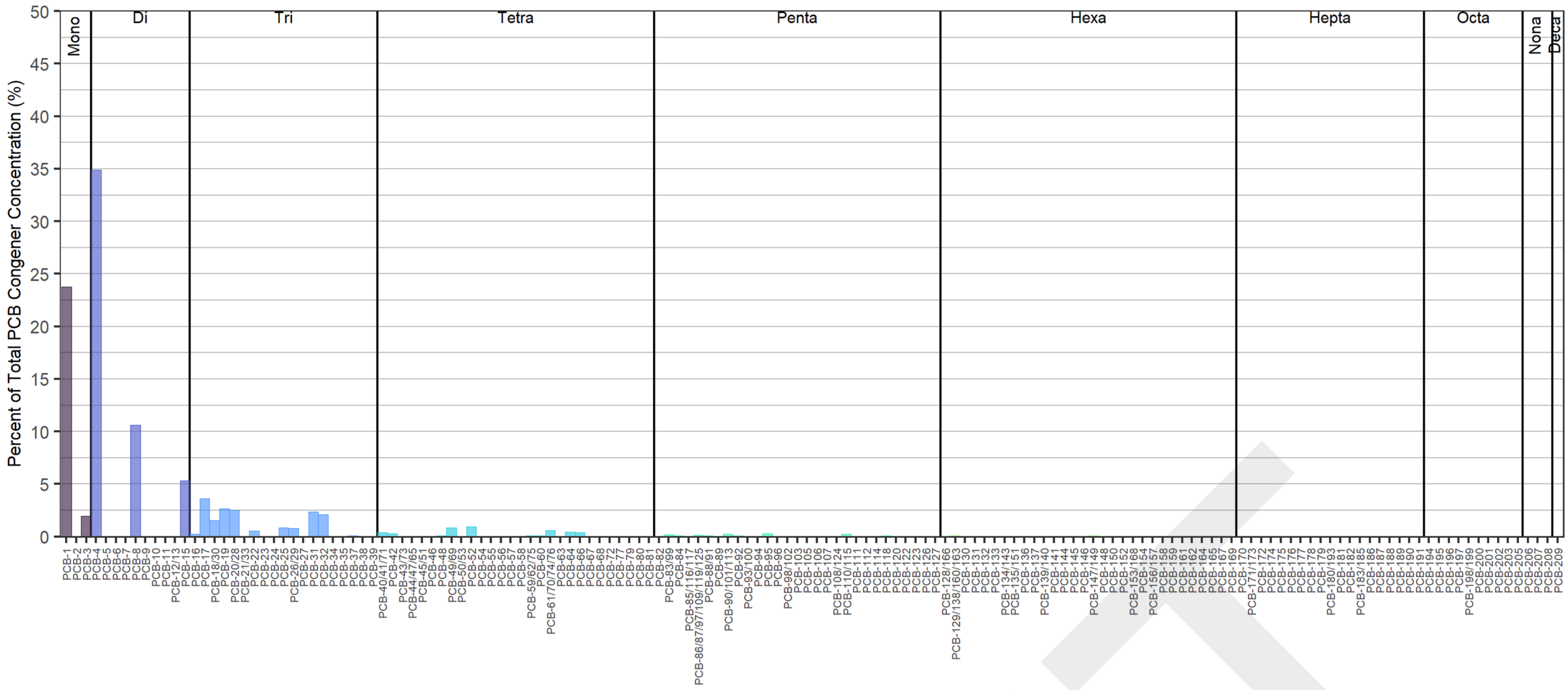
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-09

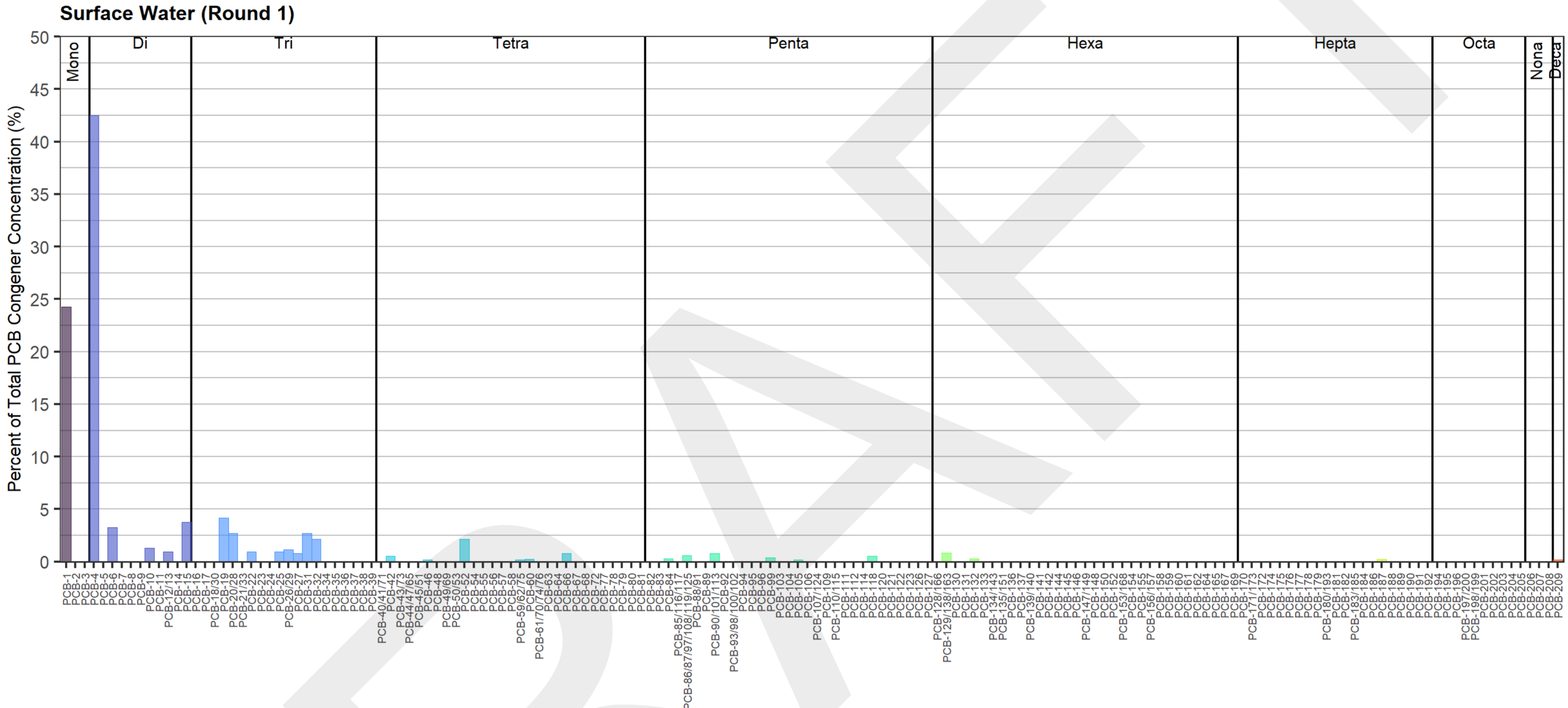
ARCADIS

FIGURE
4-2d

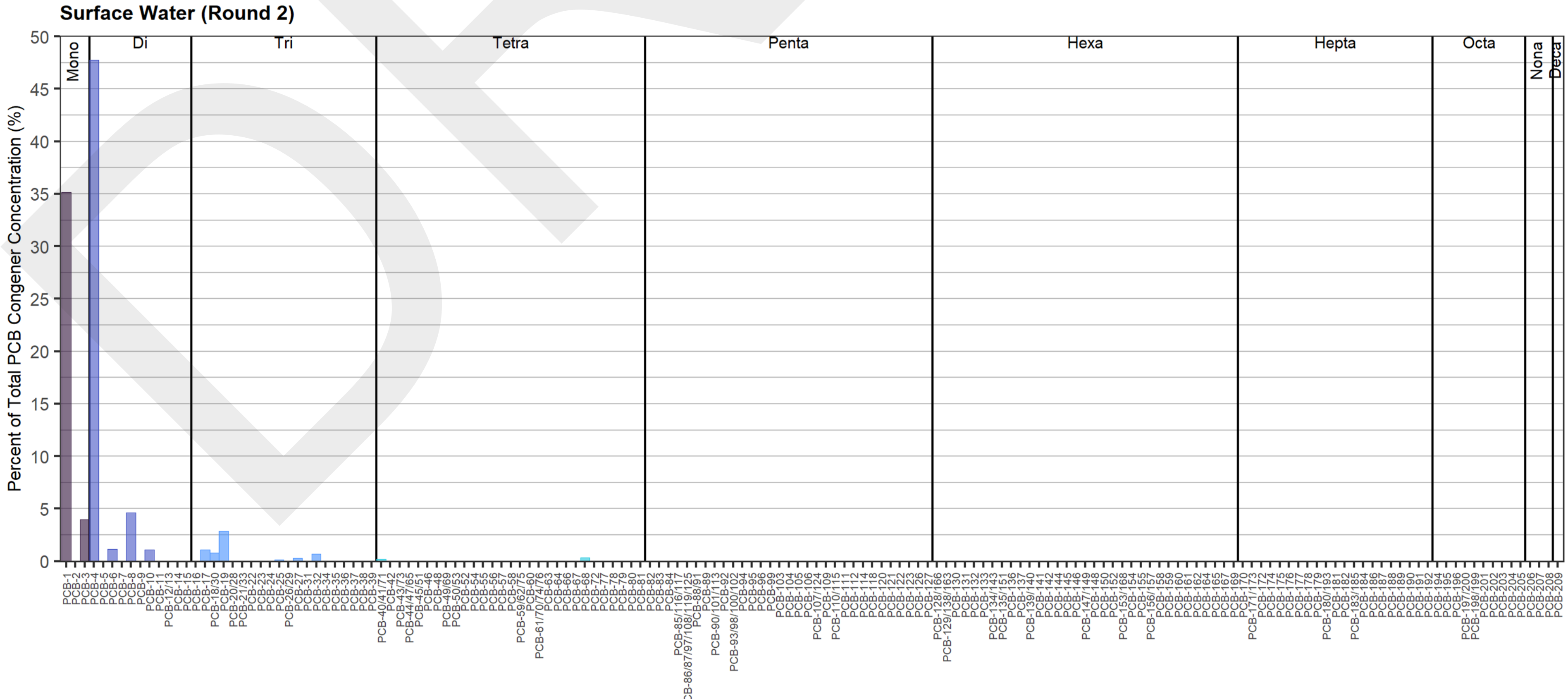
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

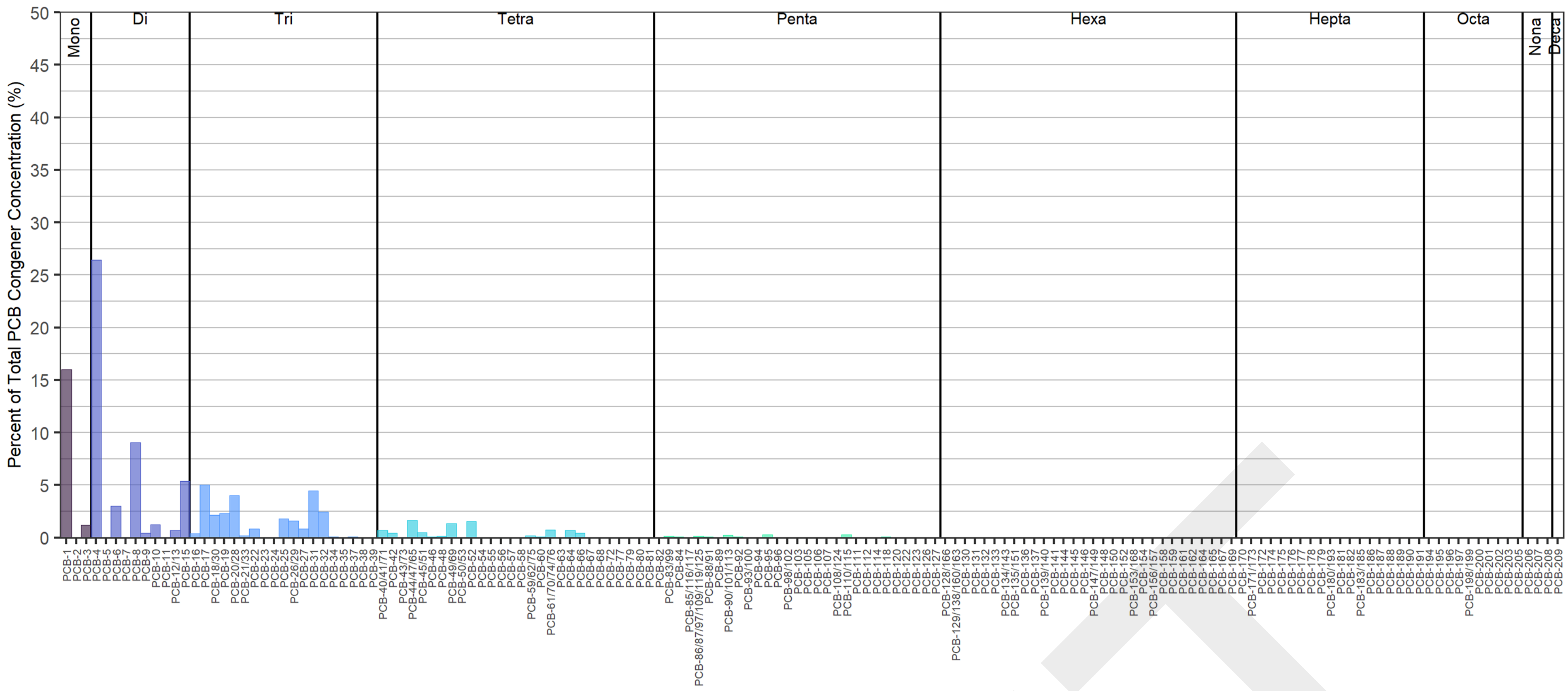
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-08

cti ARCADIS

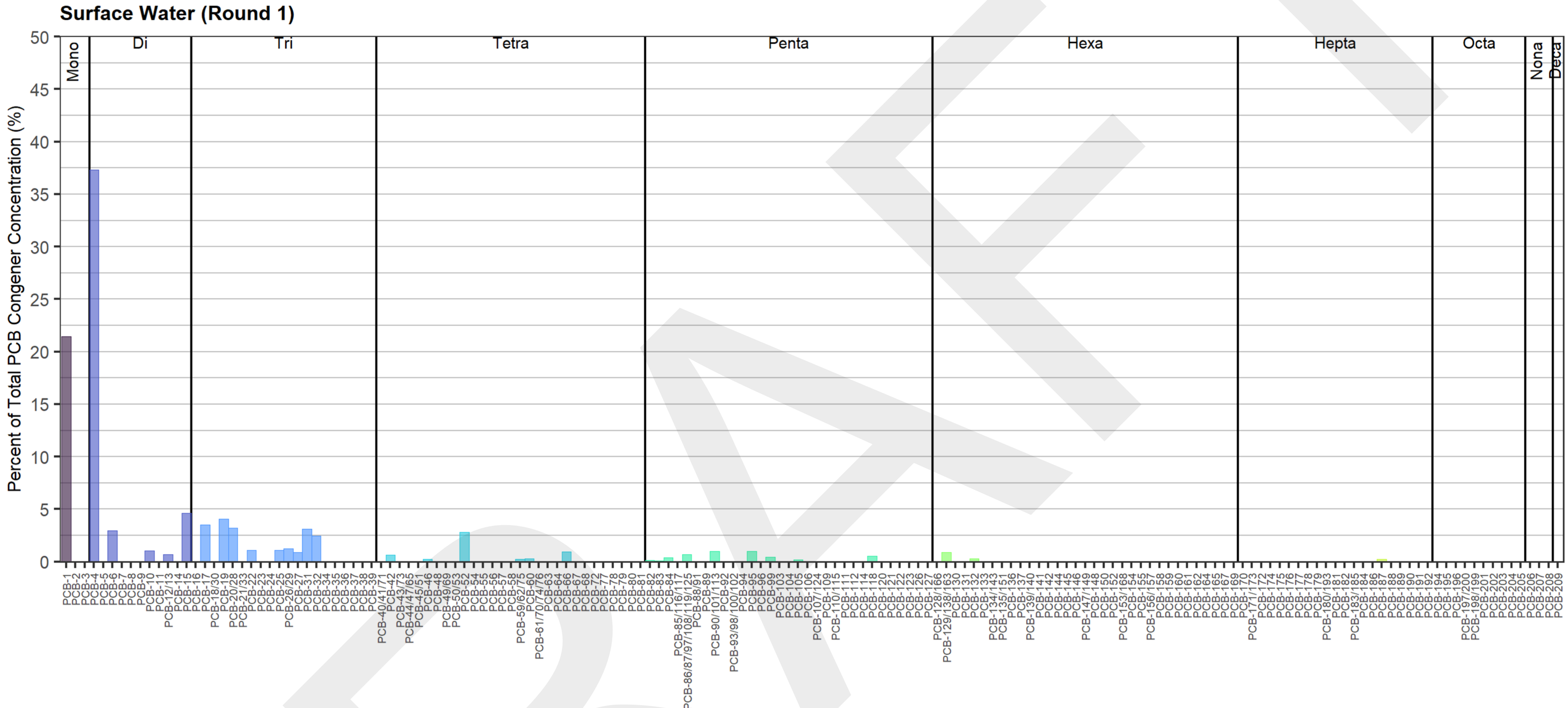
FIGURE **4-2e**

11/17/2023 10:59:59 AM

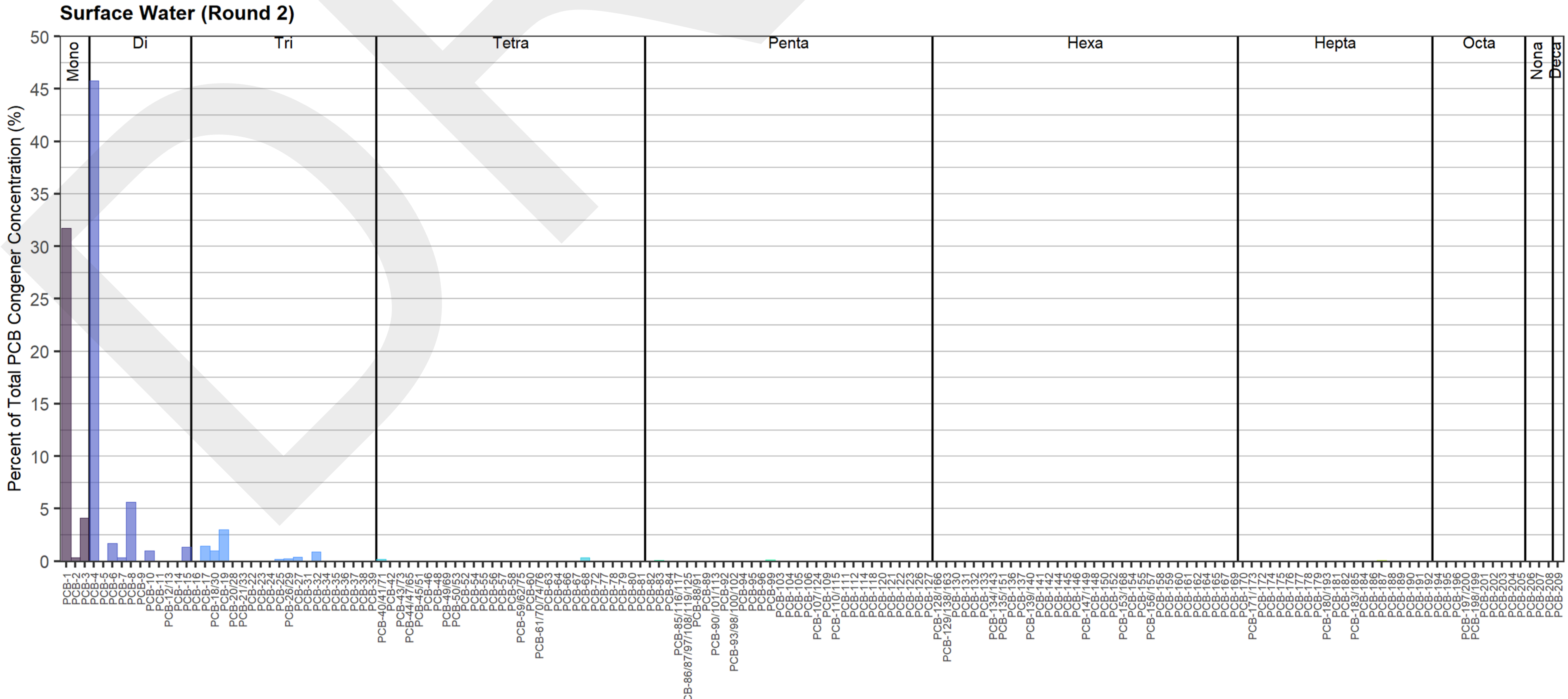
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

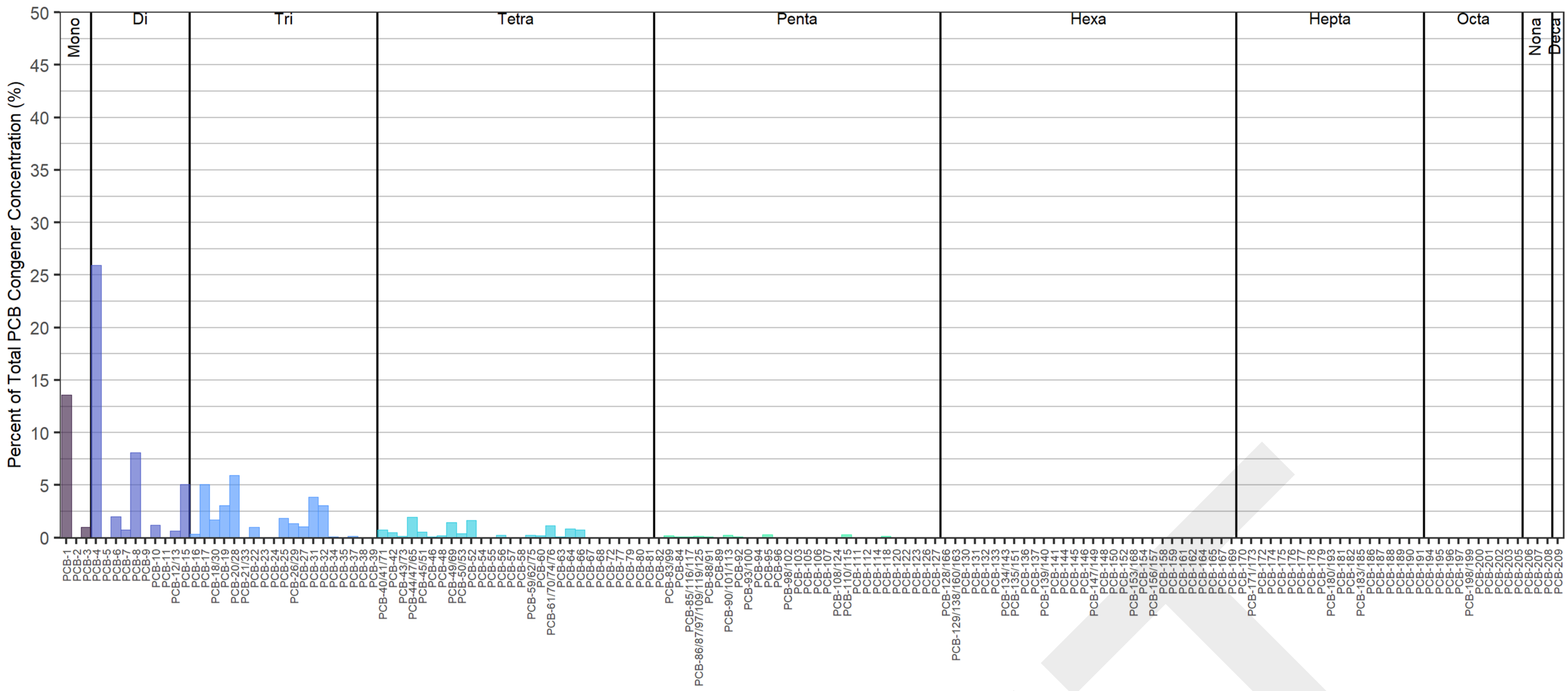
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-07

cti ARCADIS

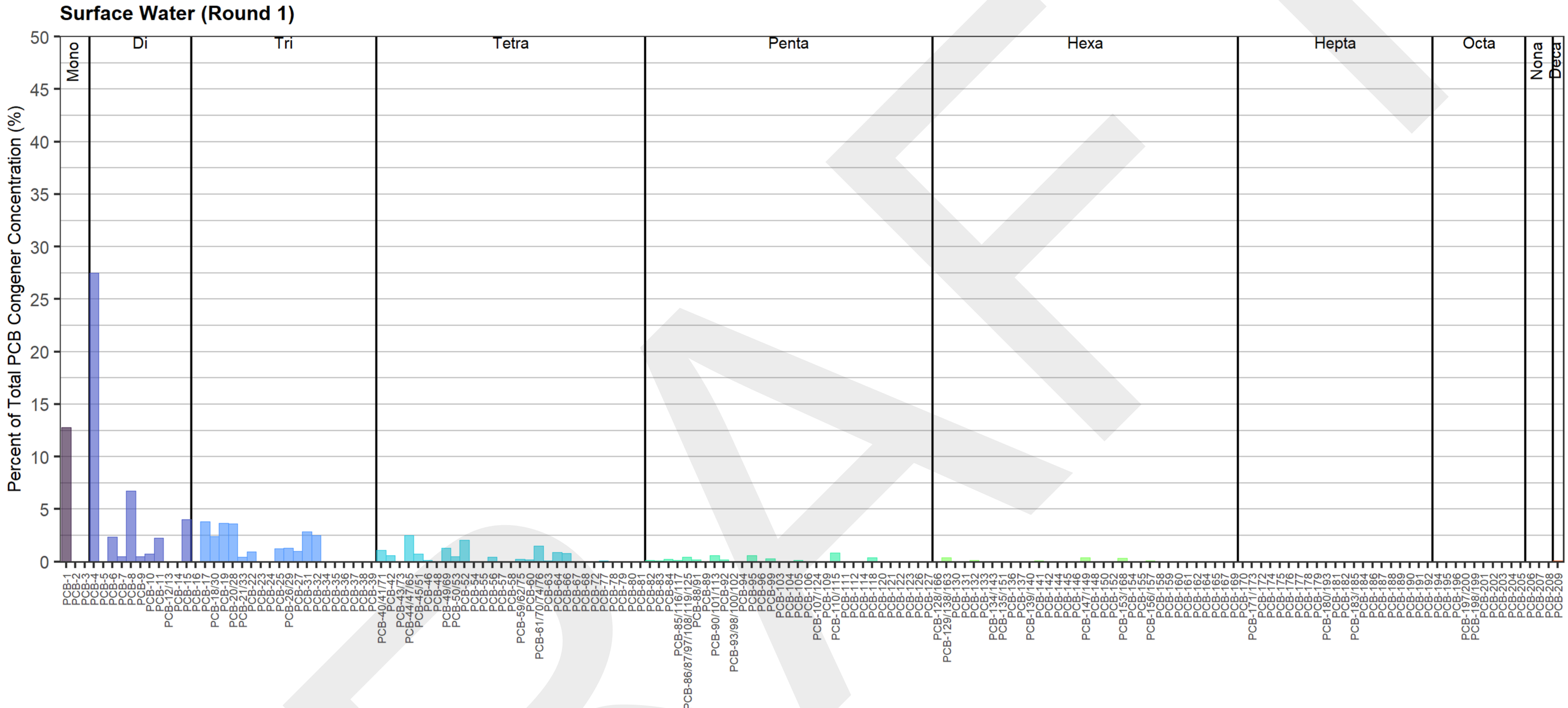
FIGURE
4-2f

11/17/2023 11:00:02 AM

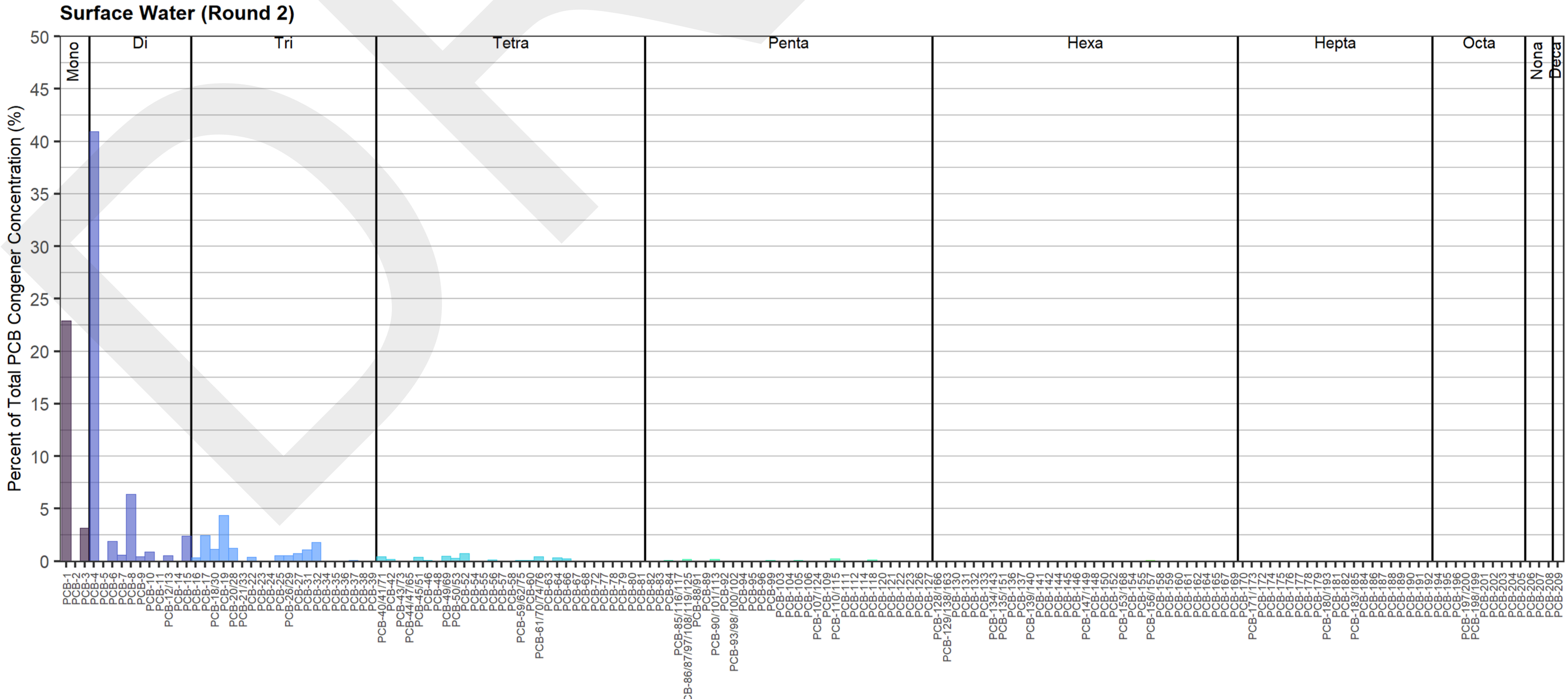
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

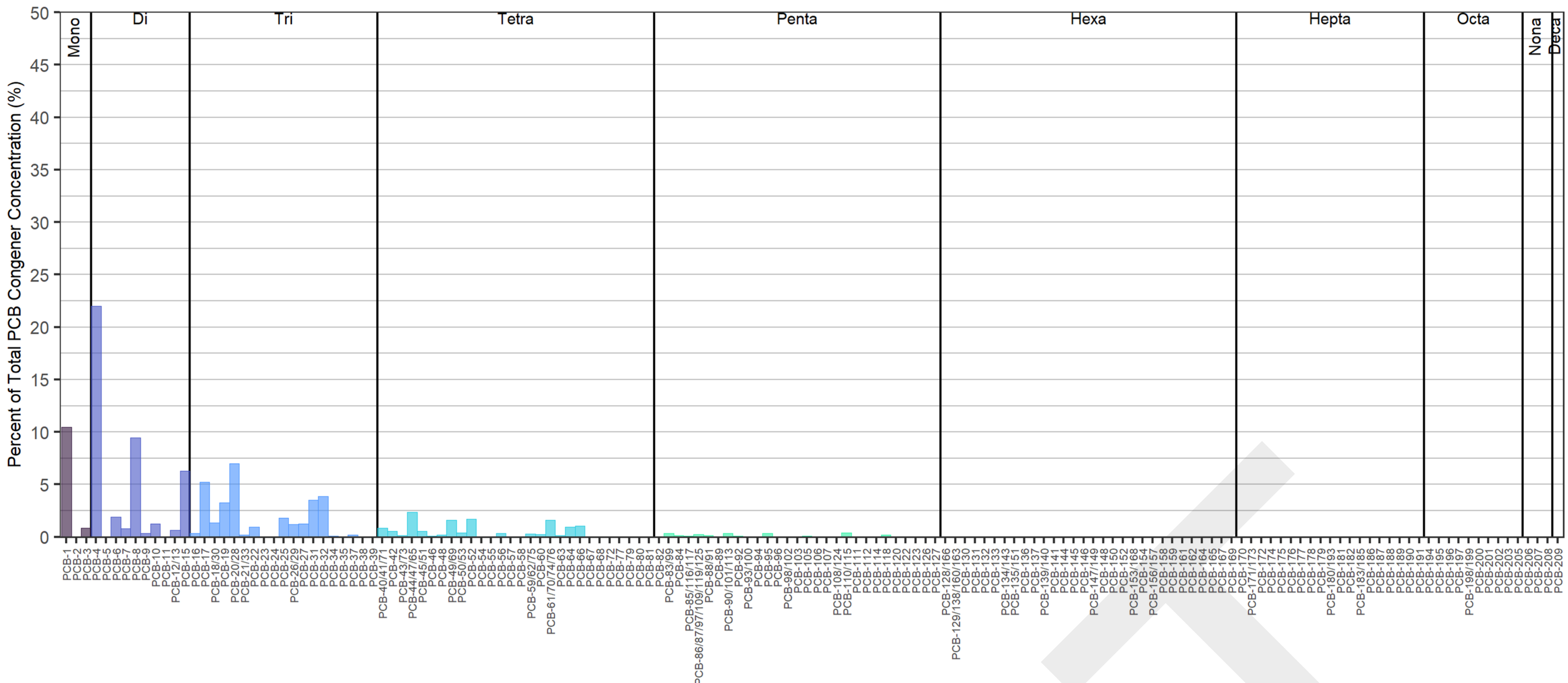
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-06

cti ARCADIS

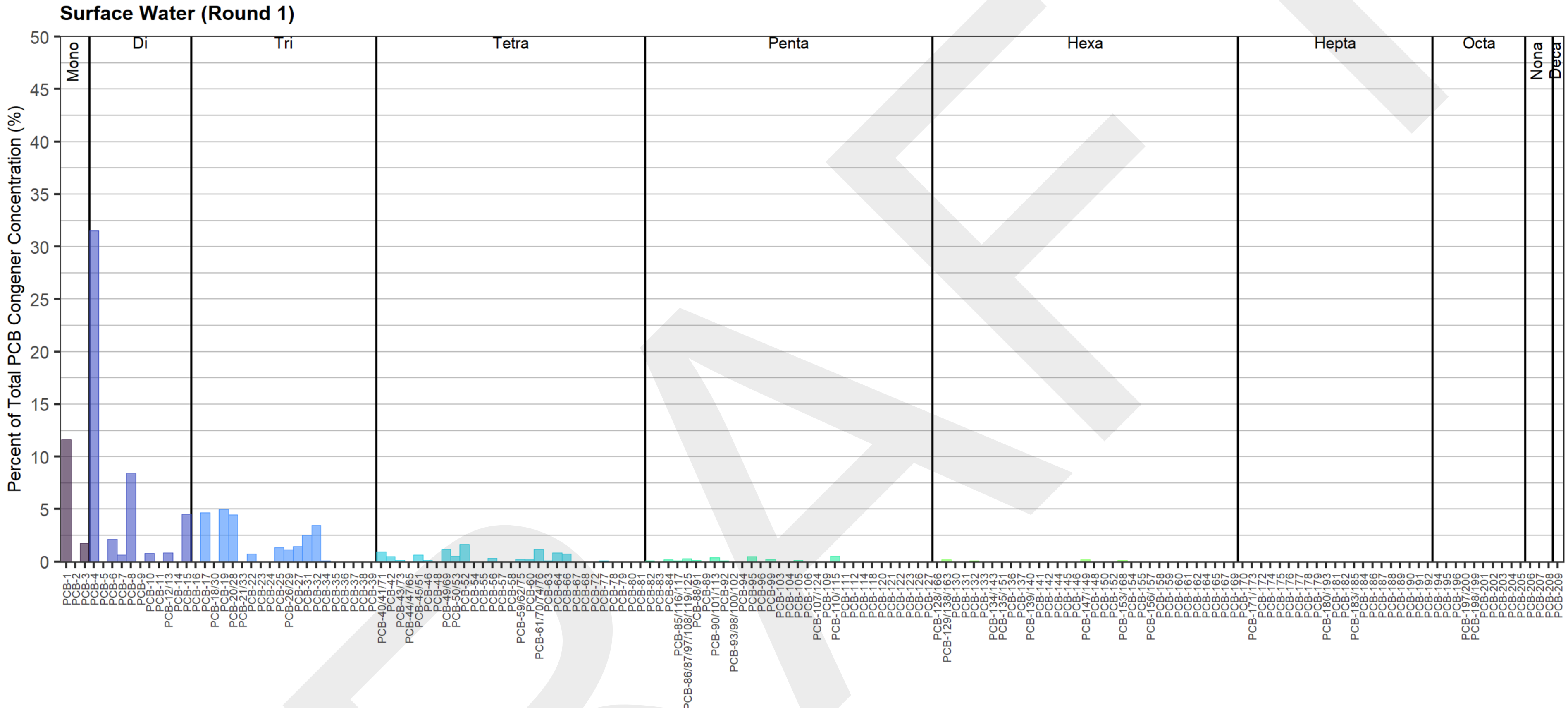
FIGURE
4-2g

11/17/2023 11:00:06 AM

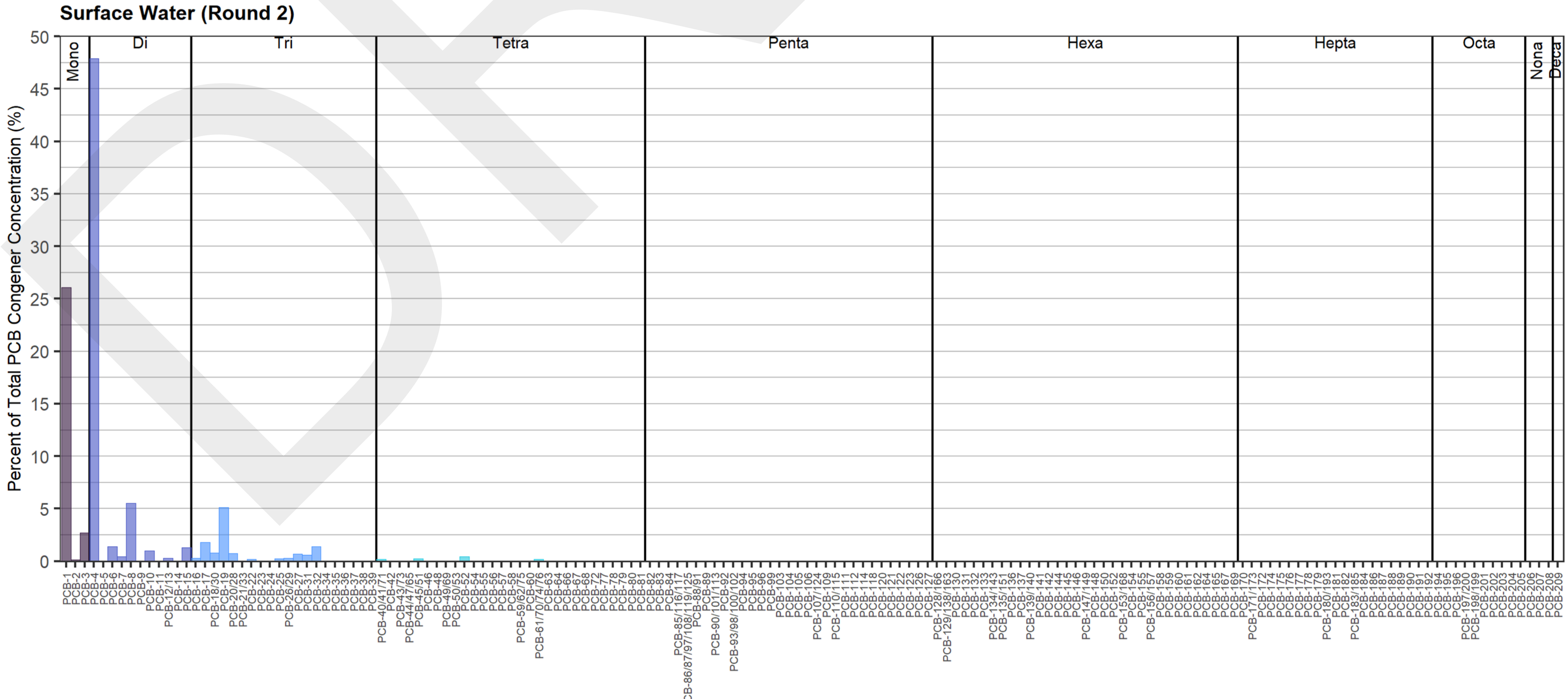
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

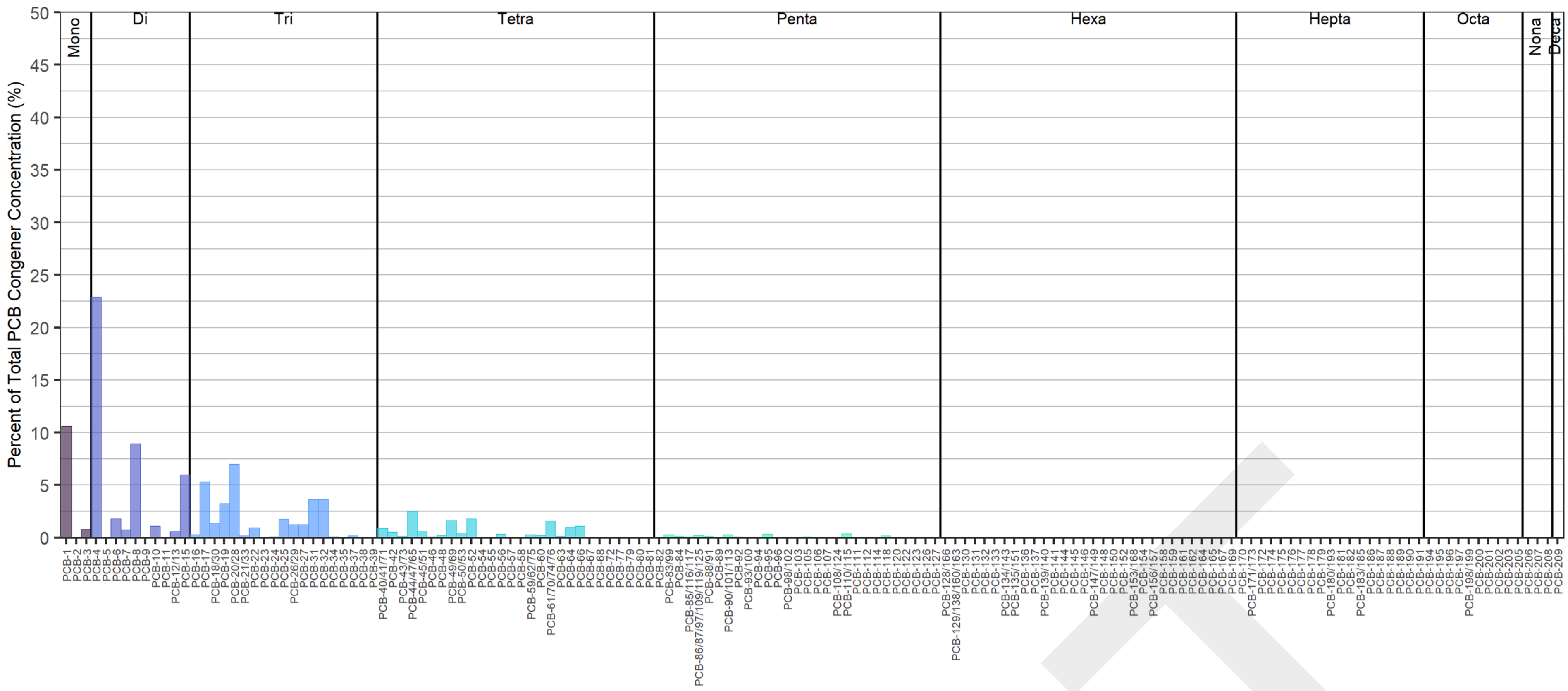
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-05

cti ARCADIS

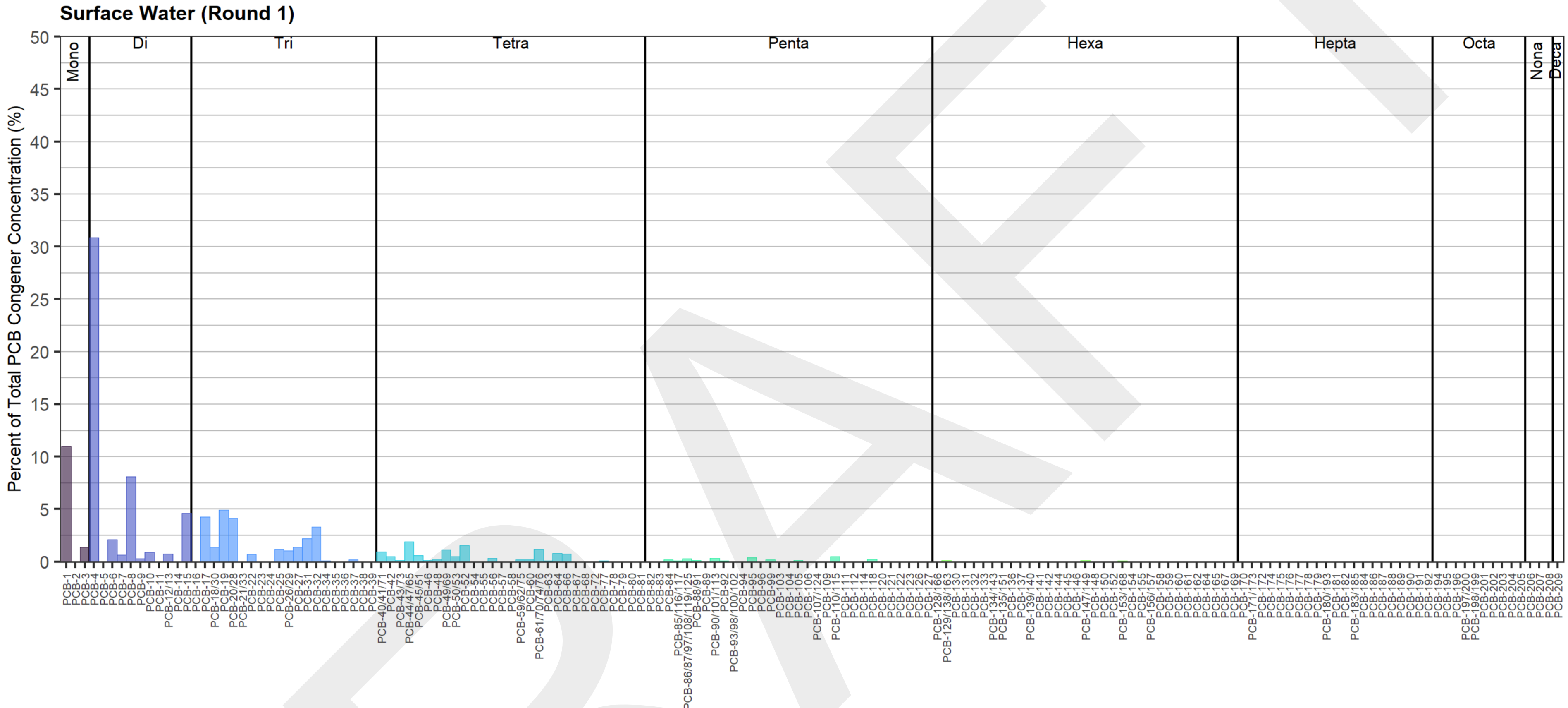
FIGURE
4-2h

11/17/2023 11:00:09 AM

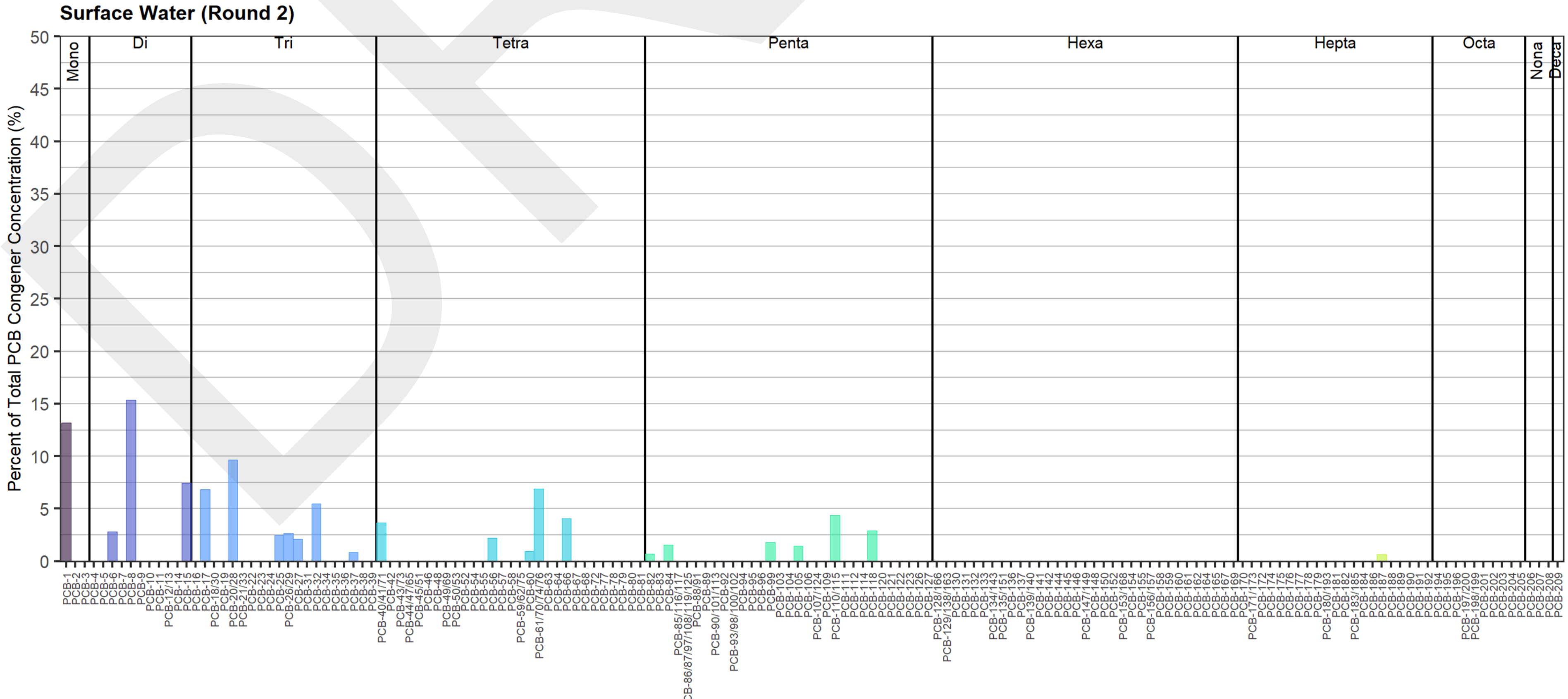
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

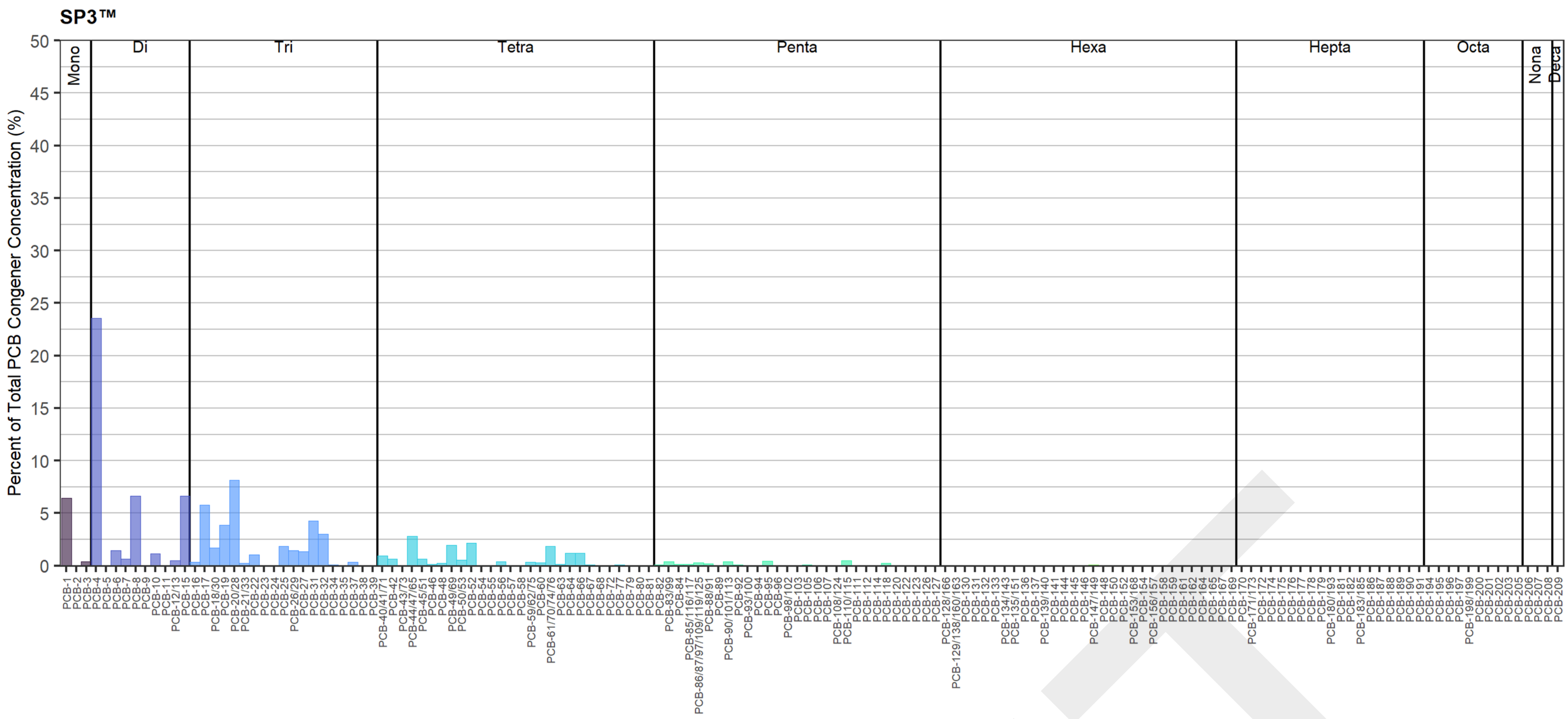
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

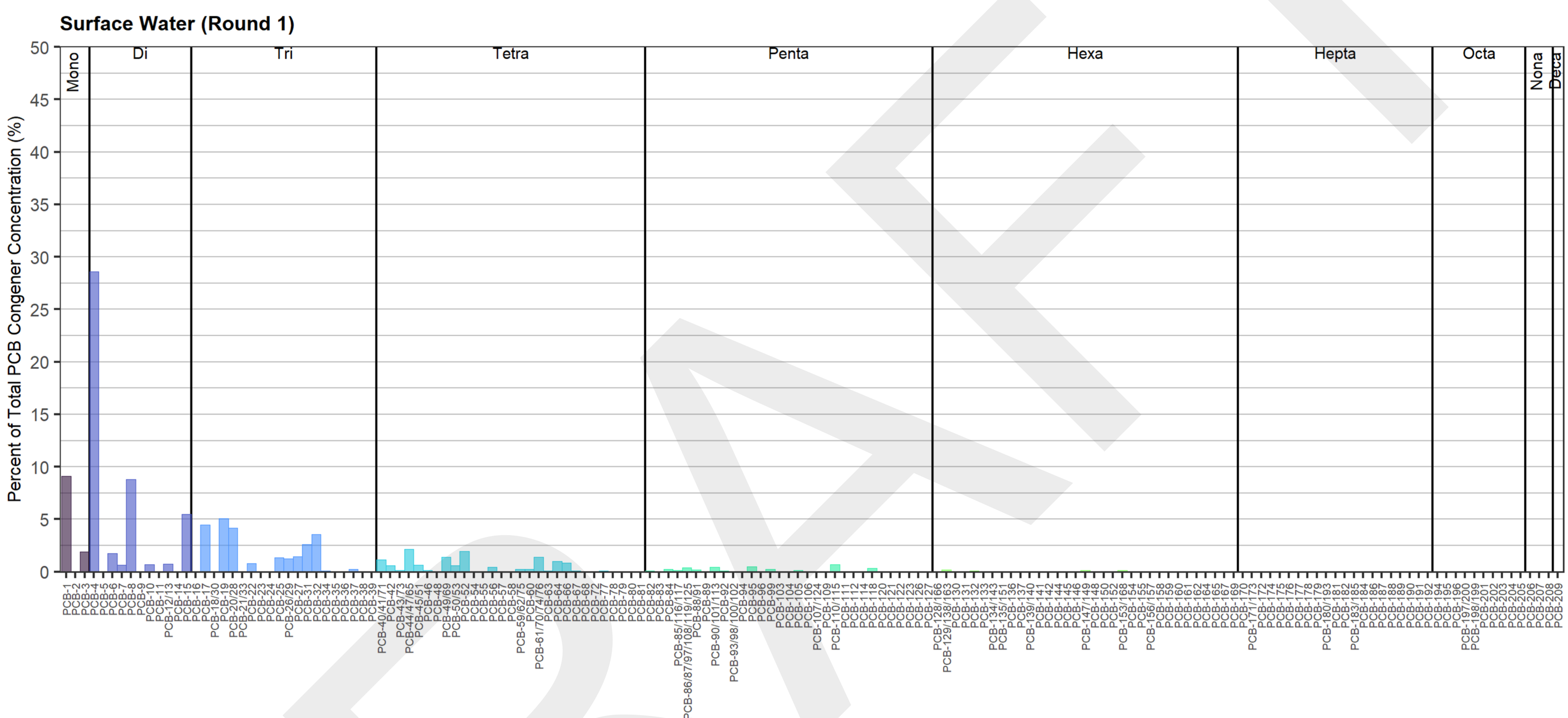
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – BR-04

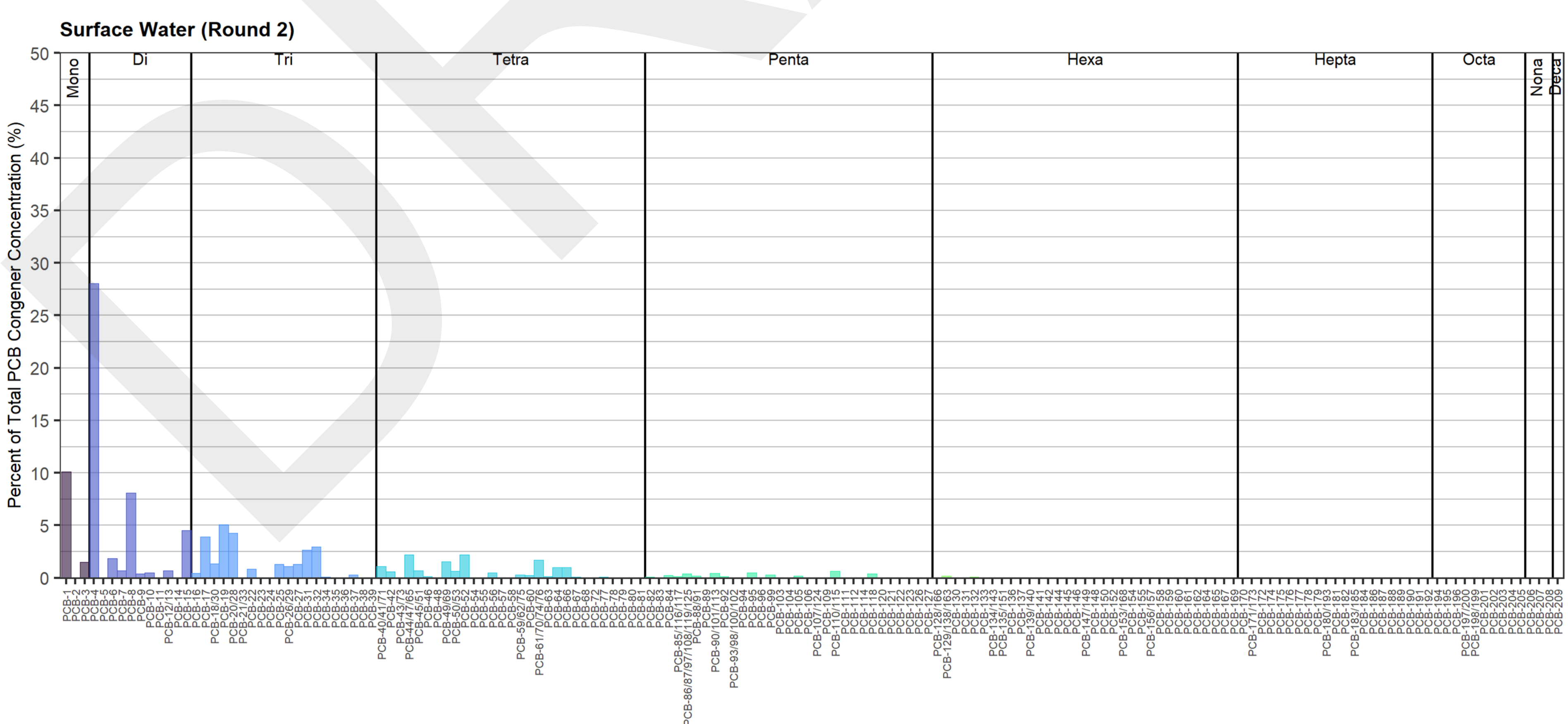
cti ARCADIS

FIGURE
4-2i

11/17/2023 11:00:12 AM







Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

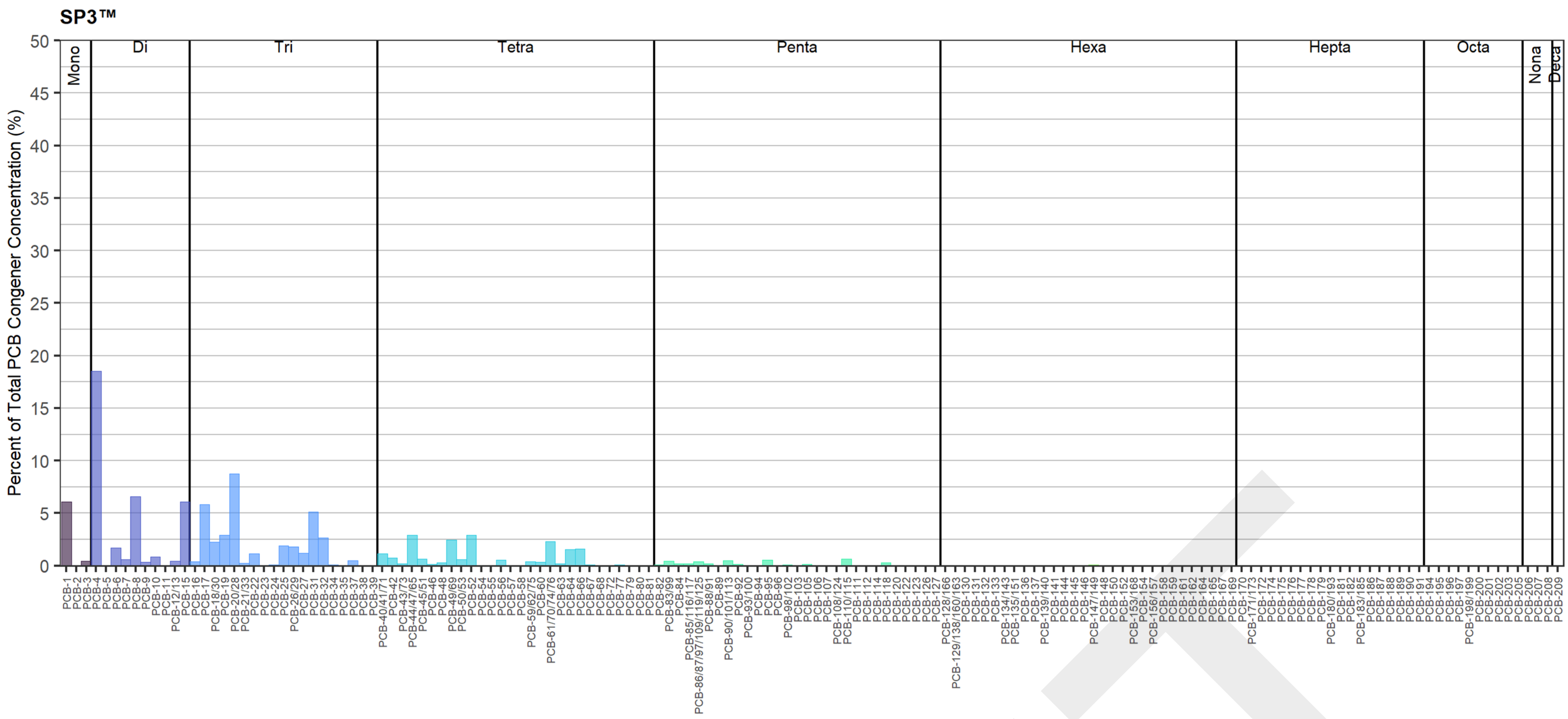
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

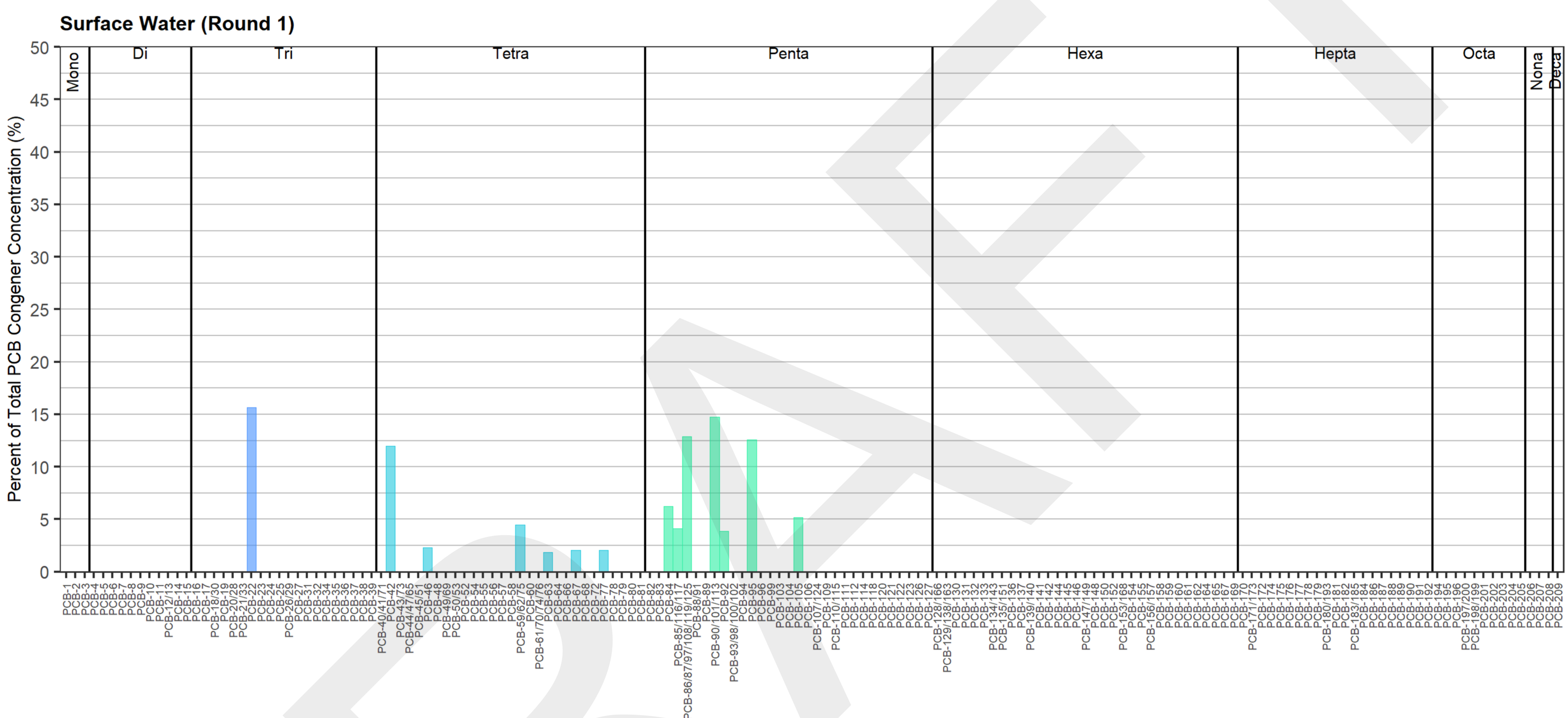
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – MR-03

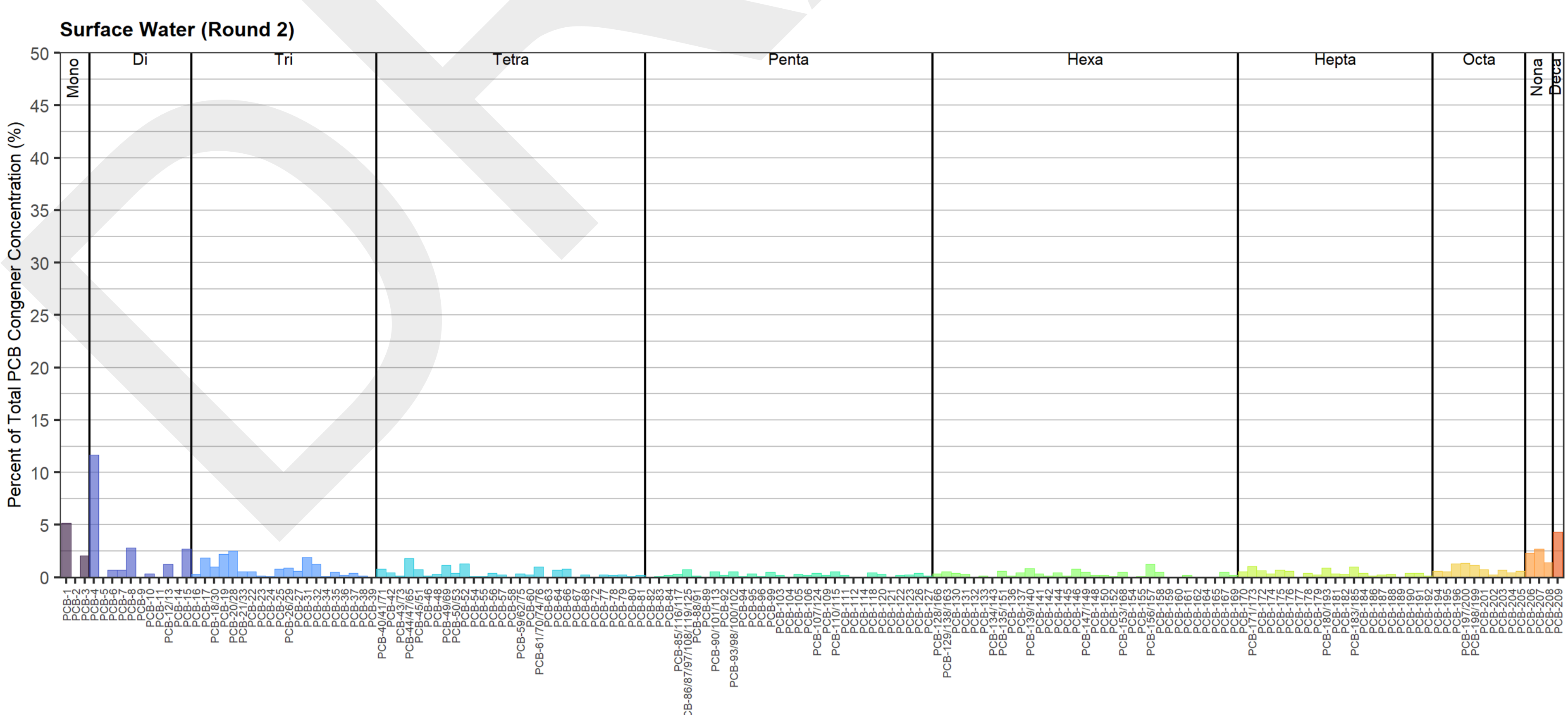
cti ARCADIS

FIGURE
4-2j

11/17/2023 11:00:15 AM







Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

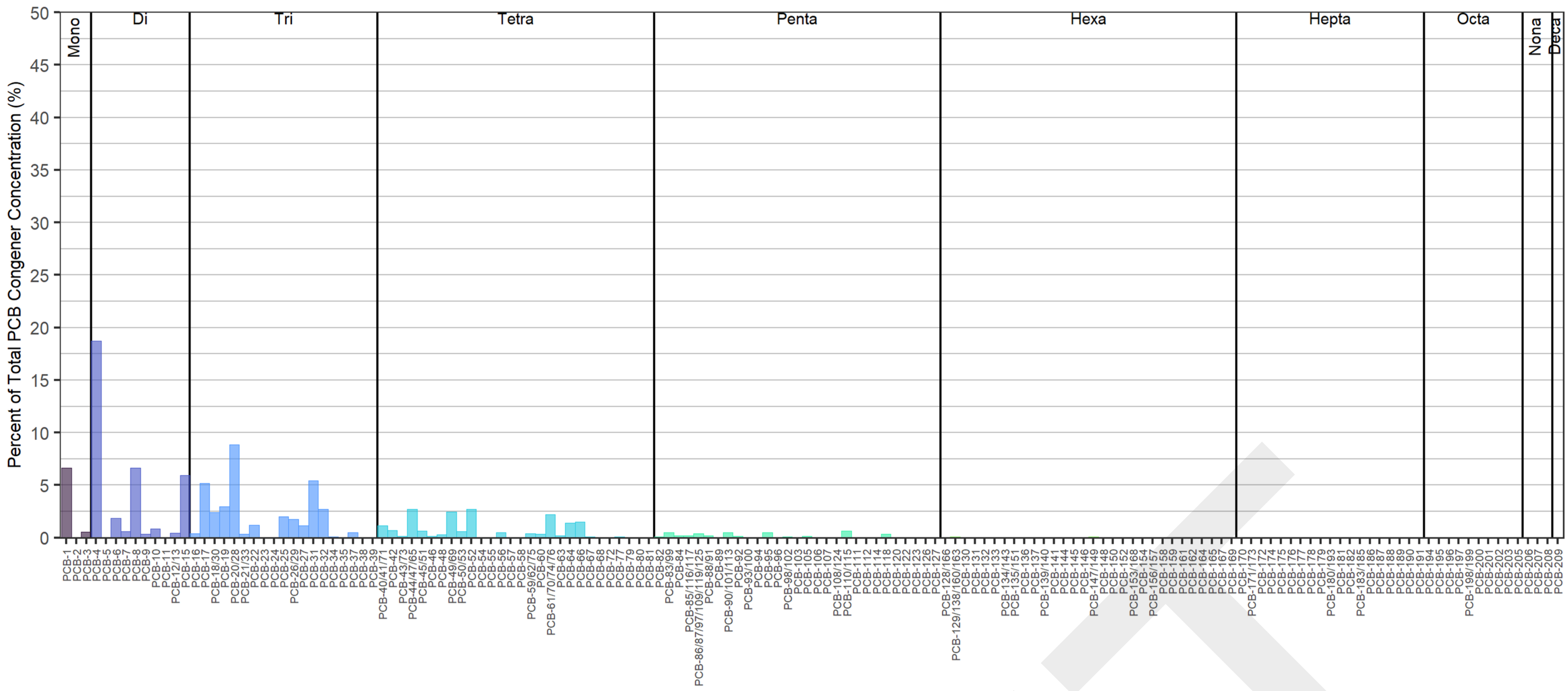
PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – CL-02

cti ARCADIS

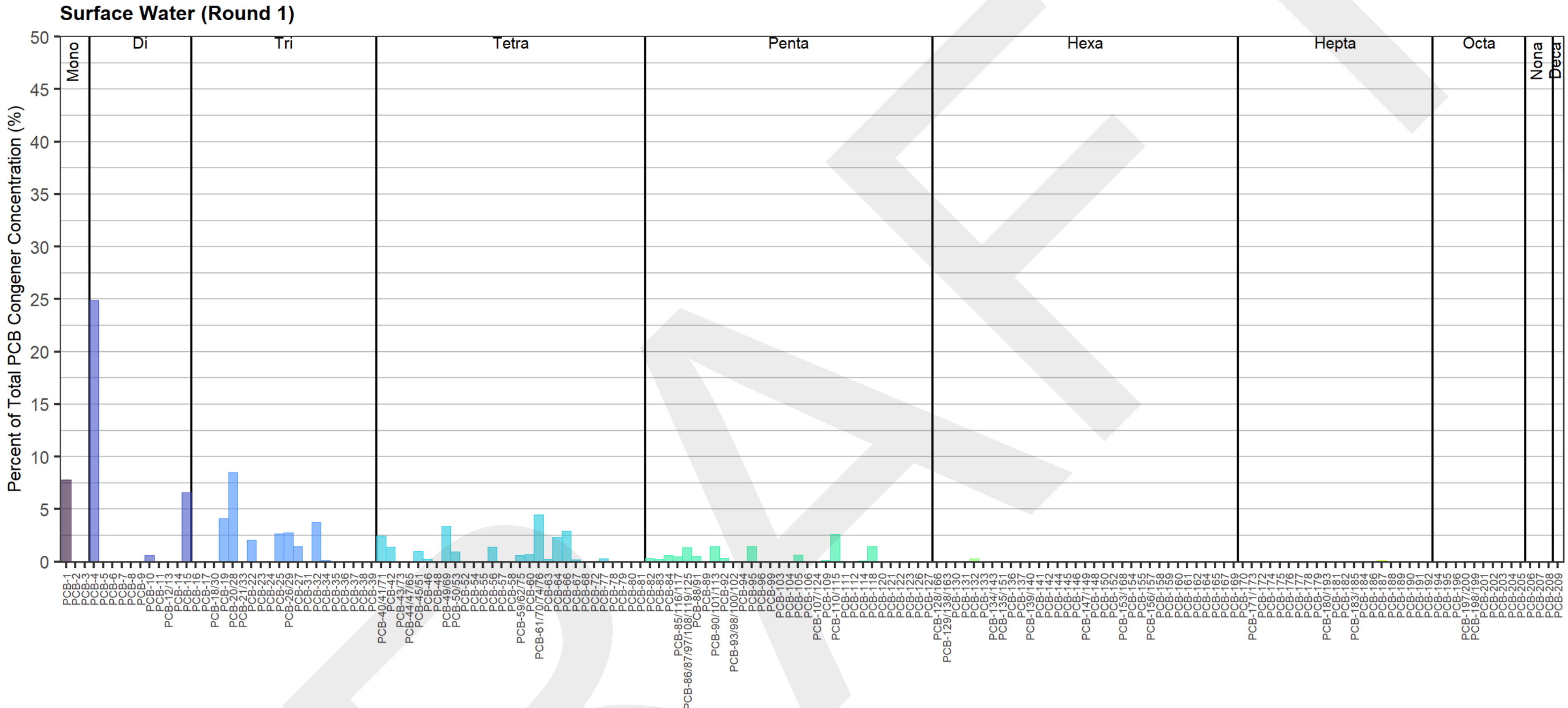
FIGURE
4-2k

11/17/2023 11:00:18 AM

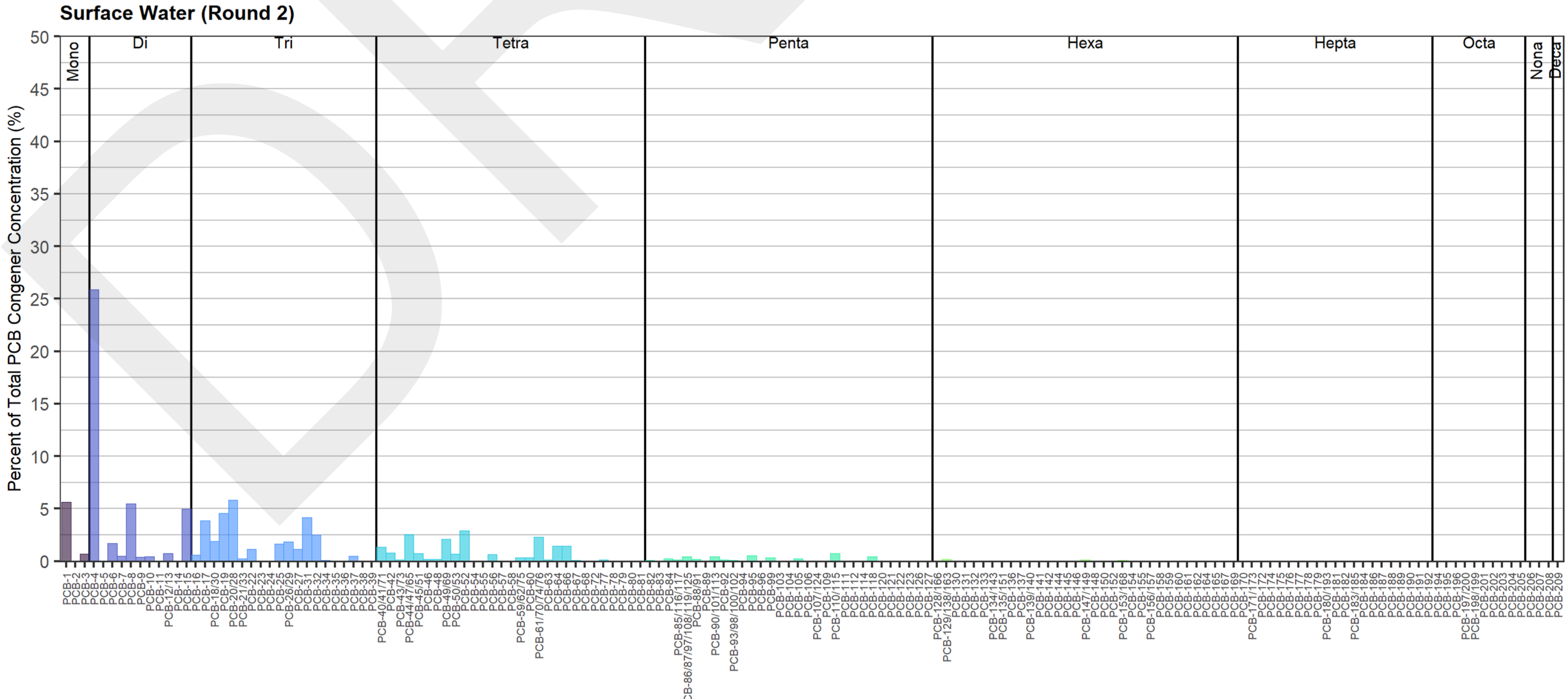
SP3™



Surface Water (Round 1)



Surface Water (Round 2)



Monochlorobiphenyl	Hexachlorobiphenyl
Dichlorobiphenyl	Heptachlorobiphenyl
Trichlorobiphenyl	Octachlorobiphenyl
Tetrachlorobiphenyl	Nonachlorobiphenyl
Pentachlorobiphenyl	Decachlorobiphenyl

Notes:

1. Non-detects summed as zero in percent of Total PCB calculation.
2. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
3. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
4. Time-averaged surface water samples were collected using SP3™ samplers. Round 1 and 2 surface water samples were discrete grab samples.
5. PCB = polychlorinated biphenyl.

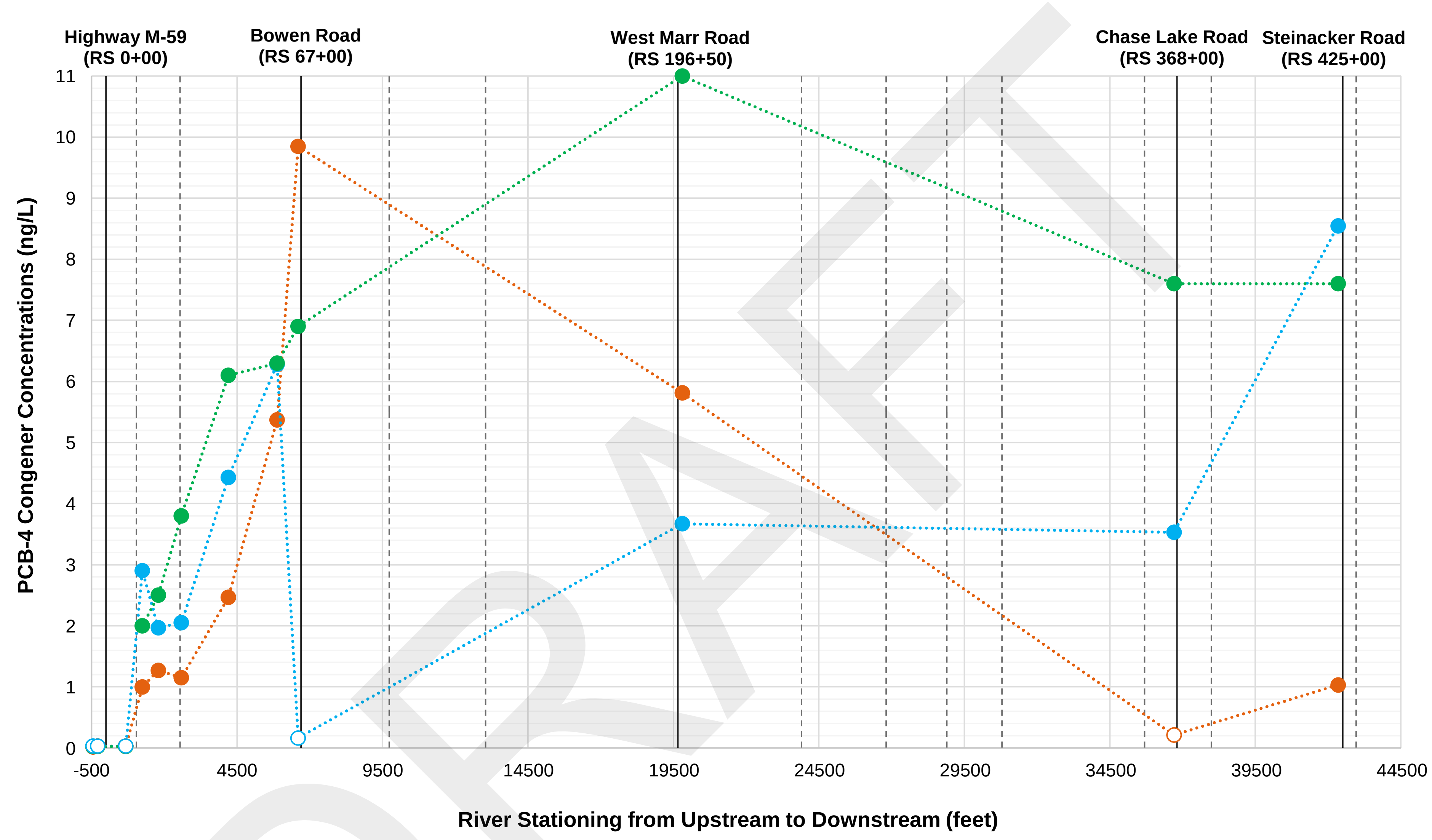
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB CONGENER MASS DISTRIBUTION IN SURFACE WATER – SR-01

cti ARCADIS

FIGURE 4-2I

11/17/2023 11:00:21 AM



Legend:

- Calculated Freely Dissolved PCB Concentrations (C_{free})
- Round 1 (September 2020) Discrete Surface Water Dissolved PCB Concentrations
- Round 2 (November 2020) Discrete Surface Water Dissolved PCB Concentrations
- Non-detect result
- Bridges
- Other Streams

Notes:

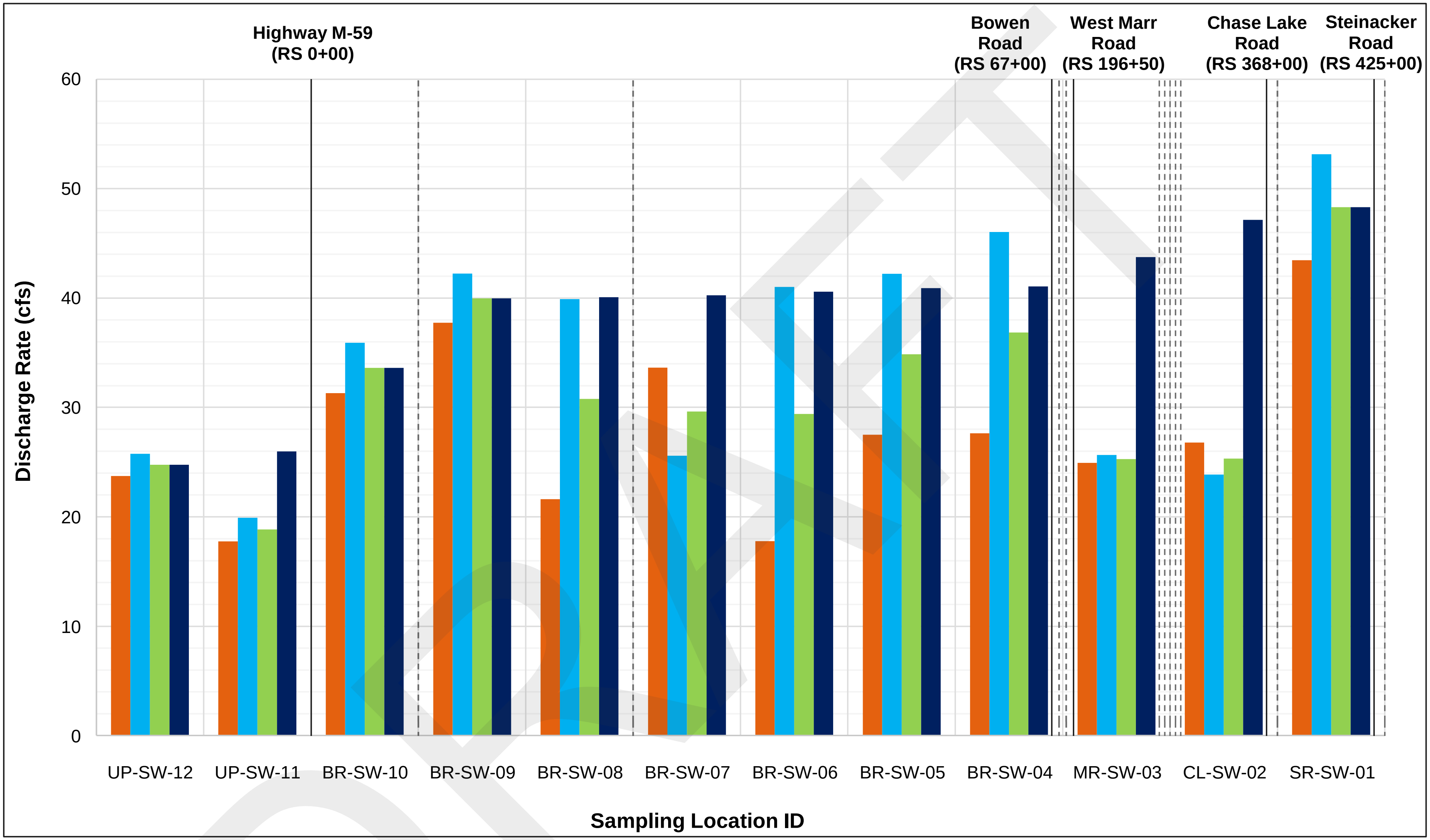
1. River stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Locations for other streams obtained from Michigan GIS Open Data portal.
3. Round 1 and 2 discrete surface water samples were field-filtered prior to laboratory analysis.
4. Parent and duplicate sample results were averaged for the Round 1 and 2 discrete surface water sampling.
5. Open circles indicate a non-detect sample result reported at the detection limit.
6. Time-averaged surface water samples were collected using the SP3™ samplers and calculated C_{free} results for each sampler are plotted.
7. PCB = polychlorinated biphenyl.
8. ng/L = nanograms per liter.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

CONGENER PCB-4 IN SURFACE WATER SAMPLES

cti | ARCADIS

FIGURE 4-3



Legend:

- Discharge Rates Calculated from Round 1 (September 2020) River Parameters
- Discharge Rates Calculated from Round 2 (November 2020) River Parameters
- Average Discharge Rates based on Round 1 and 2 measurements
- Discharge Rates Estimated for SP3™ Sampling Locations

—— Bridges

- - - - Other Streams

Notes:

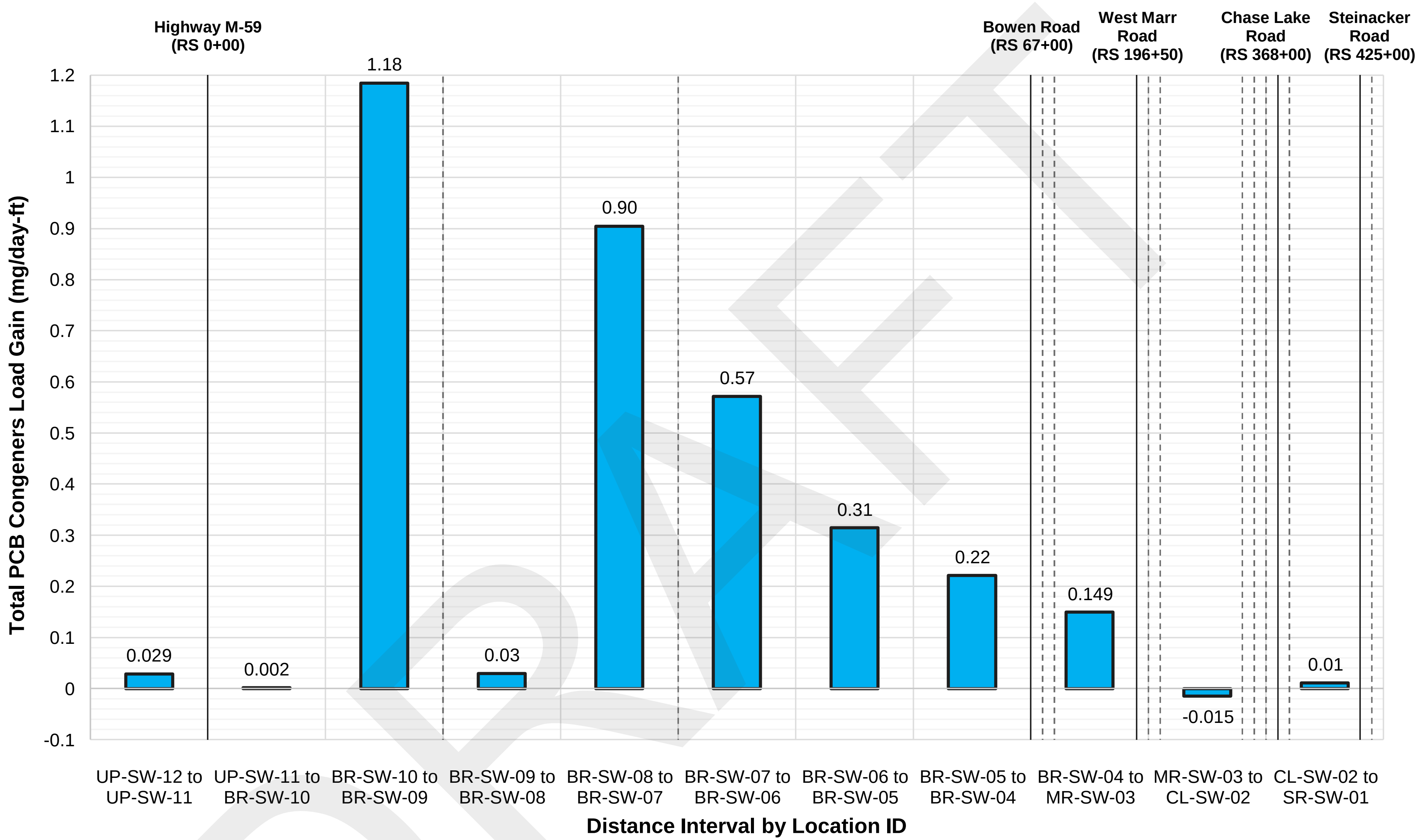
1. River stationing IDs provided on January 12, 2021 by CTI and Associates, Inc.
2. Locations for other streams obtained from Michigan GIS Open Data portal.
3. Flows were calculated by multiplying channel width, water depth, and mid-depth velocity at each location (Table 4-6).
4. Discharge rates for SP3™ sampling locations include the average discharge rates calculated for the Round 1 and 2 sampling events or the calculated distance-weighted average discharge rates, if needed (Table 4-6).
5. The x-axis indicates the sequential order of site locations; locations are not proportionally spaced.
6. cfs = cubic feet per second

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

ESTIMATED RIVER DISCHARGE RATES

cti ARCADIS

FIGURE
4-4



Legend:

—— Bridges

----- Other Streams

Notes:

1. River stationing IDs provided on January 12, 2021 by CTI and Associates, Inc.
2. Locations for other streams obtained from Michigan GIS Open Data portal.
3. Time-averaged surface water samples were collected using the SP3™ samplers and calculated C_{free} results for each sampler are plotted.
4. Load gain was determined by dividing the change in PCB load by the distance between stations.
5. The x-axis indicates the sequential order of site locations; locations are not proportionally spaced.
6. PCB = polychlorinated biphenyl.
7. mg/day-ft = milligrams per day per foot

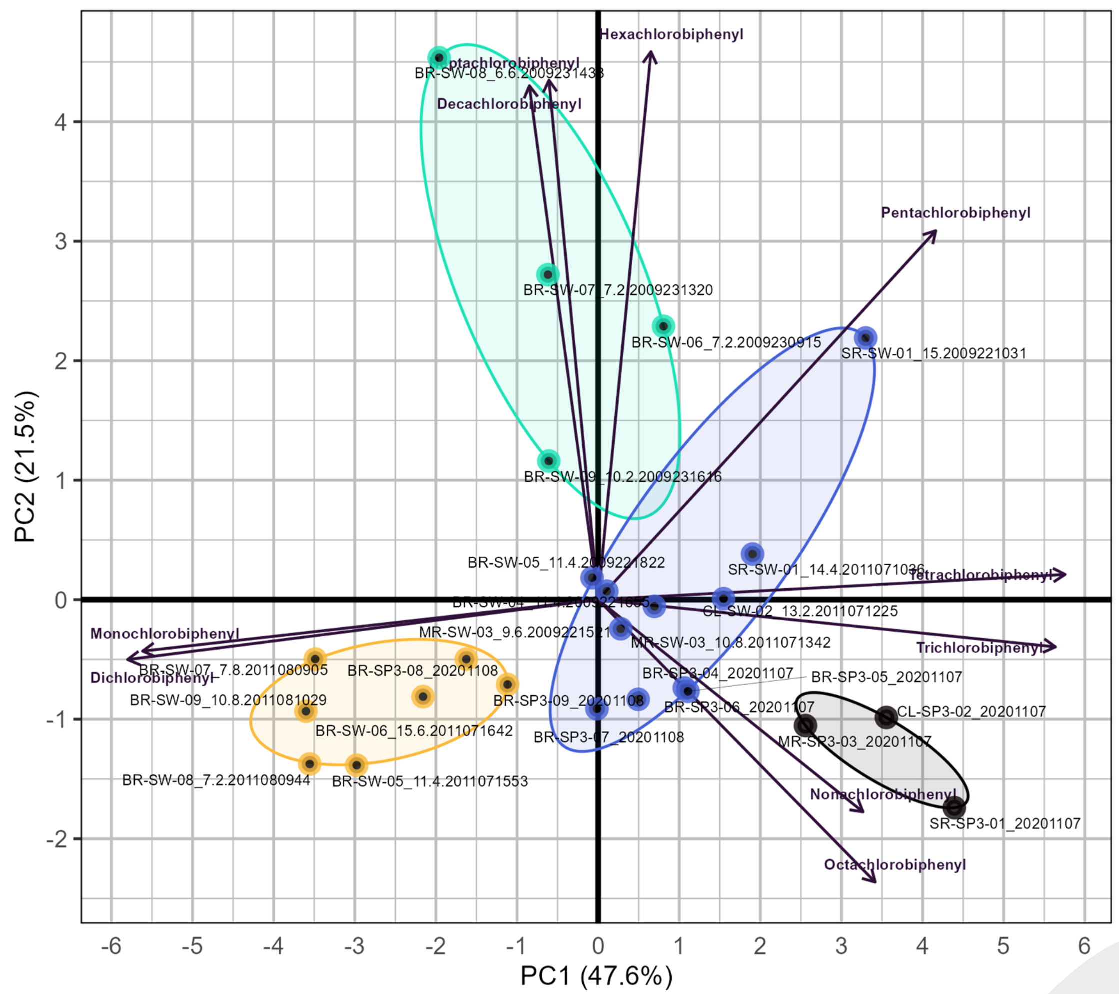
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

TOTAL PCB LOAD GAIN ANALYSIS

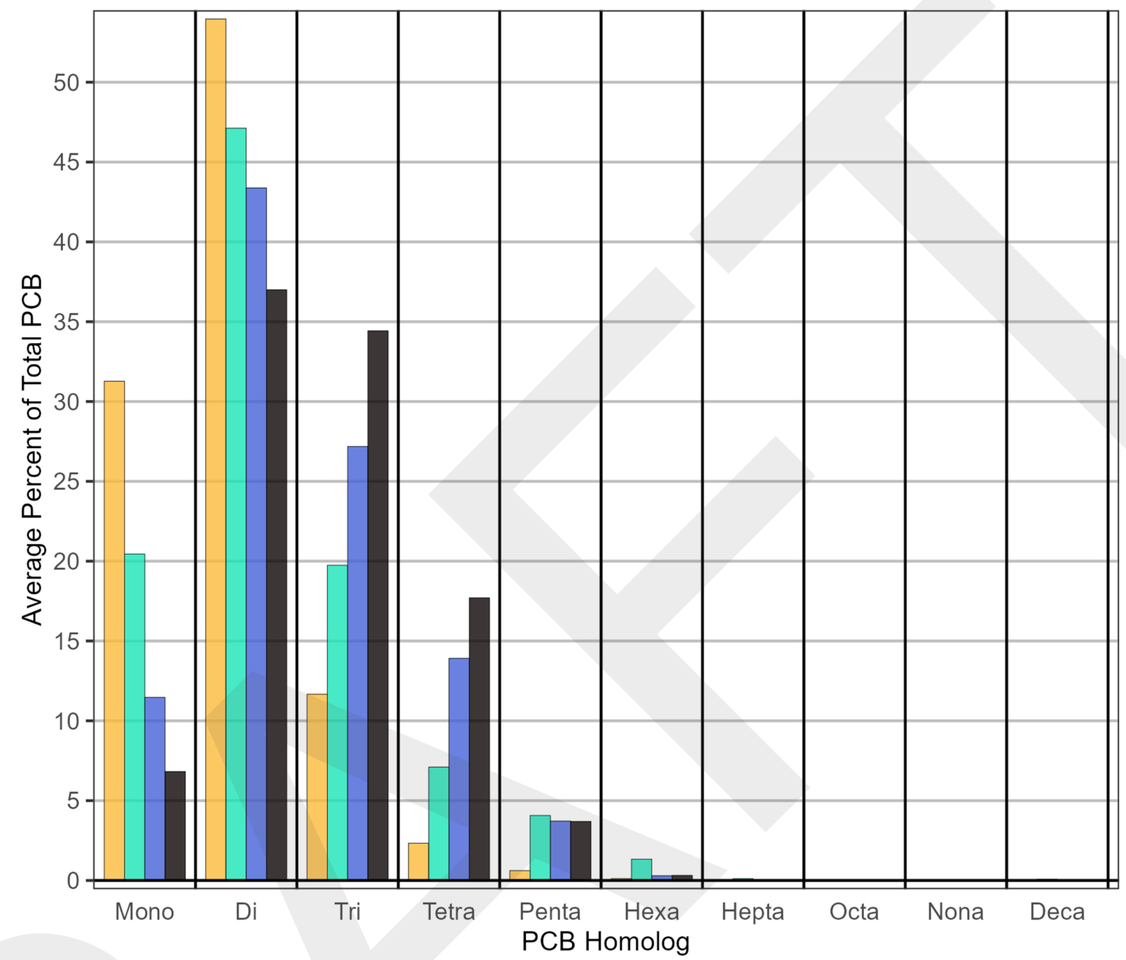
cti ARCADIS

FIGURE
4-5

PCA Biplot



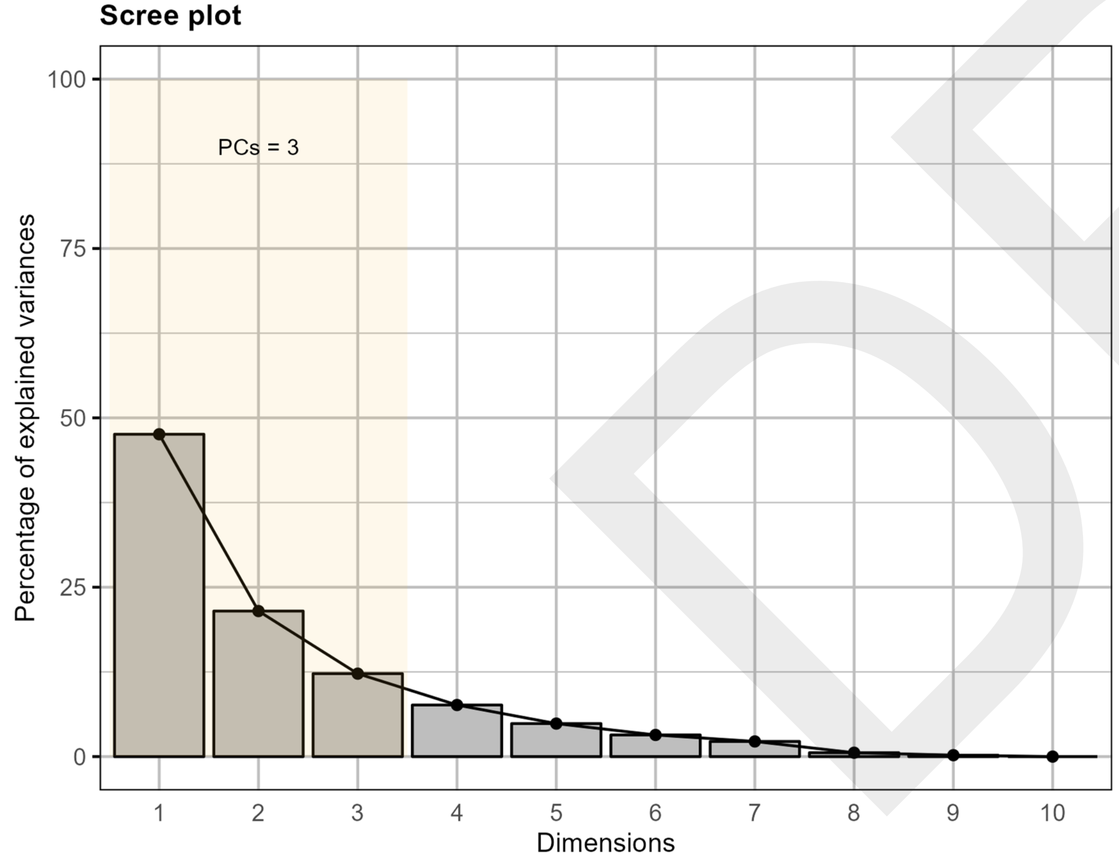
PCB Homologue Profile



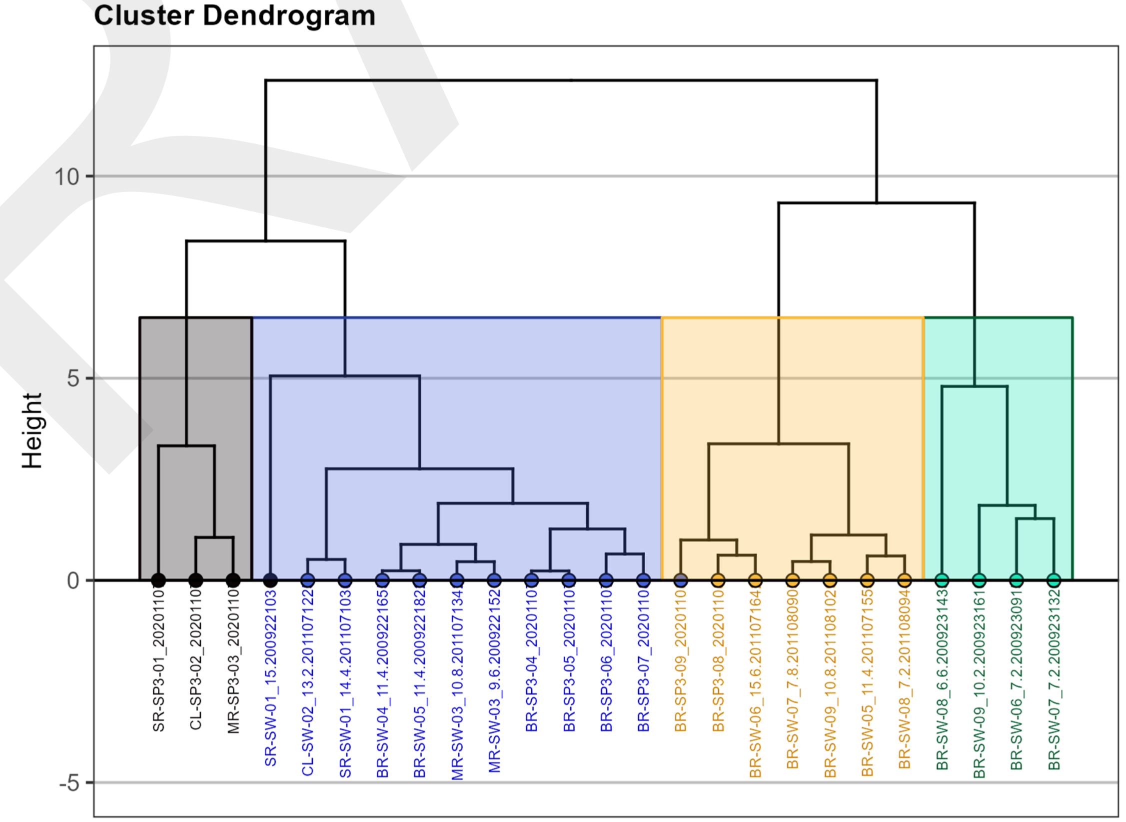
Notes:

1. The principal component analysis (PCA) was completed for the SP3™ and parent surface water samples from Rounds 1 and 2. However, the following samples with Total Polychlorinated Biphenyls (PCBs) less than 1 nanogram per liter (ng/L) were excluded:
   - UP-SW-11_17.4.2009240904 (0.0358 ng/L)
   - UP-SW-11_18.2011081306 (0.0177 ng/L)
   - UP-SW-12_13.2.2011081348 (0.0185 ng/L)
   - UP-SW-12_13.8.2009241005 (0.170 ng/L)
   - BR-SW-10_15.2009231704 (0.00379 ng/L)
   - BR-SW-10_15.2011081111 (0.0597 ng/L)
   - BR-SW-04_14.4.2011071447 (0.529 ng/L)
   - CL-SW-02_9.6.2009221144 (0.227 ng/L)
   - BR-SP3-10_20201108 (0.134 ng/L)
   - UP-SP3-11_20201108 (0.145 ng/L)
   - UP-SP3-12_20201108 (0.0789 ng/L).
2. On the PCA Biplot, PCA Scores (points) provide for interpreting relationships among samples and PCA Loadings (arrows) provide for interpreting relationships among variables.
3. PCA/hierarchical clustering analysis (HCA) conducted using the R FactoMineR package (Lê, Josse, and Husson, 2008).
4. PC = principal component

Scree plot



Cluster Dendrogram



Cluster

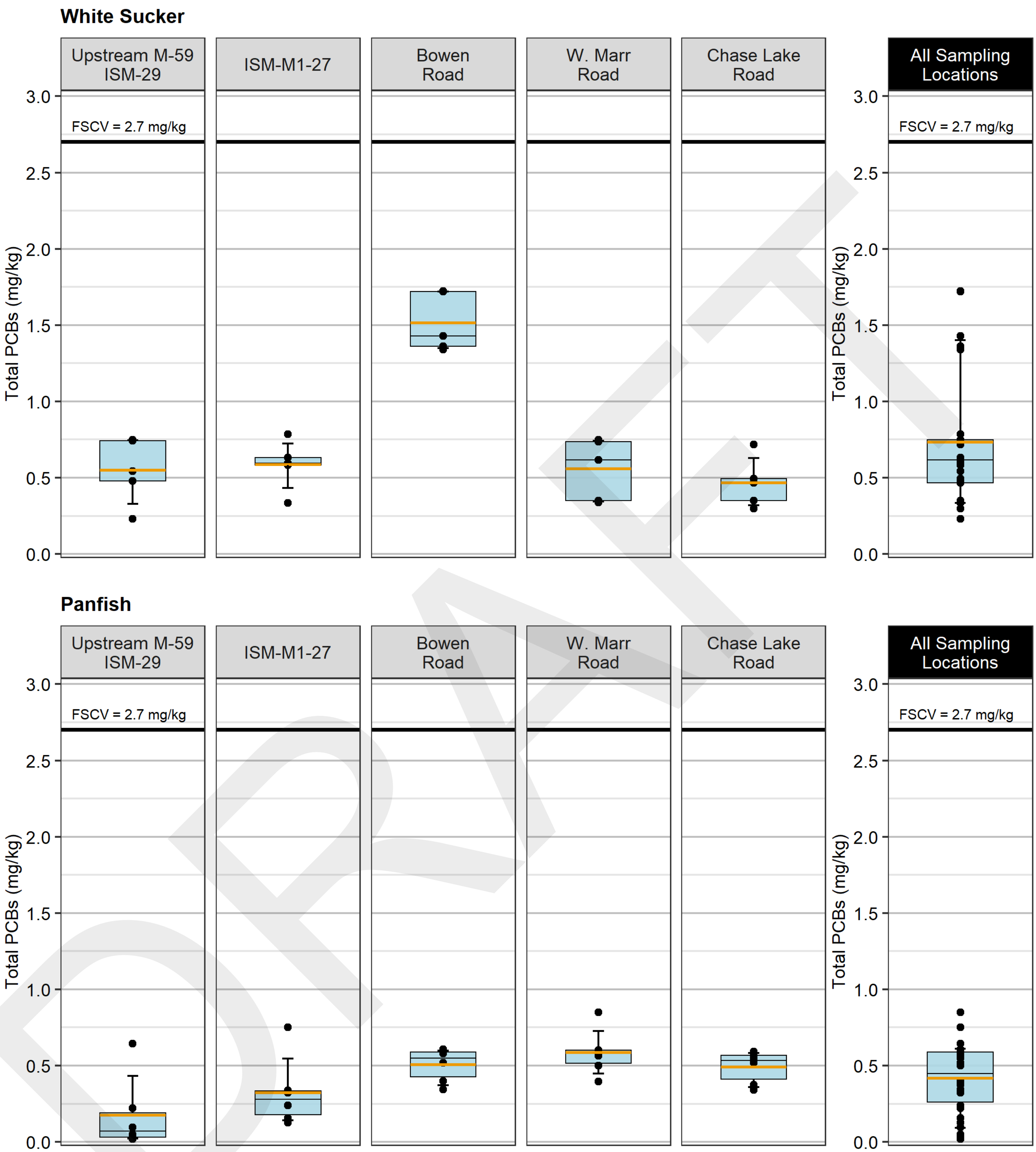
- Cluster 1
- Cluster 2
- Cluster 3
- Cluster 4

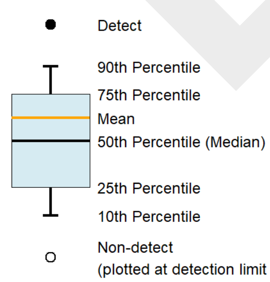
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB COMPOSITION IN SP3 AND SURFACE WATER SAMPLES

cti ARCADIS

FIGURE
4-6





FSCV = Fish Consumption Screening Value for "Do Not Eat" Meal Category (MDCH, 2016; see Note 1)

mg/kg = milligrams per kilogram

Note:

1. The comparison to FSCV is presented as a line of evidence to demonstrate progress toward reducing risks to fish consumers. Any revisions to the consumption advisories will be subject to further sampling and data review by the State of Michigan.

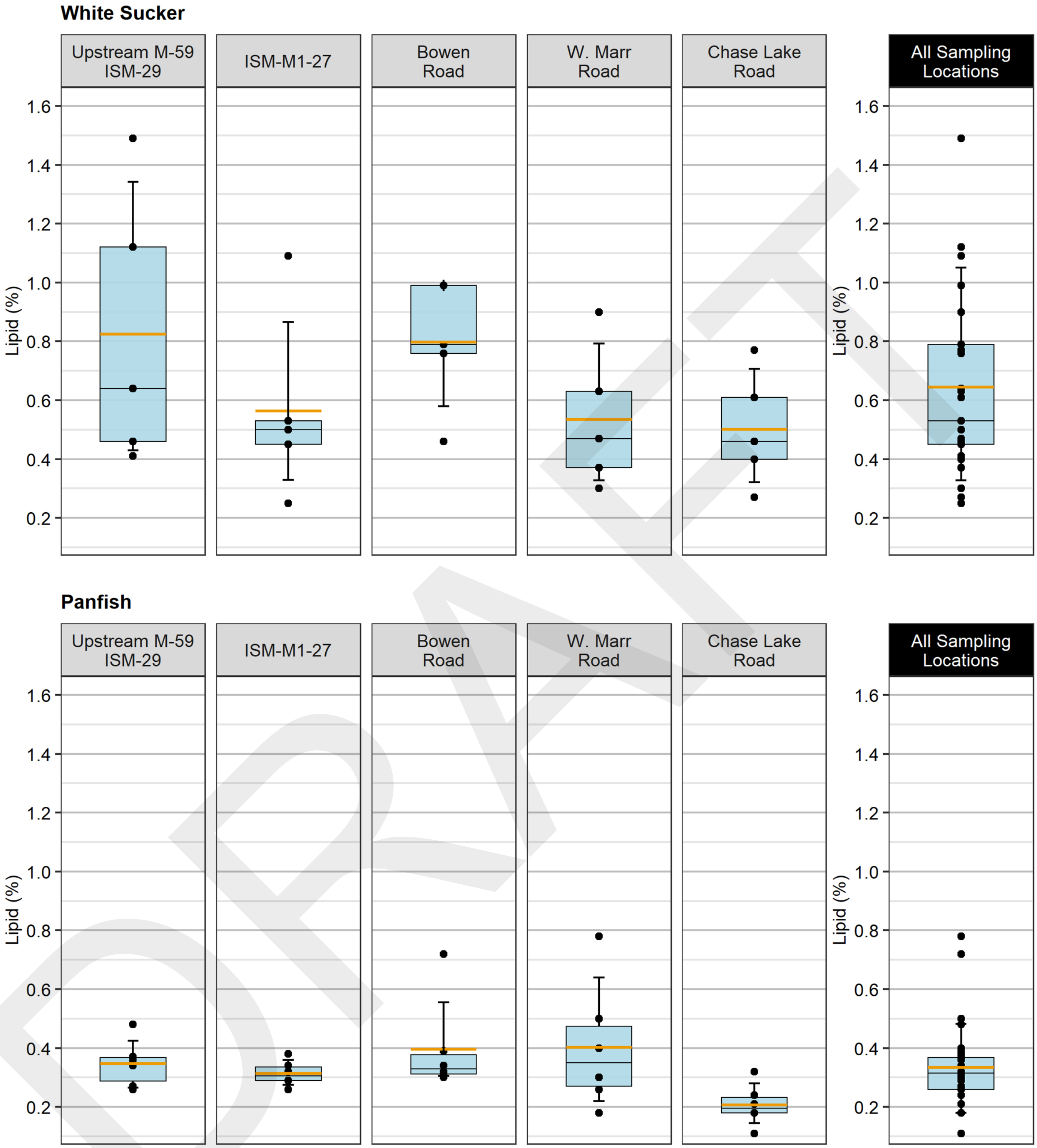
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

TOTAL PCB CONGENERS IN 2021 FISH SAMPLES

cti ARCADIS

FIGURE
5-1

2/22/2024 12:35:16 AM



Detect

% - percent

90th Percentile
75th Percentile
Mean
50th Percentile (Median)
25th Percentile
10th Percentile

Non-detect
(plotted at detection limit

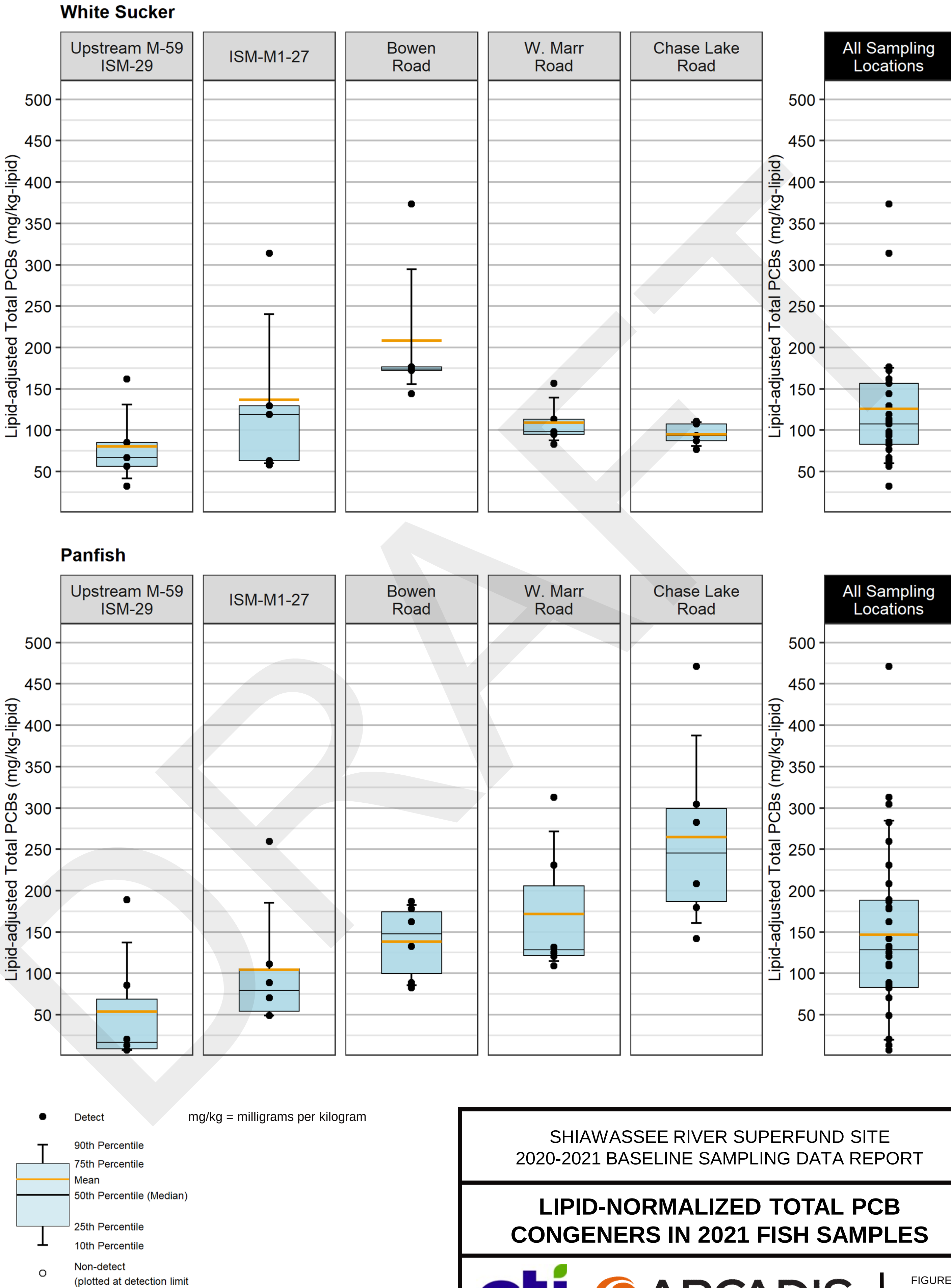
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

LIPID IN 2021 FISH TISSUE SAMPLES

cti ARCADIS

FIGURE
5-2

11/17/2023 11:01:39 AM

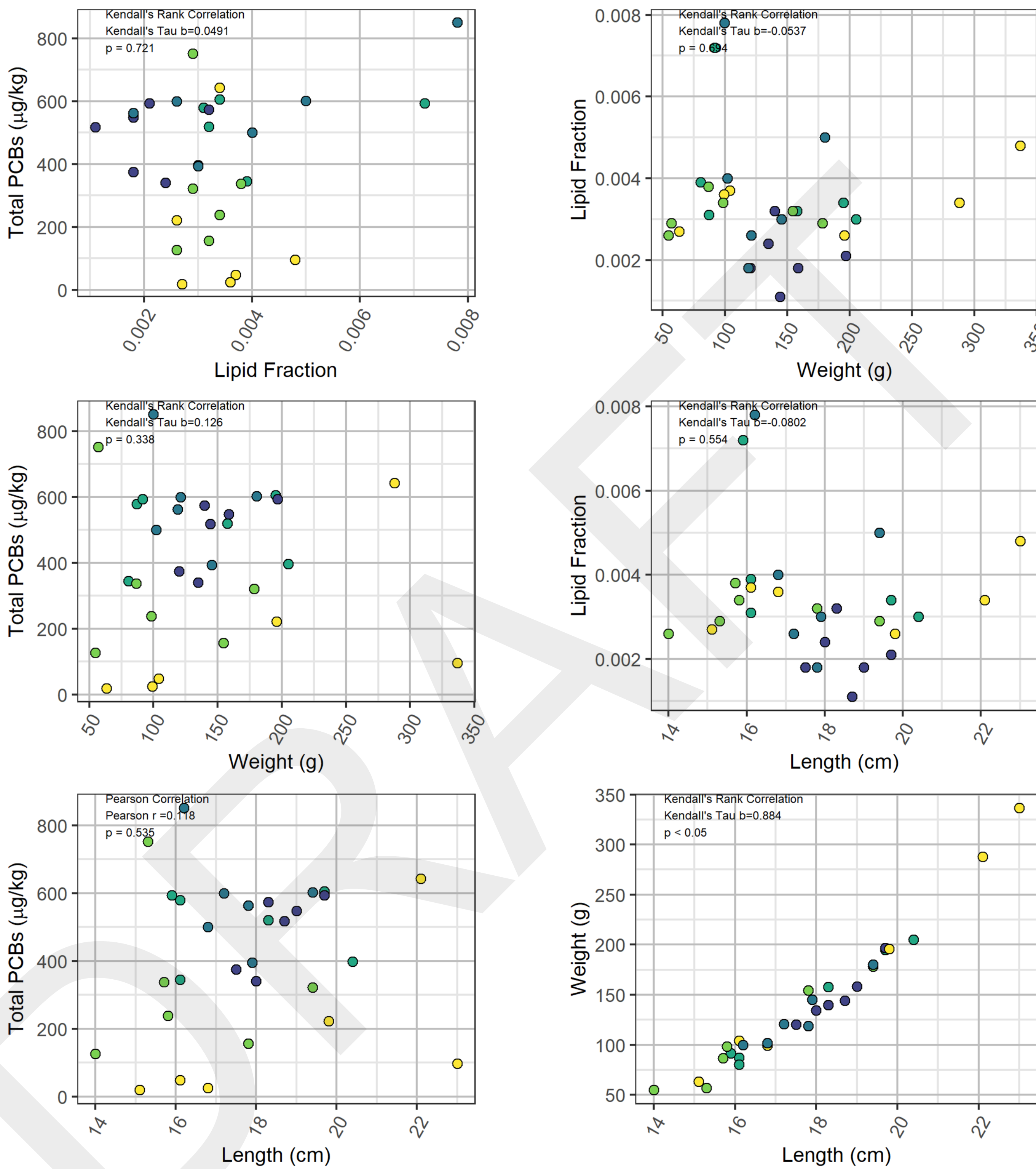


SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

LIPID-NORMALIZED TOTAL PCB CONGENERS IN 2021 FISH SAMPLES

FIGURE 5-3

11/17/2023 11:01:40 AM



Sampling Location

- Upstream M-59 ISM-29
- ISM-M1-27
- Bowen Road
- W. Marr Road
- Chase Lake Road

Notes:

1. Pearson's product moment correlation coefficient reported for bivariate normal datasets
2. Kendall rank correlation coefficient reported for datasets that are not bivariate normal.
3. Bivariate normality tested using Mardia's test for multivariate normality.

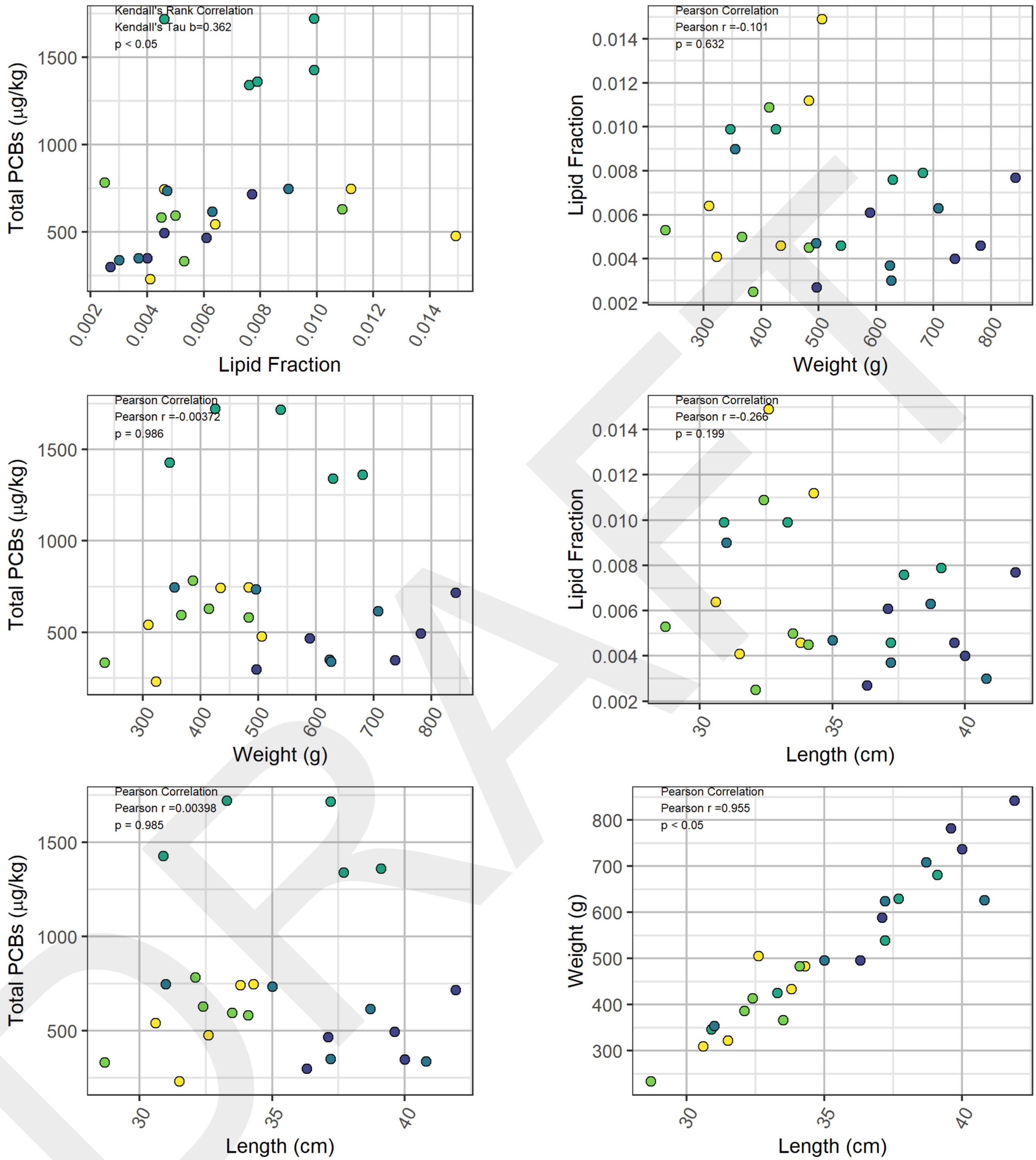
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

CORRELATION BETWEEN PCB, LIPID, WEIGHT, AND LENGTH IN PANFISH SAMPLES

cti ARCADIS

FIGURE
5-4

11/17/2023 11:01:41 AM



Sampling Location

- Upstream M-59 ISM-29
- ISM-M1-27
- Bowen Road
- W. Marr Road
- Chase Lake Road

Notes:

1. Pearson's product moment correlation coefficient reported for bivariate normal datasets
2. Kendall rank correlation coefficient reported for datasets that are not bivariate normal.
3. Bivariate normality tested using Mardia's test for multivariate normality.

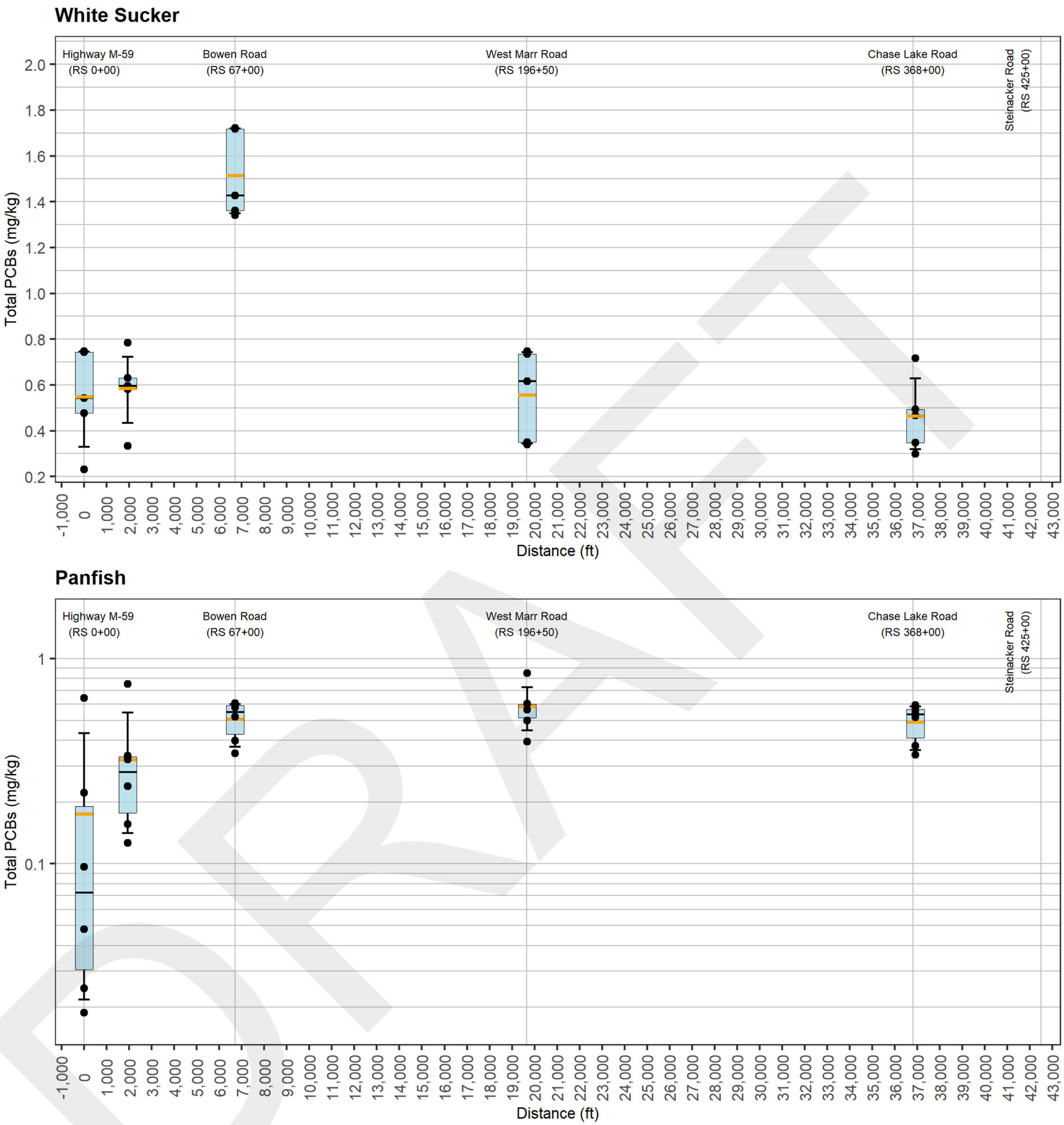
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

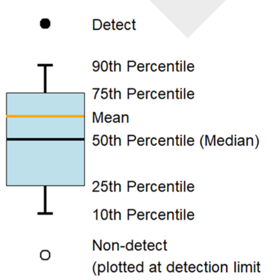
CORRELATION BETWEEN PCB, LIPID, WEIGHT, AND LENGTH IN WHITE SUCKER SAMPLES

cti ARCADIS

FIGURE
5-5

11/17/2023 11:01:43 AM





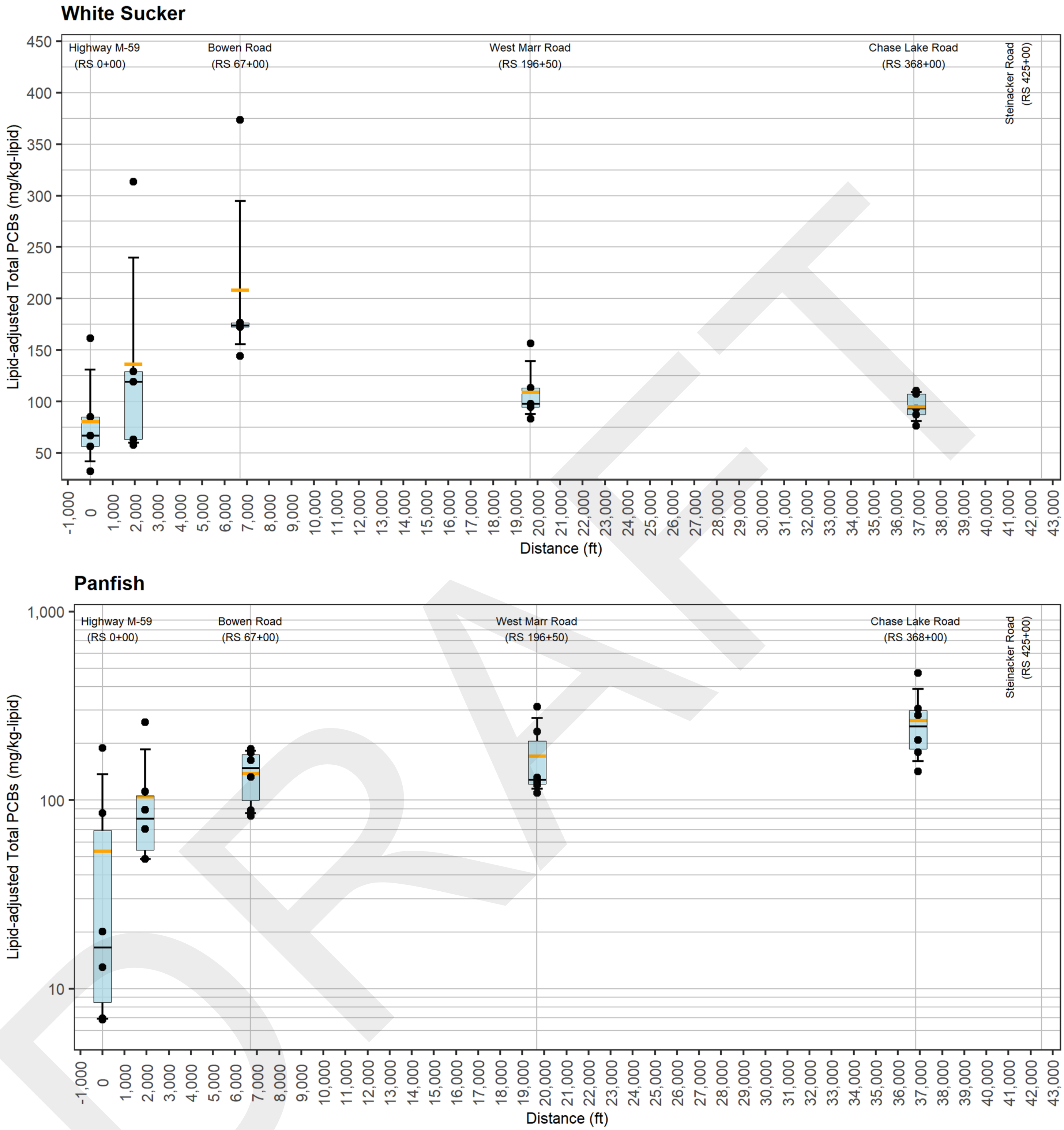
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

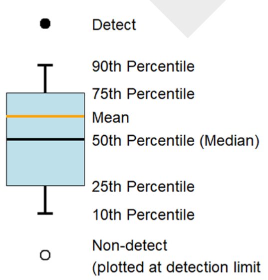
WET-WEIGHT TOTAL PCBs IN 2021 WHITE SUCKER AND PANFISH

cti ARCADIS

FIGURE
5-6

11/17/2023 11:01:44 AM





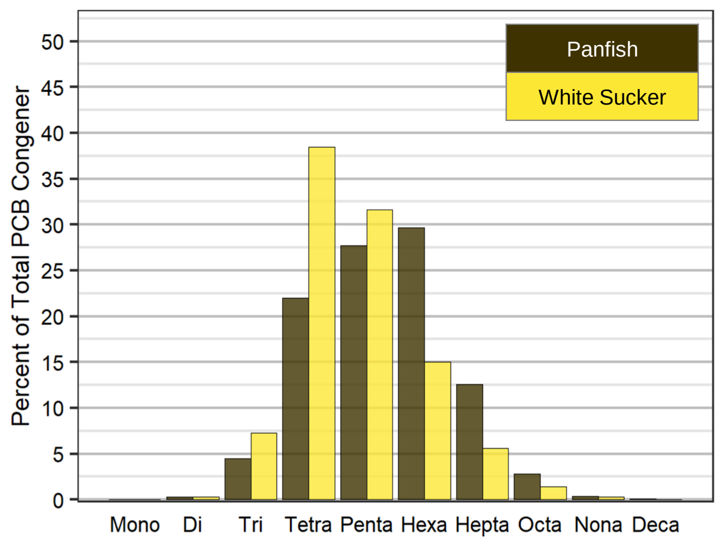
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

LIPID-NORMALIZED TOTAL PCBs IN 2021 WHITE SUCKER AND PANFISH

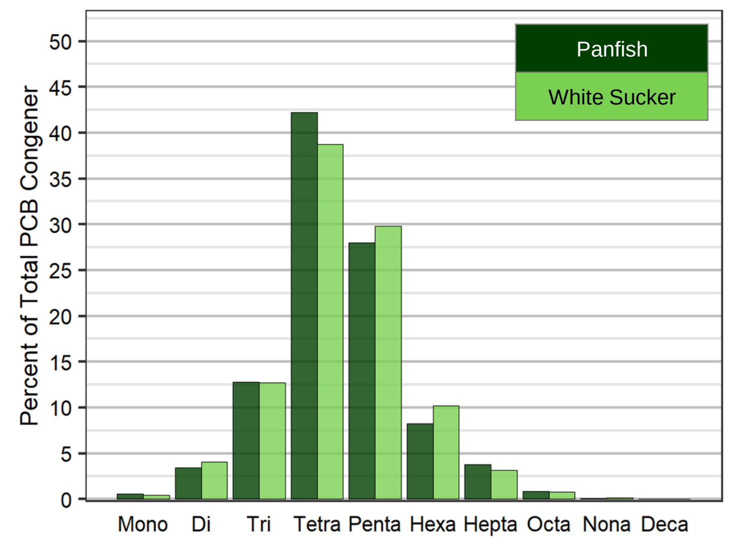
cti ARCADIS

FIGURE
5-7

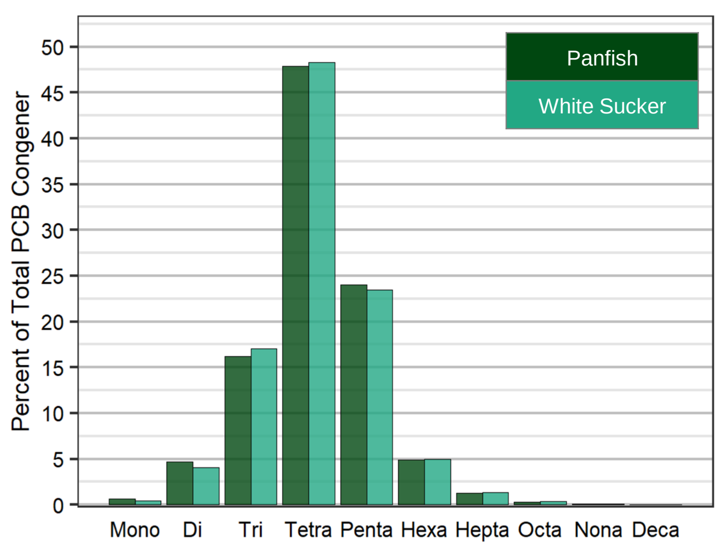
Upstream M-59 ISM-29



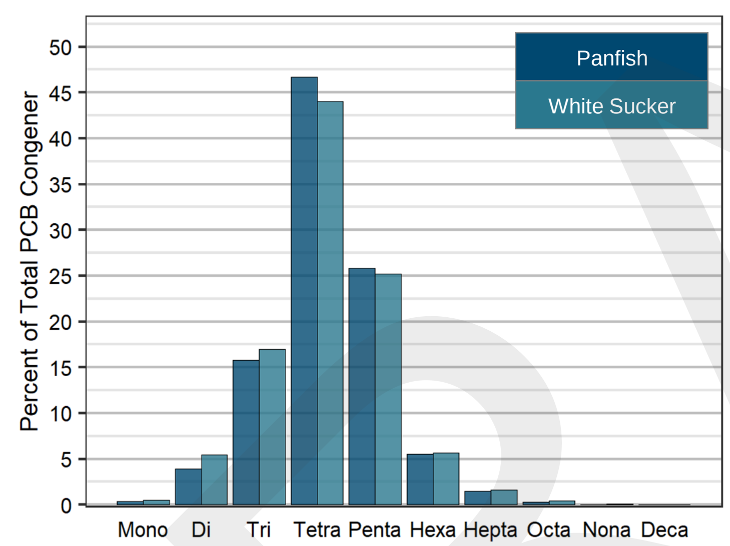
ISM-M1-27



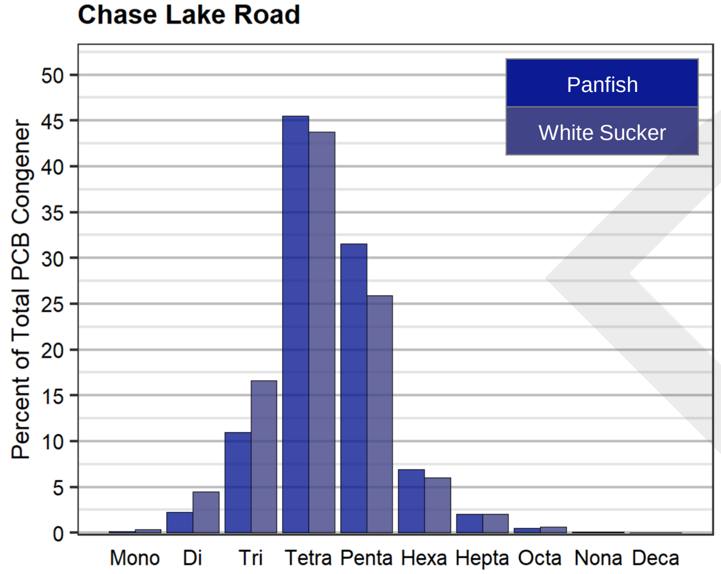
Bowen Road



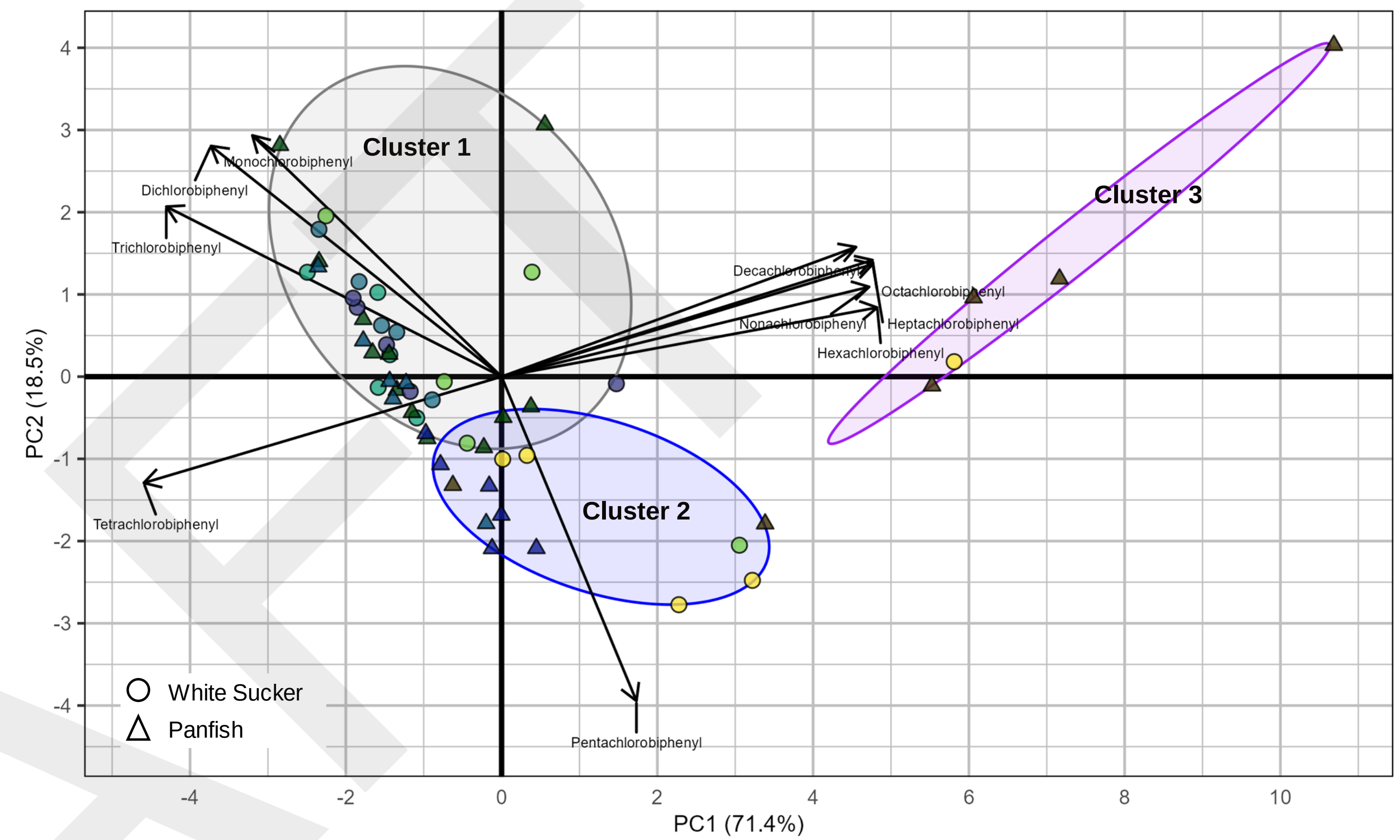
W. Marr Road



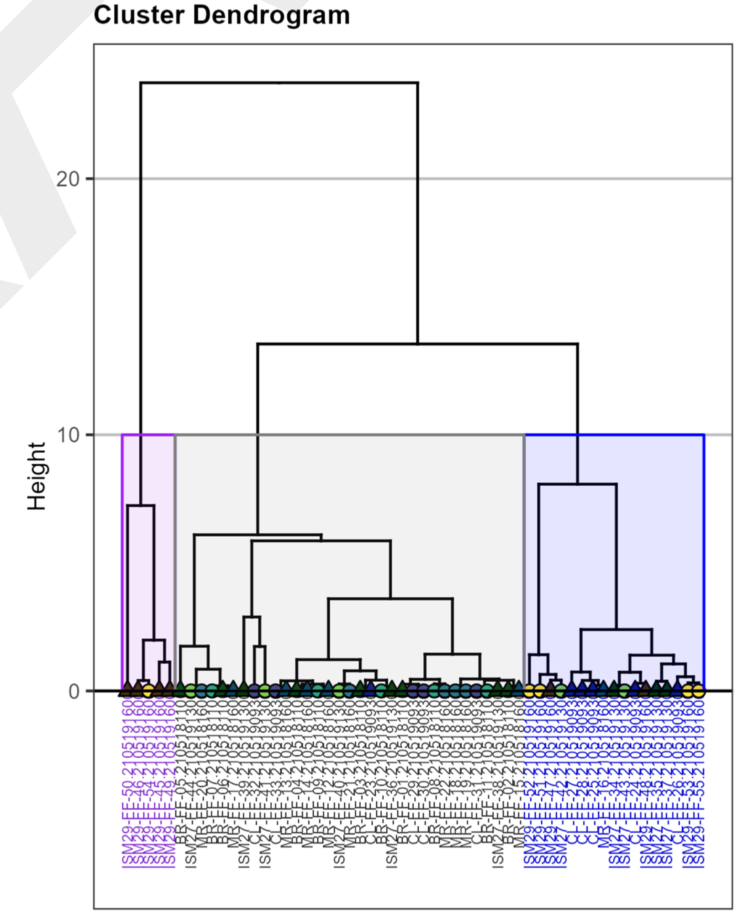
Chase Lake Road



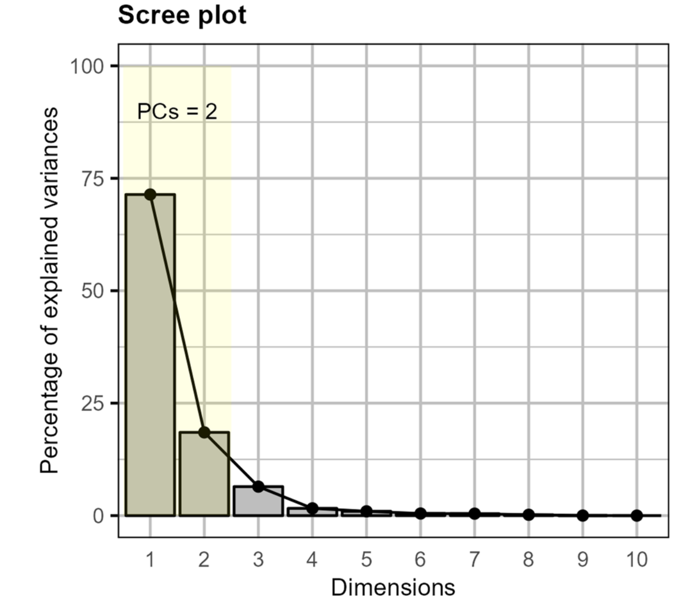
PCA Biplot



Cluster Dendrogram



Scree plot



Notes:

1. On the principal component analysis (PCA) Biplot, PCA Scores (points) provide for interpreting relationships among samples and PCA Loadings (arrows) provide for interpreting relationships among variables.
2. PCA/hierarchical clustering analysis (HCA) evaluation conducted using the R FactoMineR package (Lê, Josse, and Husson, 2008).
3. PC = principal component
4. Mono = monochlorobiphenyl
   Di = dichlorobiphenyl
   Tri = trichlorobiphenyl
   Tetra = tetrachlorobiphenyl
   Penta = pentachlorobiphenyl
   Hexa = hexachlorobiphenyl
   Hepta = heptachlorobiphenyl
   Octa = octachlorobiphenyl,
   Nona = nonachlorobiphenyl
   Deca = decachlorobiphenyl

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

PCB COMPOSITION IN 2021 WHITE SUCKER AND PANFISH SAMPLES

cti ARCADIS

FIGURE
5-8

LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

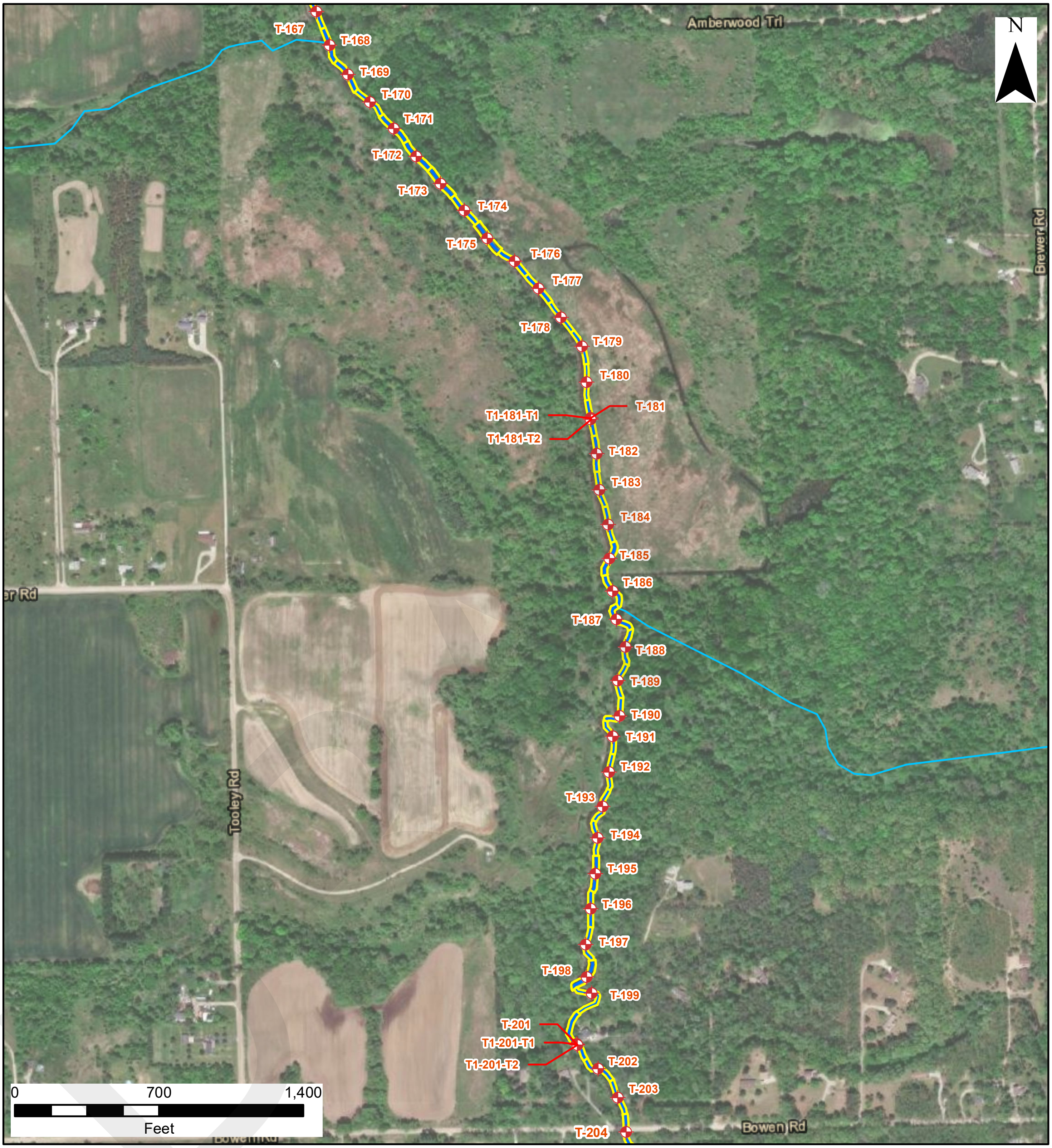
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT SURFACE WEIGHTED AVERAGE CONCENTRATION AREAS – HIGHWAY M-59 TO BOWEN ROAD

cti ARCADIS

FIGURE
6-1a

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Polygons_Final\Fig6-1a_M59_To_Bowen_Road.mxd 11/07/2023



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

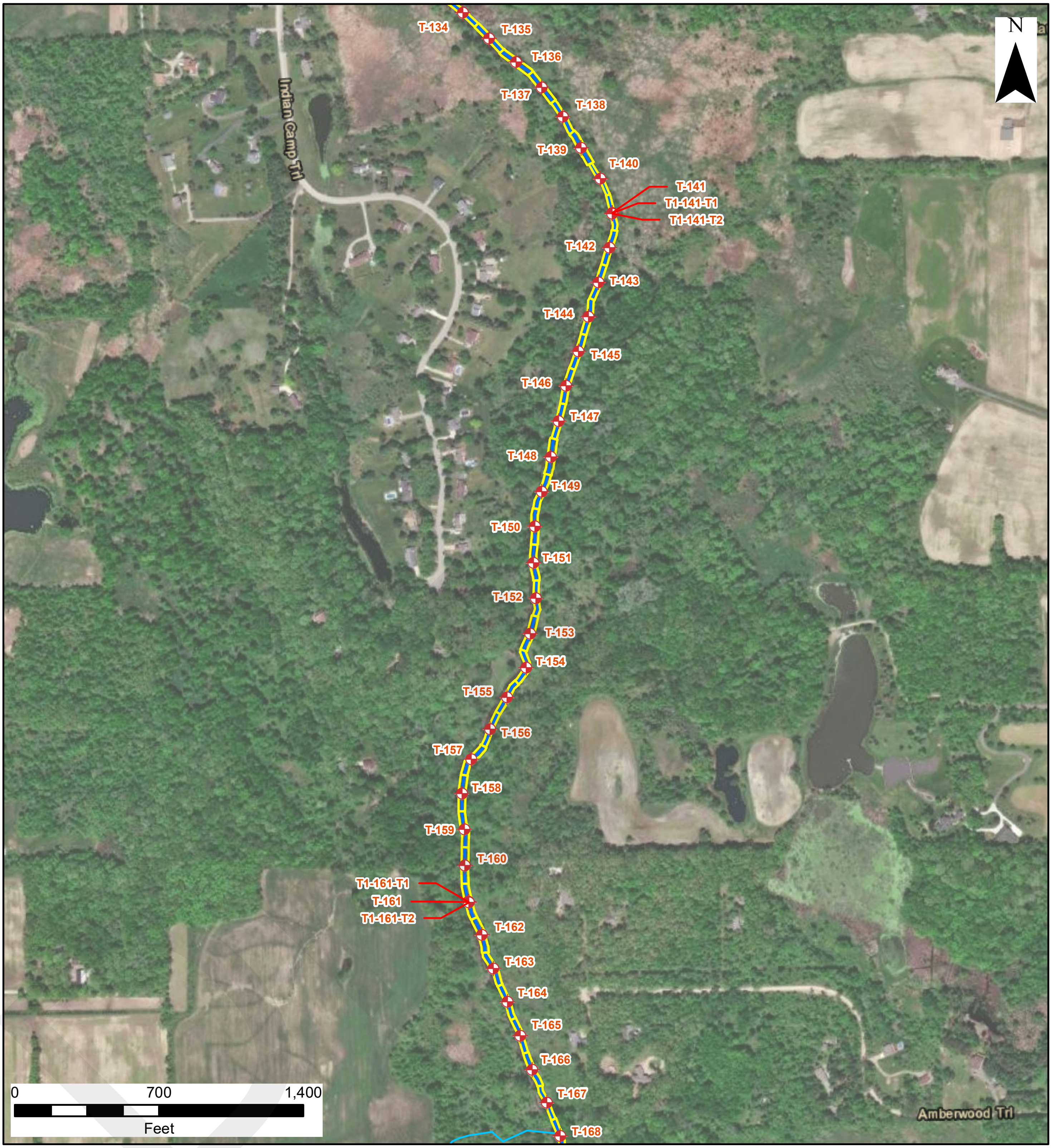
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT SURFACE
WEIGHTED AVERAGE CONCENTRATION AREAS –
BOWEN ROAD TO WEST BARRON ROAD

cti ARCADIS

FIGURE
6-1b

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations with Transect Polygons_Final\Fig6-1b_Bowen_Road_To_WBarron_Road.mxd 08/01/2022



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

Notes:

1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

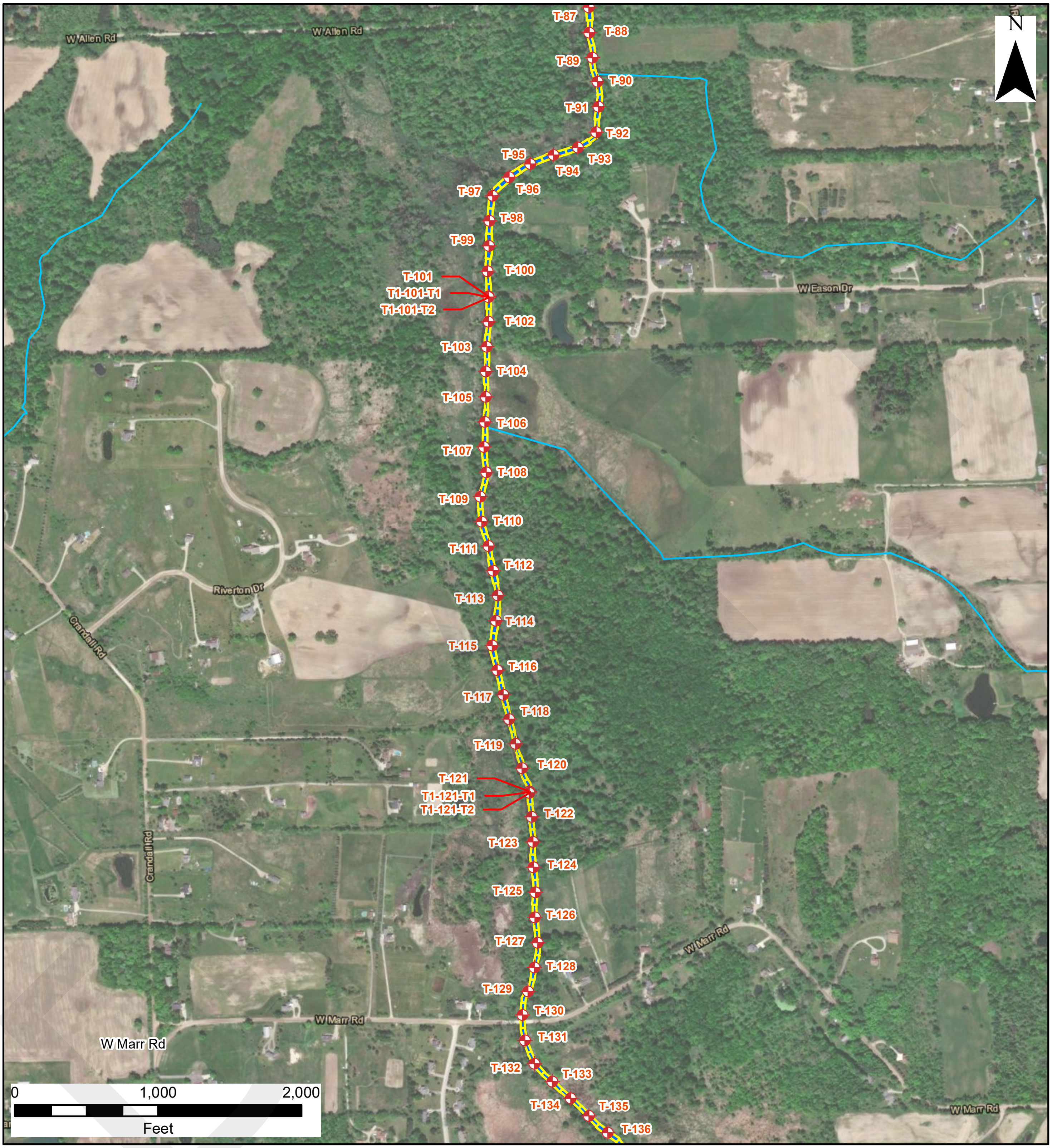
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT SURFACE WEIGHTED AVERAGE CONCENTRATION AREAS – WEST BARRON ROAD TO WEST MARR ROAD

cti ARCADIS

FIGURE
6-1c

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations with Transect Polygons_Final\Fig6-1c_WBarron_Road_To_WMarr_Road.mxd 08/01/2022



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

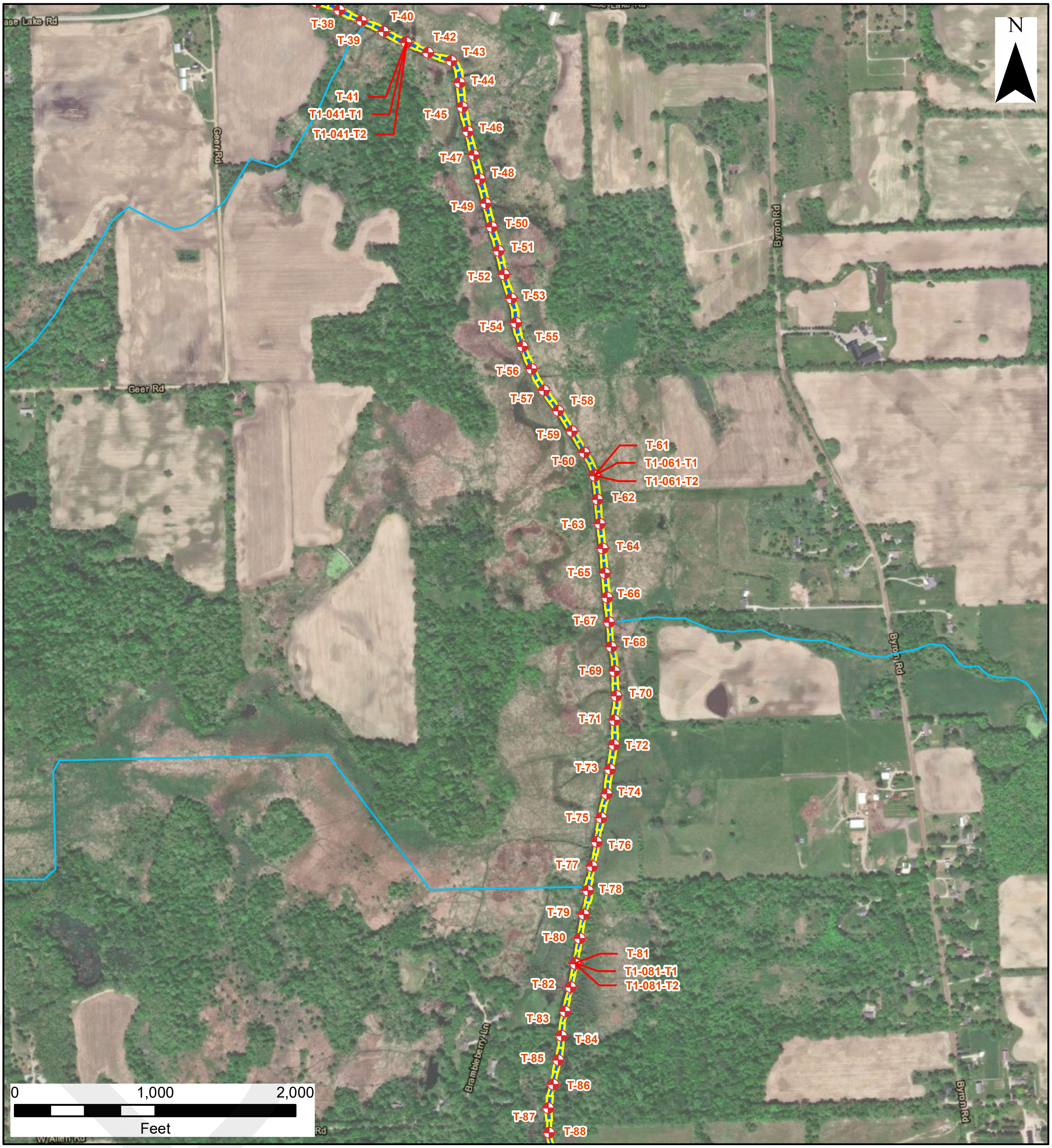
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT SURFACE WEIGHTED AVERAGE CONCENTRATION AREAS – WEST MARR ROAD TO WEST ALLEN ROAD

cti ARCADIS

FIGURE 6-1d

User: mgi01044 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations with Transect Polygons_Final\Fig6-1d_WMarr_Road_To_WAllen_Road.mxd 11/07/2023



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

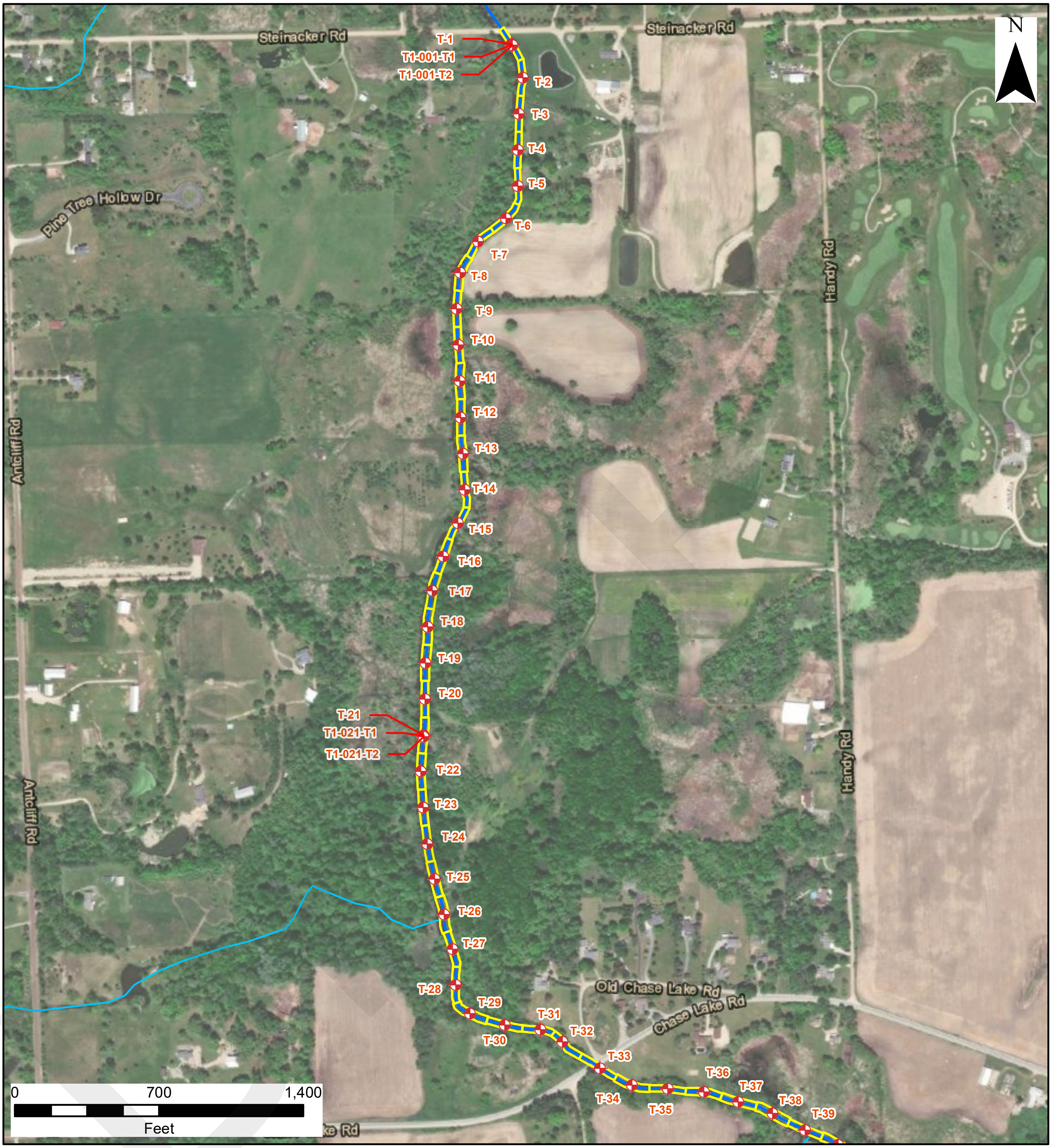
Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

SEDIMENT SURFACE WEIGHTED AVERAGE CONCENTRATION AREAS – WEST ALLEN ROAD TO CHASE LAKE ROAD

FIGURE
6-1e

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Polygons_Final\Fig6-1e_WAllen_Road_To_Chase_Lake_Road.mxd 08/01/2022



LEGEND

- Sediment Transect Locations
- River Centerline
- Other Streams
- Transect Polygon

Notes:
1. River centerline and stationing provided on January 12, 2021 by CTI and Associates, Inc.
2. Data for other rivers and streams obtained from Michigan GIS Open Data portal.

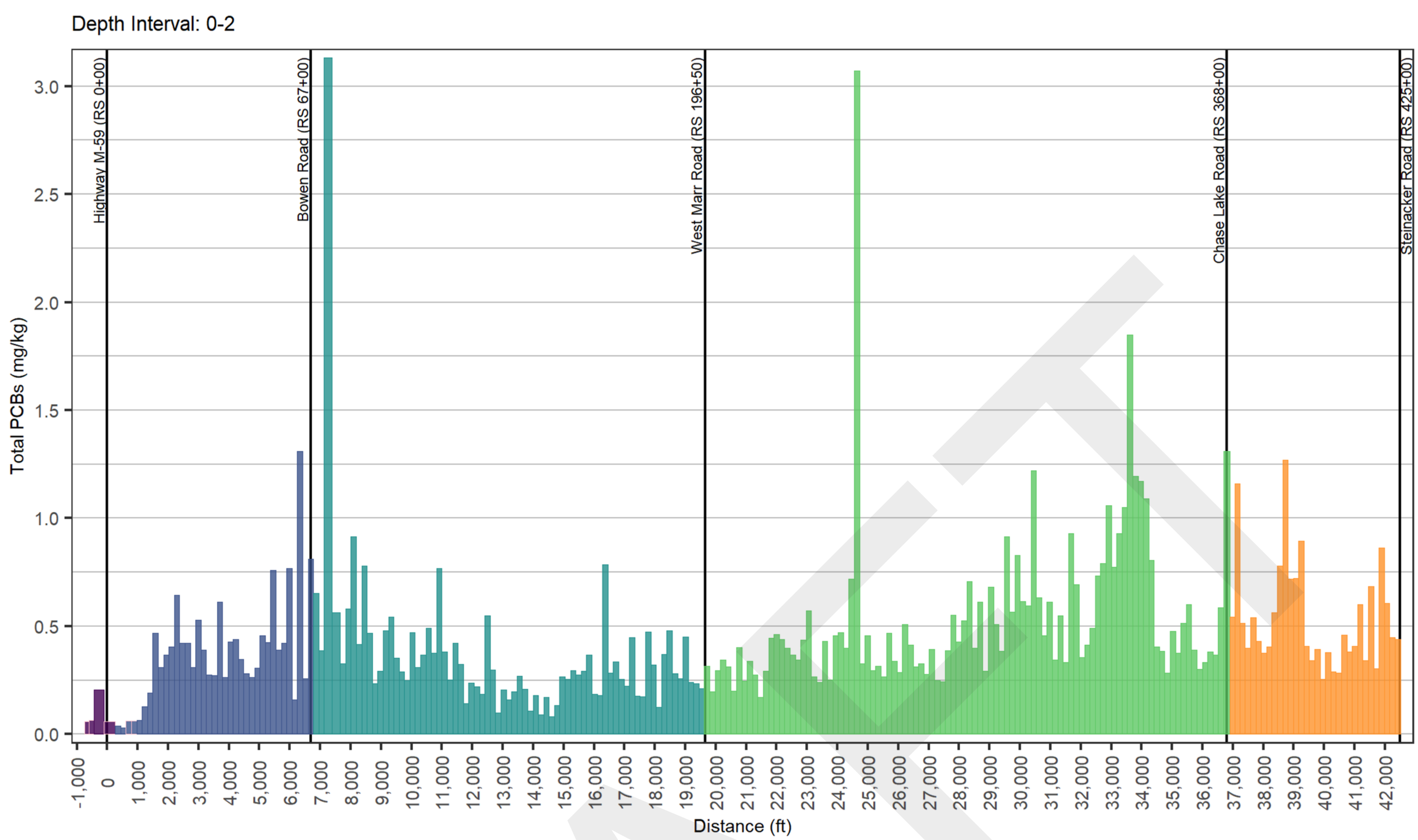
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

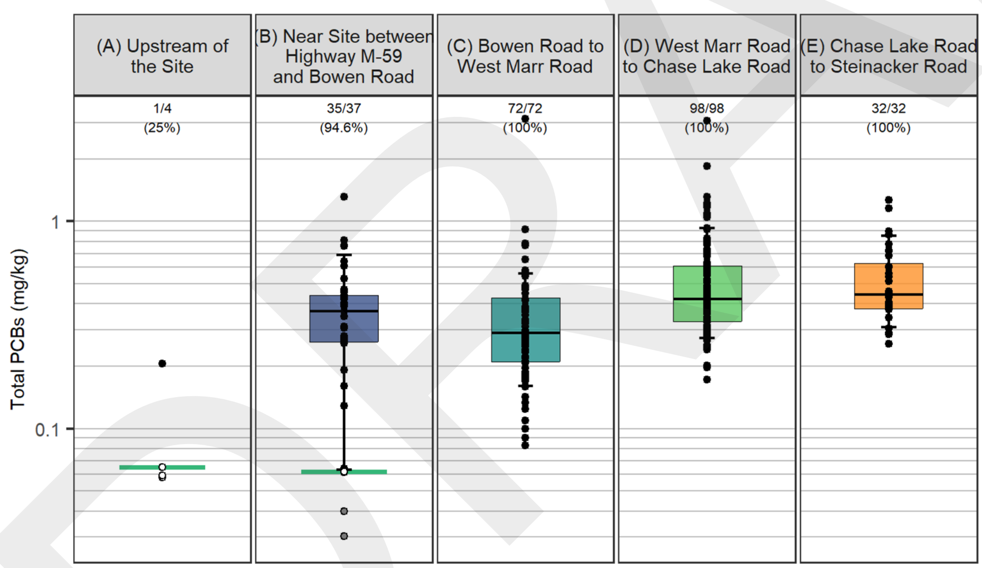
SEDIMENT SURFACE WEIGHTED AVERAGE CONCENTRATION AREAS – CHASE LAKE ROAD TO STEINACKER ROAD

cti ARCADIS

FIGURE
6-1f

User: cvi00949 Location: WVD
Path: T:_ENV\CTI\MXD\Sediment Transect Locations with Transect Polygons_Final\Fig6-1f_Chase_Lake_Road_To_Steinacker_Road.mxd 08/01/2022

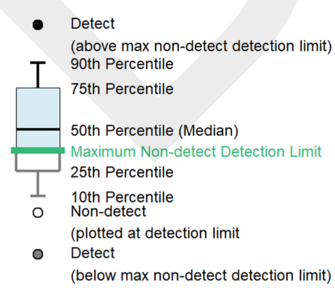




Compare Distribution		
Comparison	**p-value**	**Sig. Dif. (Yes/No)**
B - C	0.332	No
B - D	0.0171	Yes
B - E	<0.01	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	0.332	No

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Peto-Peto Test conducted for datasets with non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

Boxplot Legend



- Non-detects included at the detection limit in percentile estimation.
- Non-detects plotted at the detection limit.

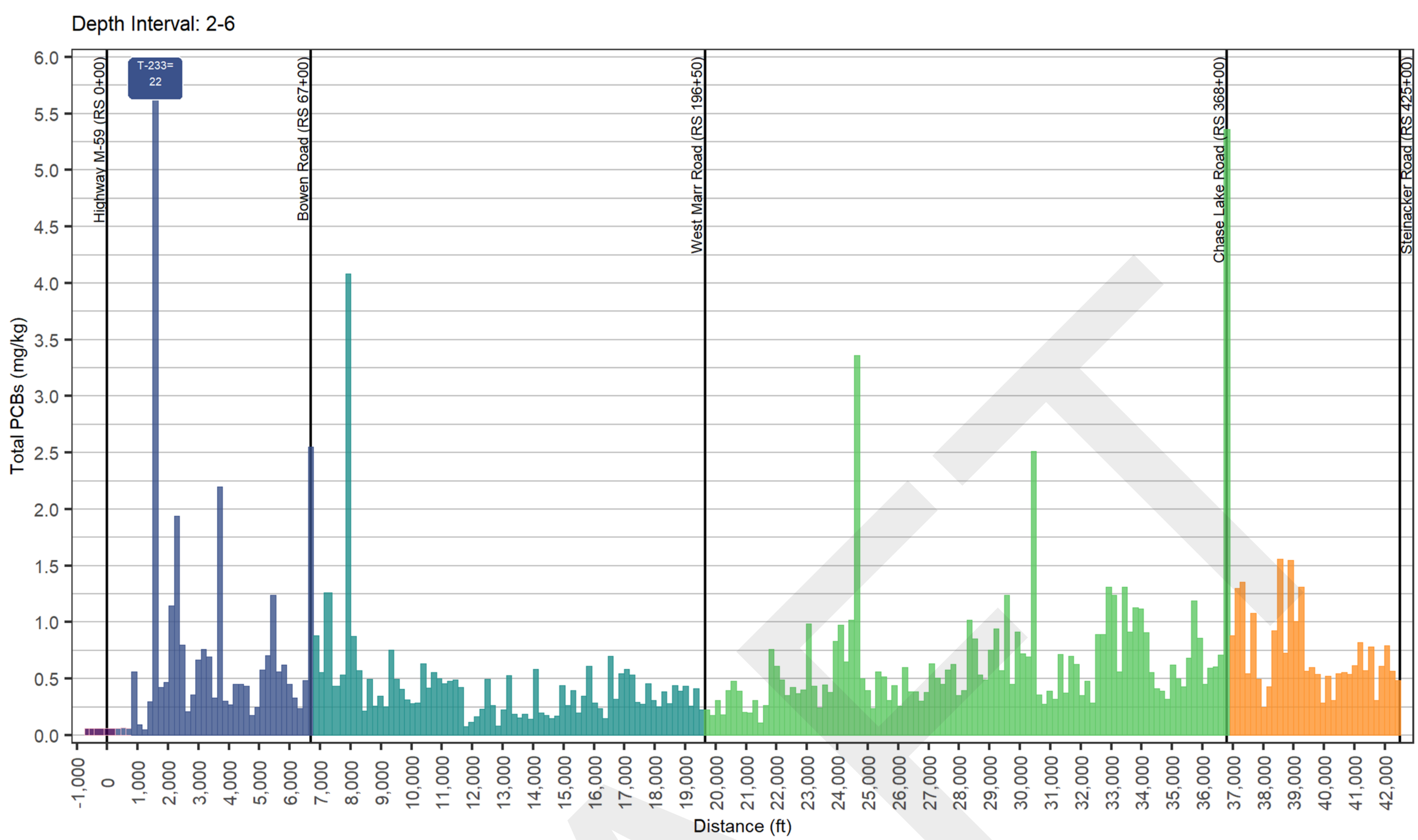
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

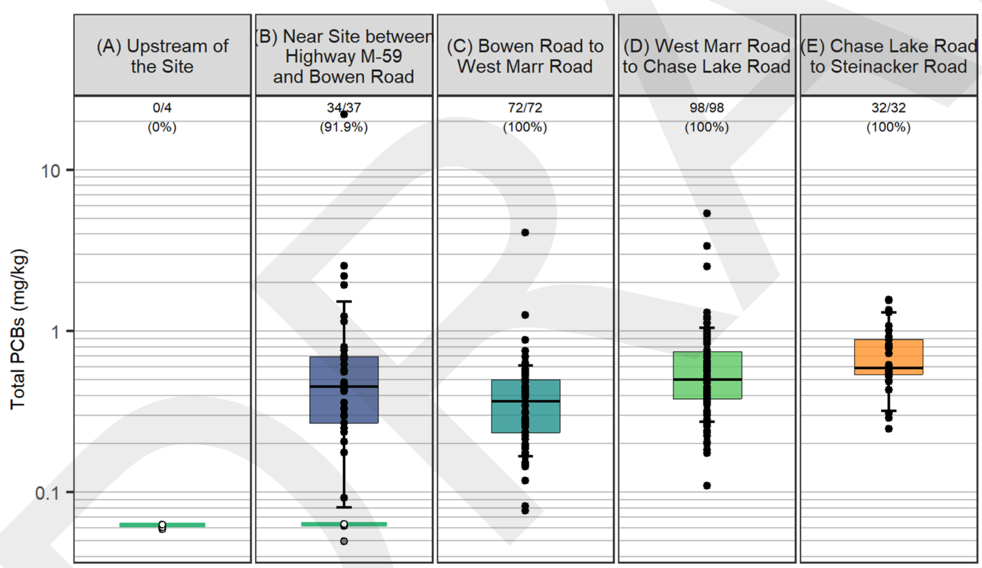
2021 SEDIMENT SAMPLE TOTAL PCBs
0- to 2-INCH DEPTH

cti ARCADIS

FIGURE
6-2a

11/17/2023 11:03:05 AM

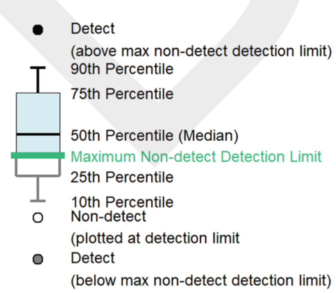




Compare Distribution		
Comparison	**p-value**	**Sig. Dif. (Yes/No)**
B - C	0.104	No
B - D	0.216	No
B - E	0.0302	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	0.054	No

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Peto-Peto Test conducted for datasets with non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

Boxplot Legend



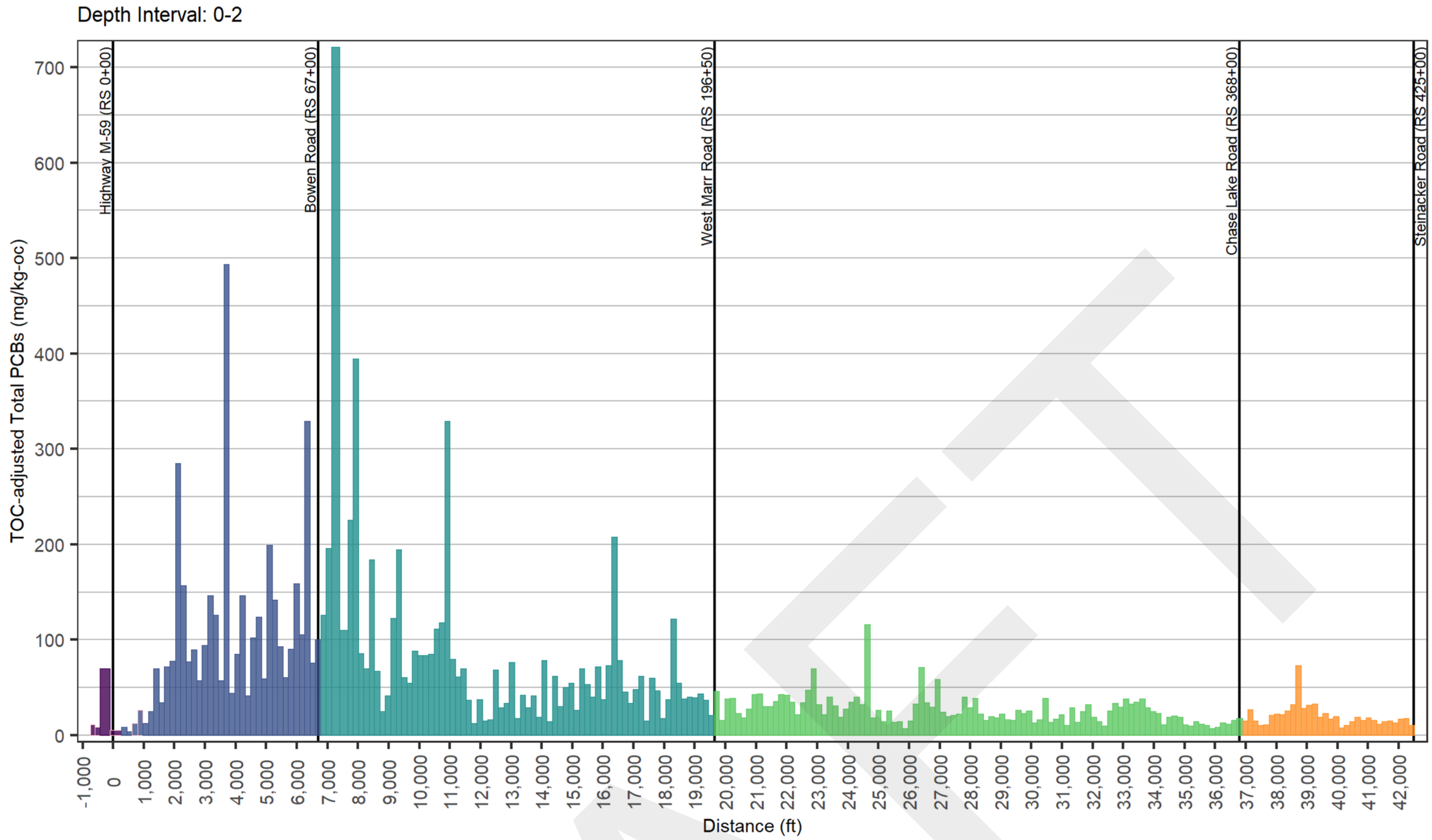
- Non-detects included at the detection limit in percentile estimation.
- Non-detects plotted at the detection limit.

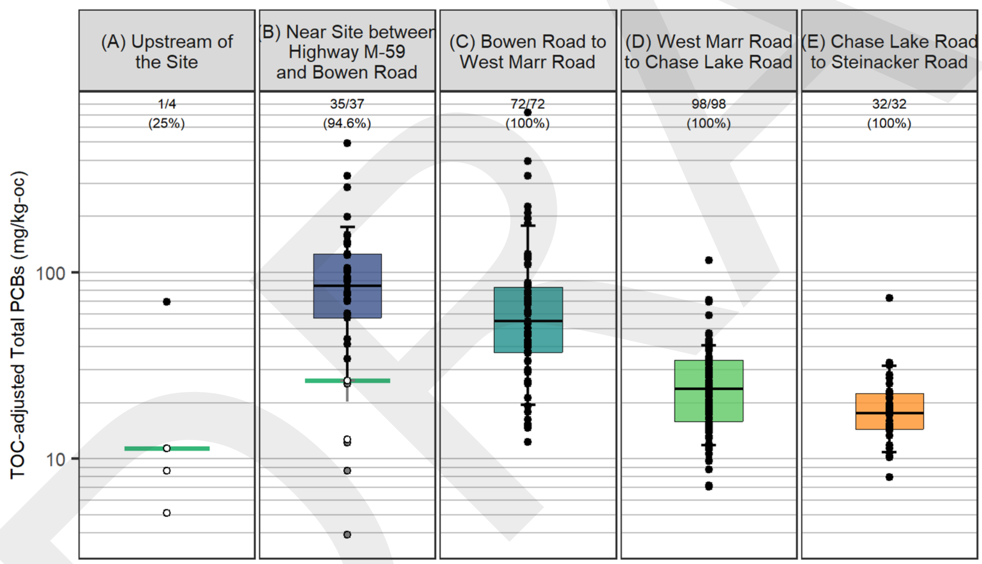
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

2021 SEDIMENT SAMPLE TOTAL PCBs
2- to 6-INCH DEPTH

cti ARCADIS

FIGURE
6-2b

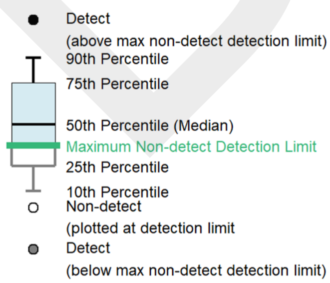




Compare Distribution		
Comparison	p-value	Sig. Dif. (Yes/No)
B - C	0.0297	Yes
B - D	<0.01	Yes
B - E	<0.01	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	<0.01	Yes

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Peto-Peto Test conducted for datasets with non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

Boxplot Legend



- Non-detects included at the detection limit in percentile estimation.
- Non-detects plotted at the detection limit.

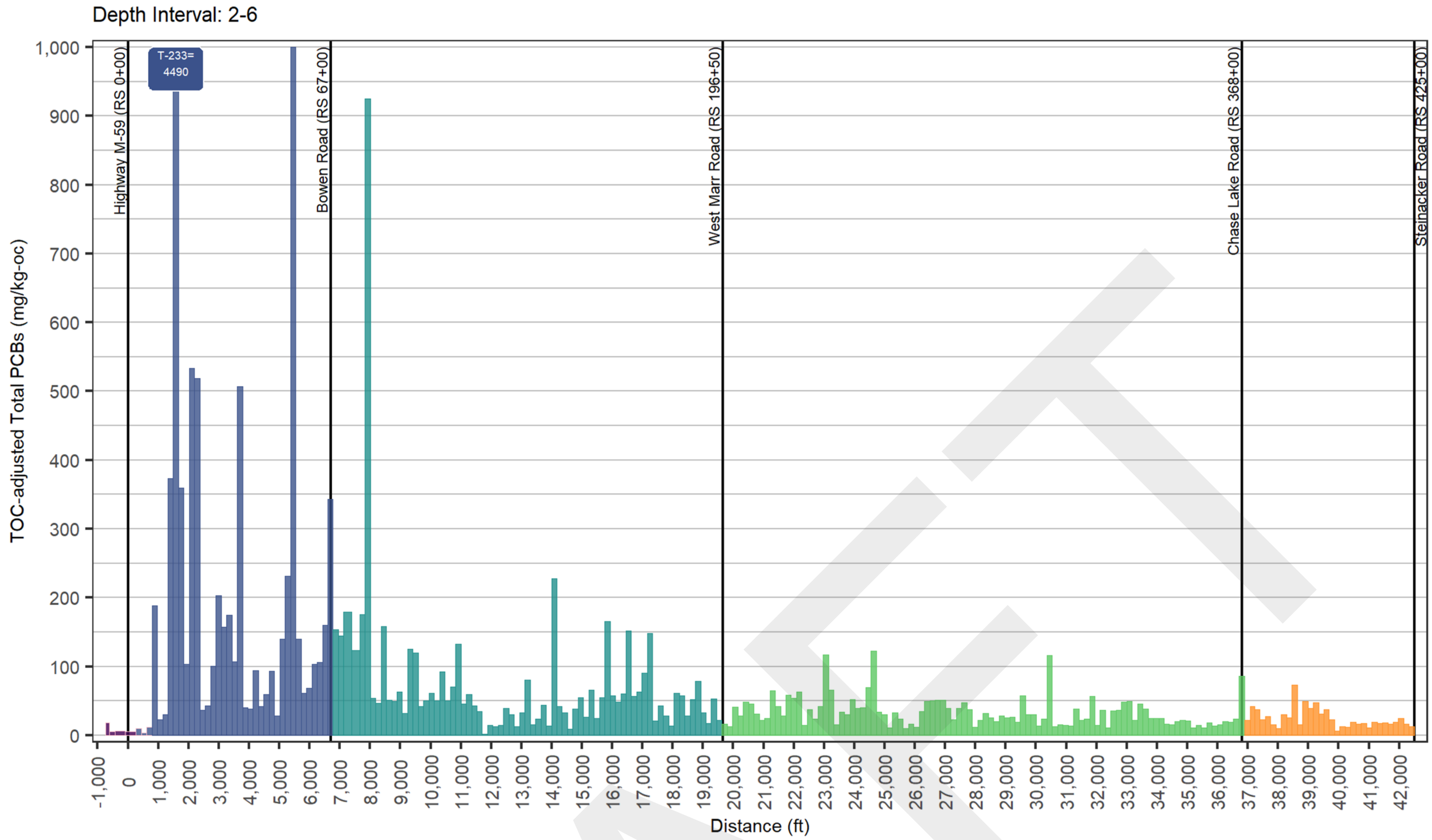
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

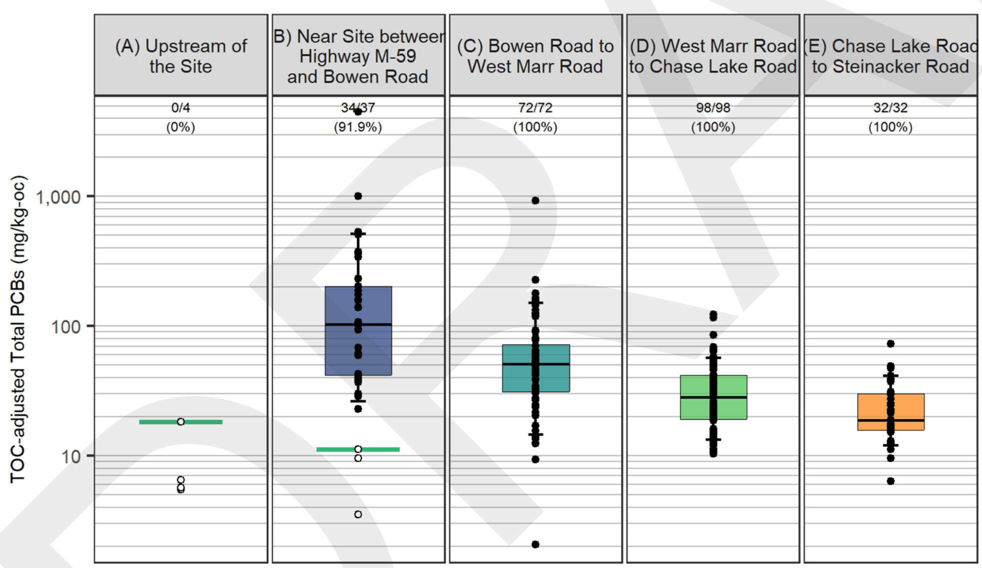
2021 SEDIMENT SAMPLE TOC-ADJUSTED TOTAL PCBs 0- to 2-INCH DEPTH

cti ARCADIS

FIGURE
6-3a

11/17/2023 11:03:08 AM

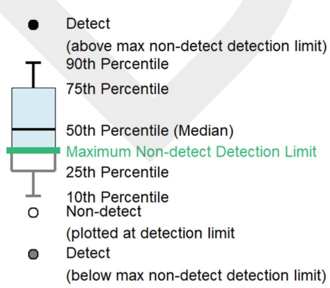




Compare Distribution		
Comparison	p-value	Sig. Dif. (Yes/No)
B - C	<0.01	Yes
B - D	<0.01	Yes
B - E	<0.01	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	0.0209	Yes

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Peto-Peto Test conducted for datasets with non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

Boxplot Legend



- Non-detects included at the detection limit in percentile estimation.
- Non-detects plotted at the detection limit.

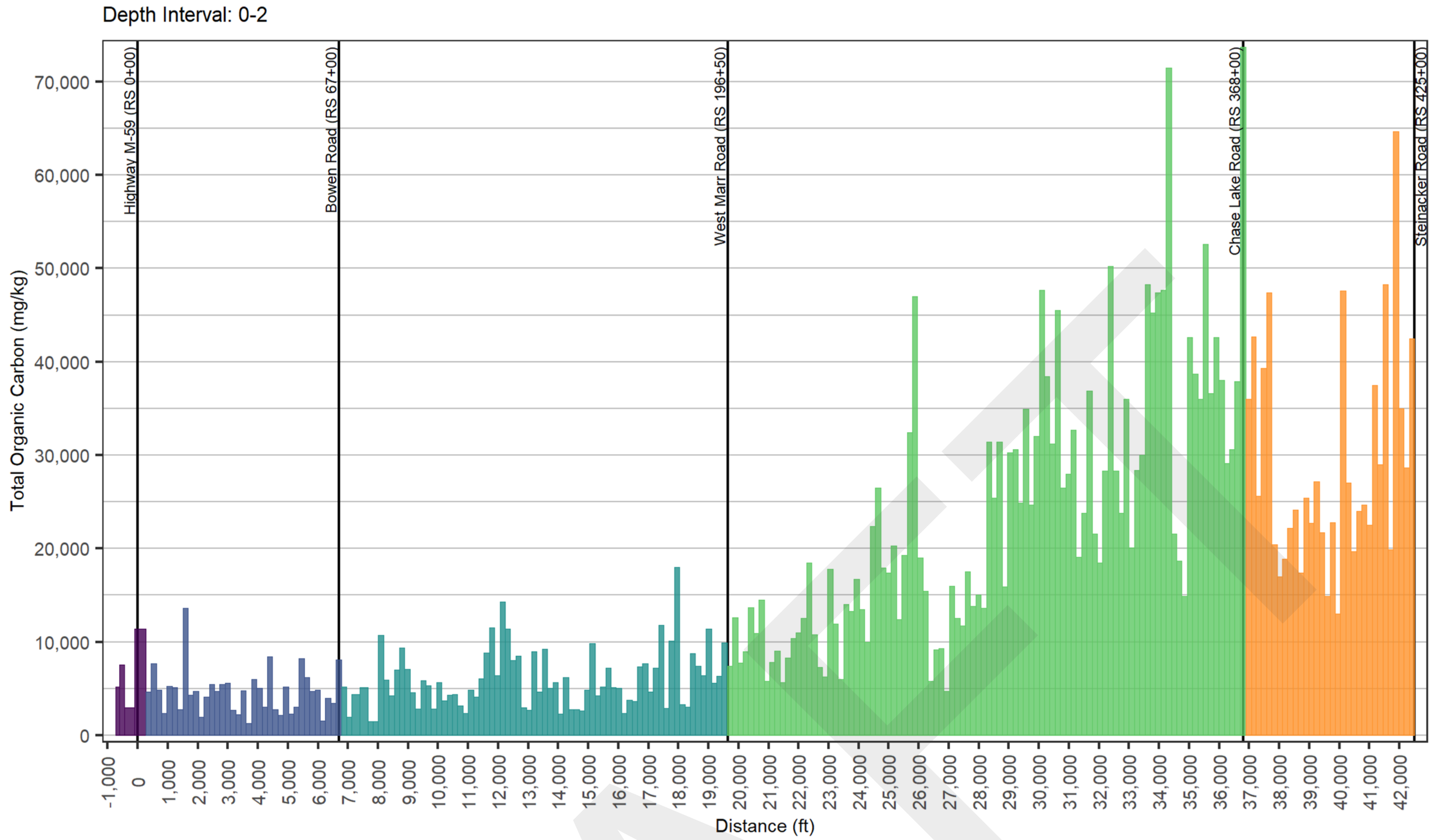
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

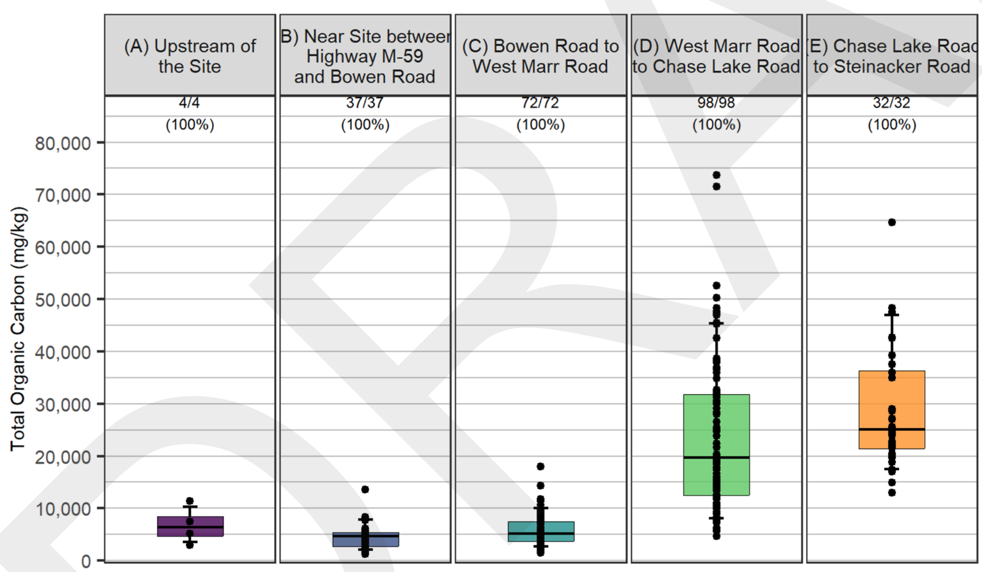
2021 SEDIMENT SAMPLE TOC-ADJUSTED TOTAL PCBs 2- to 6-INCH DEPTH

cti ARCADIS

FIGURE
6-3b

11/17/2023 11:03:09 AM

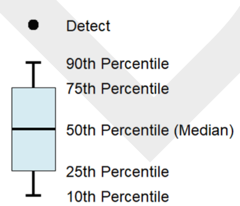




Compare Distribution		
Comparison	**p-value**	**Sig. Dif. (Yes/No)**
B - C	0.0289	Yes
B - D	<0.01	Yes
B - E	<0.01	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	0.0228	Yes

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

Boxplot Legend



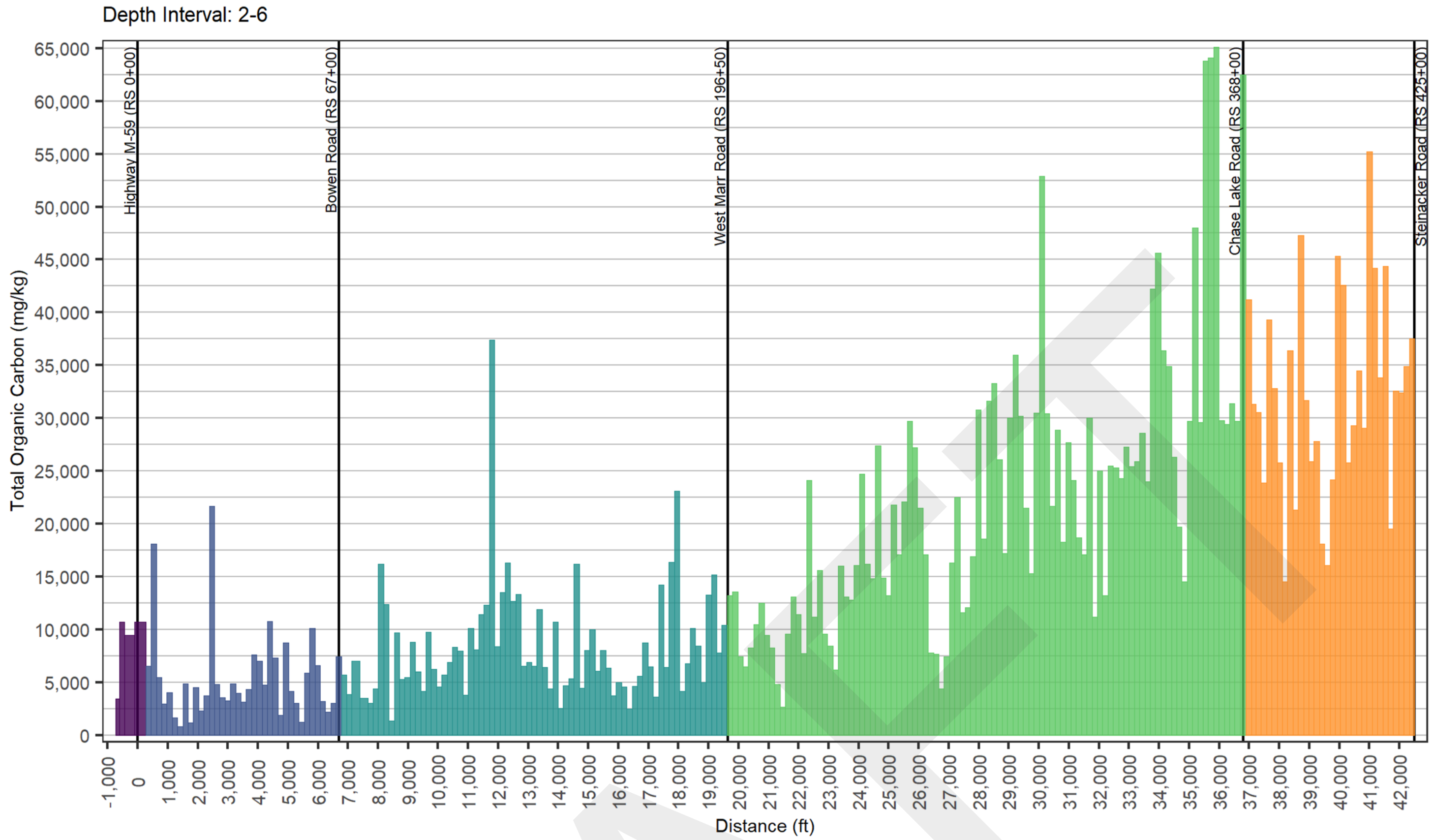
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

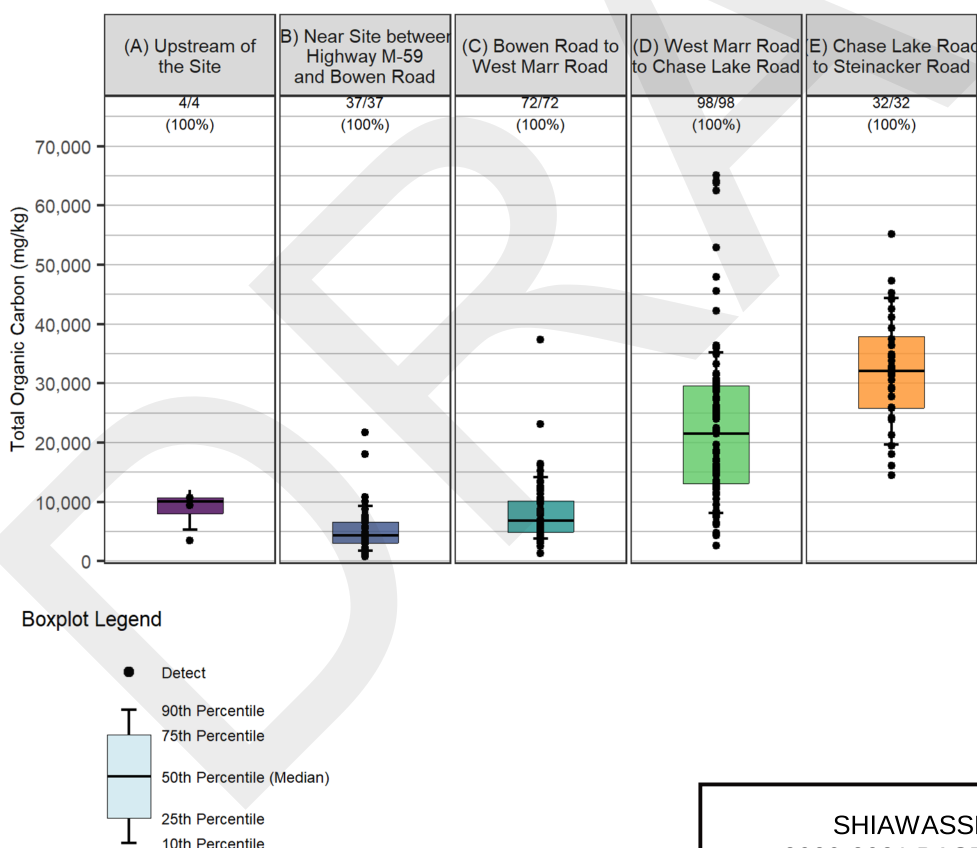
2021 SEDIMENT SAMPLE TOTAL ORGANIC CARBON 0- to 2-INCH DEPTH

cti ARCADIS

FIGURE
6-4a

11/17/2023 11:03:10 AM





Compare Distribution		
Comparison	p-value	Sig. Dif. (Yes/No)
B - C	<0.01	Yes
B - D	<0.01	Yes
B - E	<0.01	Yes
C - D	<0.01	Yes
C - E	<0.01	Yes
D - E	<0.01	Yes

- Comparsions not conducted on datasets with small sample size (n<8).
- Wilcoxon Rank Sum Test conducted for datasets without non-detect results.
- Benjamini-Hochberg adjustment was used to minimize the false discovery rate.

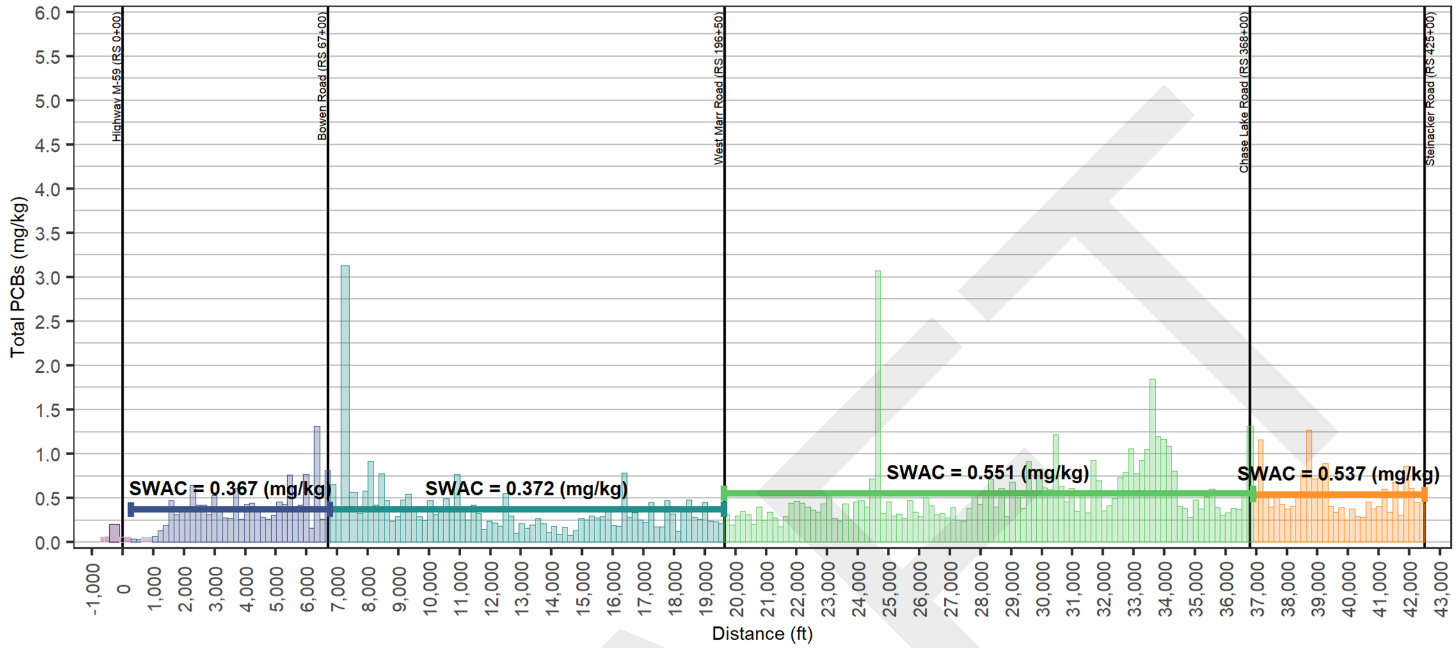
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

2021 SEDIMENT SAMPLE TOTAL ORGANIC CARBON 2- to 6-INCH DEPTH

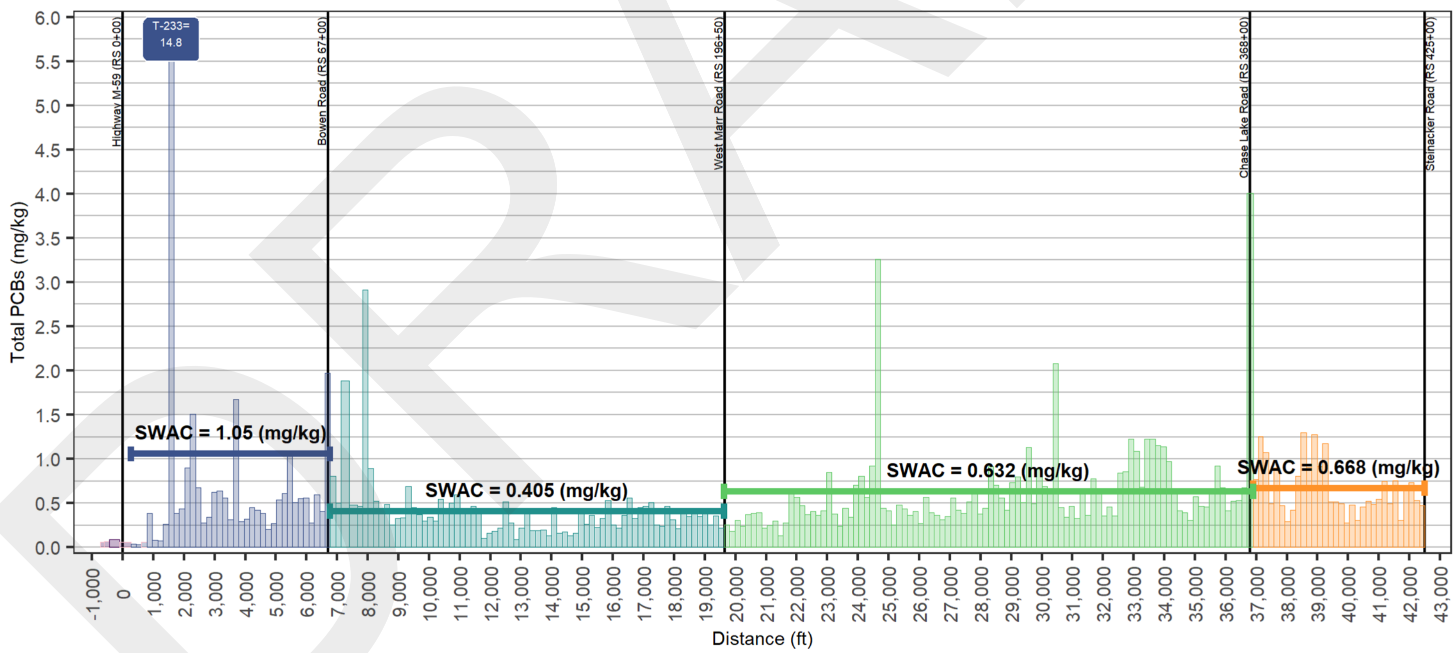
FIGURE
6-4b

11/17/2023 11:03:11 AM

Surface Sediment (0-2 in) and Surface Weighted Area Concentration



Length-weighted Surface Sediment (0-6 in) and Surface Weighted Area Concentration



2021 Baseline Data SWAC (mg/kg)			2013 ISM SWAC (CTI 2015)
River Mile	0 to 2-inch	0 to 6-inch	0 to 6-inch
1	0.293	1.06	3.96
2	0.643	0.696	0.910
3	0.250	0.280	0.490
4	0.304	0.336	0.600
5	0.459	0.528	0.800
6	0.525	0.606	1.01
7	0.702	0.811	1.32
8	0.540	0.675	1.30

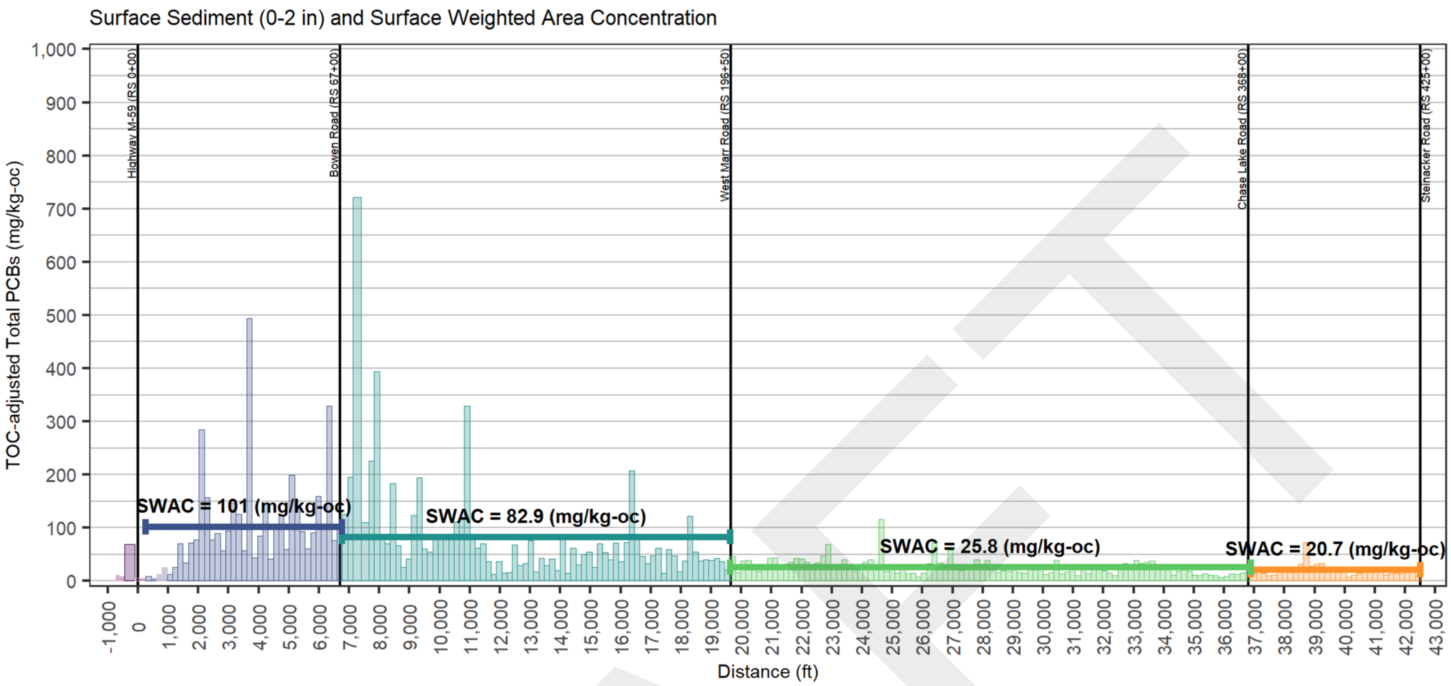
SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

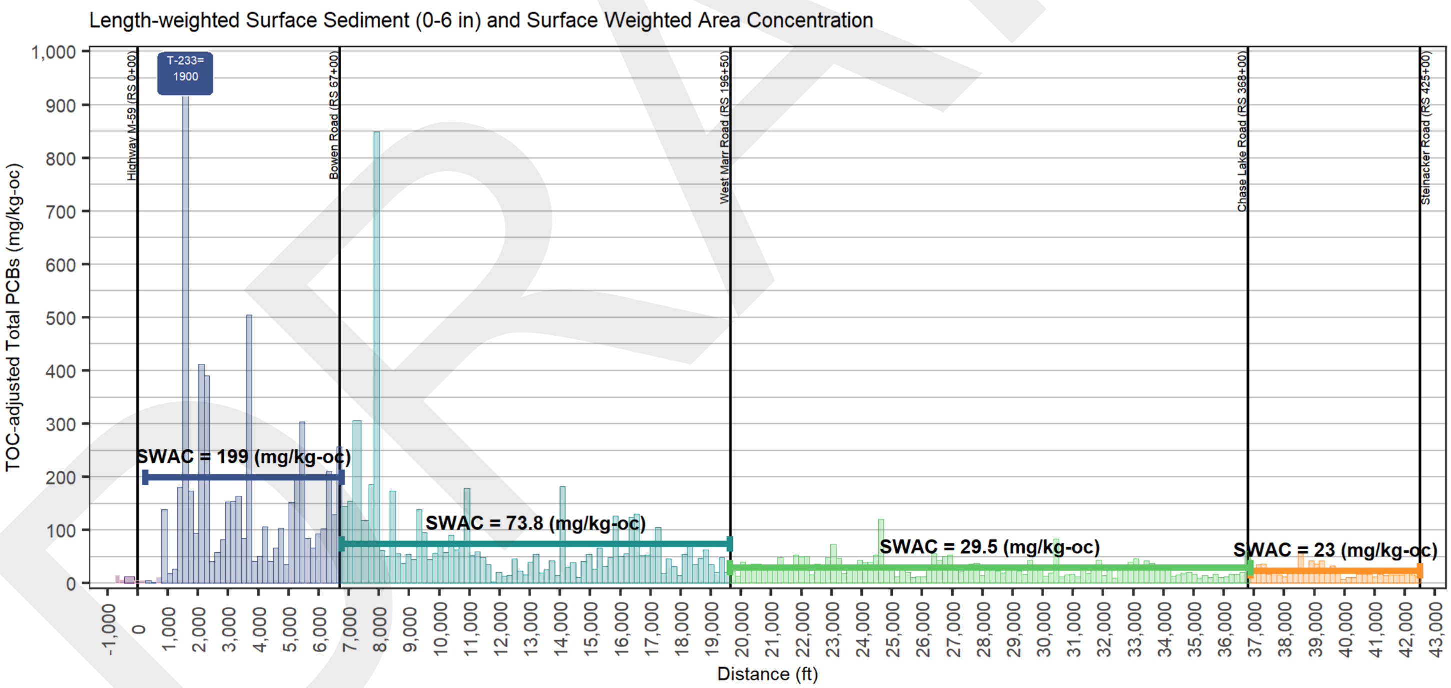
2021 SEDIMENT SURFACE-WEIGHTED AREA CONCENTRATION TOTAL PCBs

cti ARCADIS

FIGURE
6-5

11/17/2023 11:03:12 AM





2021 Baseline Data SWAC (mg/kg-oc)		
River Mile	0 to 2-inch	0 to 6-inch
1	89.5	197
2	155	144
3	52.7	45.4
4	49.6	50.5
5	32.2	36.1
6	24.2	29.0
7	20.6	24.5
8	21.0	23.4

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

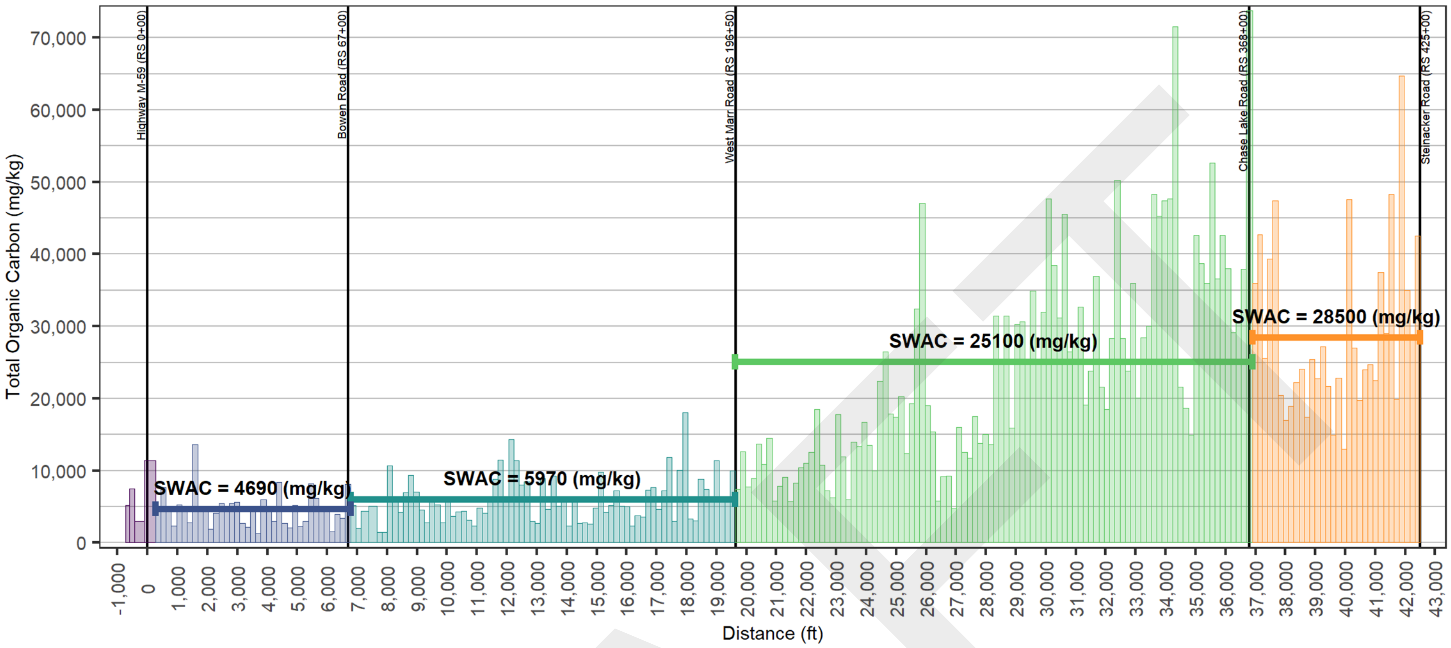
2021 SEDIMENT SURFACE-WEIGHTED AREA CONCENTRATION TOC-ADJUSTED TOTAL PCBs

cti ARCADIS

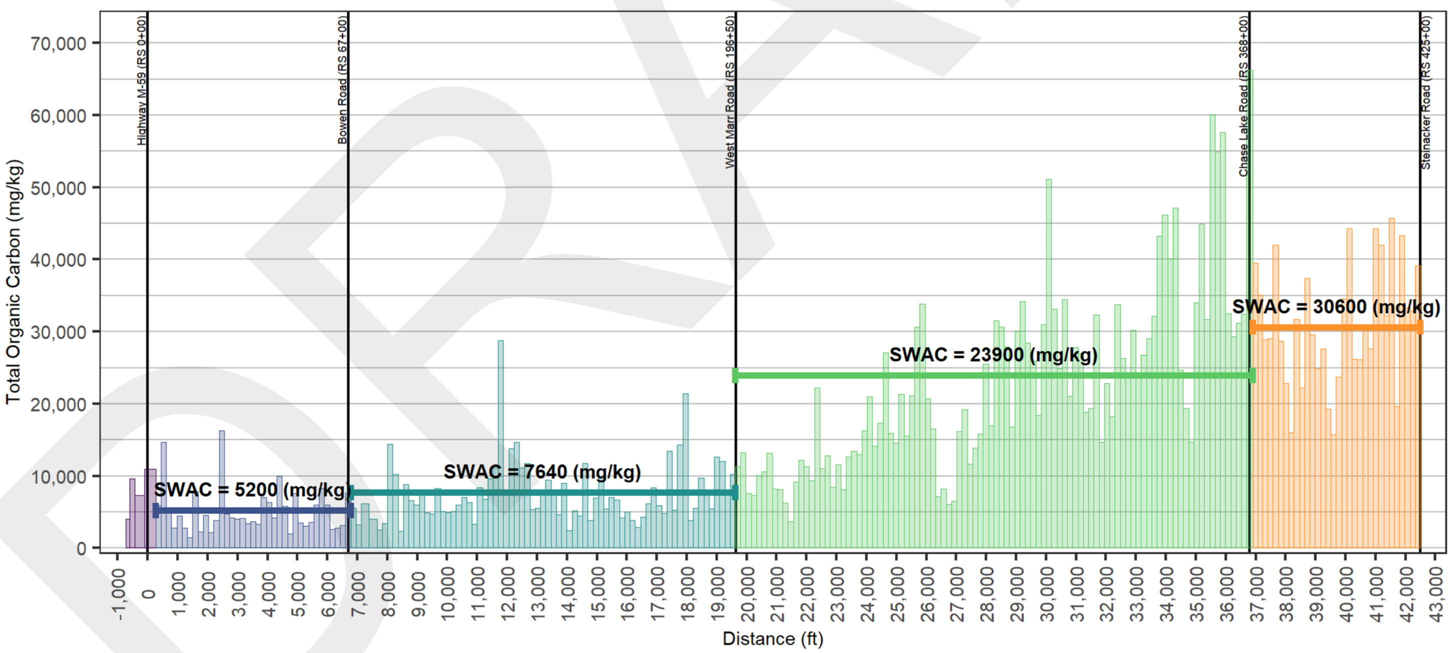
FIGURE
6-6

11/17/2023 11:03:13 AM

Surface Sediment (0-2 in) and Surface Weighted Area Concentration



Length-weighted Surface Sediment (0-6 in) and Surface Weighted Area Concentration



2021 Baseline Data SWAC (mg/kg)		
River Mile	0 to 2-inch	0 to 6-inch
1	5,010	5,590
2	4,920	5,760
3	6,180	8,660
4	7,620	8,320
5	15,900	15,700
6	24,500	23,400
7	36,200	34,000
8	28,100	30,300

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

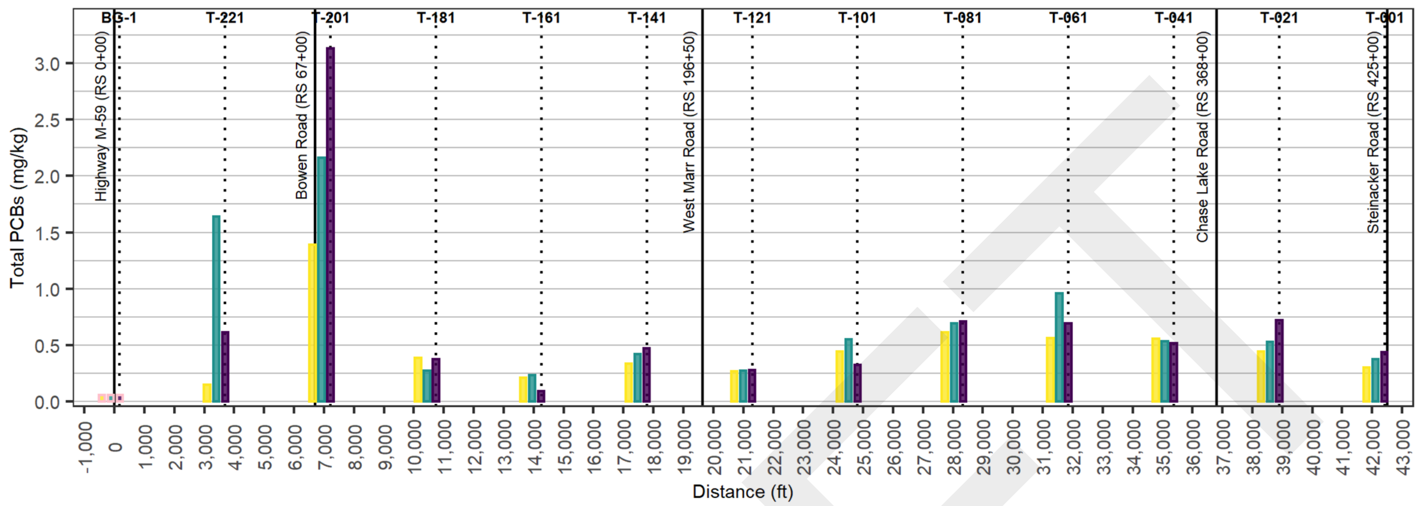
2021 SEDIMENT SURFACE-WEIGHTED AREA CONCENTRATION TOTAL ORGANIC CARBON

cti ARCADIS

FIGURE
6-7

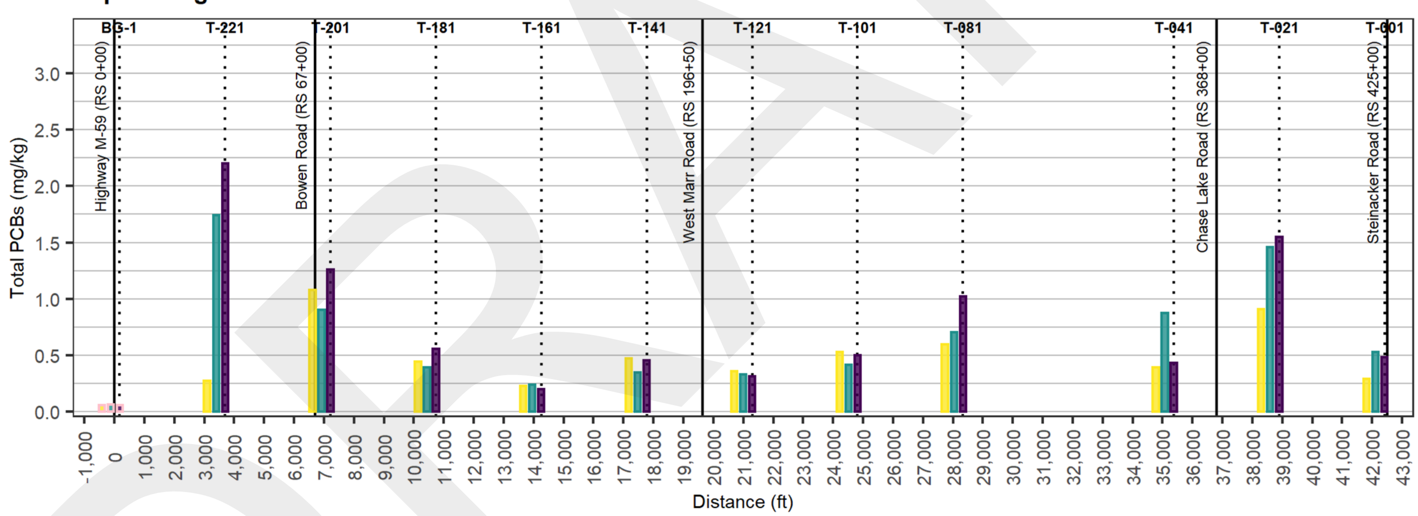
11/17/2023 11:03:14 AM

Depth Range = 0-2 in



Core stationing is approximate. Postioning of triplicate cores adjusted for plotting purposes.

Depth Range = 2-6 in



Core stationing is approximate. Postioning of triplicate cores adjusted for plotting purposes.

Parent Sample

Triplicate Sample 1

Triplicate Sample 2

Non-detect (pink border; plotted at reporting limit)

SHIAWASSEE RIVER SUPERFUND SITE
2020-2021 BASELINE SAMPLING DATA REPORT

TOTAL PCBs IN 2021
TRIPLICATE SAMPLE RESULTS

cti ARCADIS

FIGURE
6-8

APPENDIX F

SITE INSPECTION PHOTOS

Shiawassee River Superfund Site
Five-Year Review Site Inspection Photos from November 2, 2023

Image 1: Chemical storage in the ECS, LLC facility located in the northeast portion of the former CFC building.

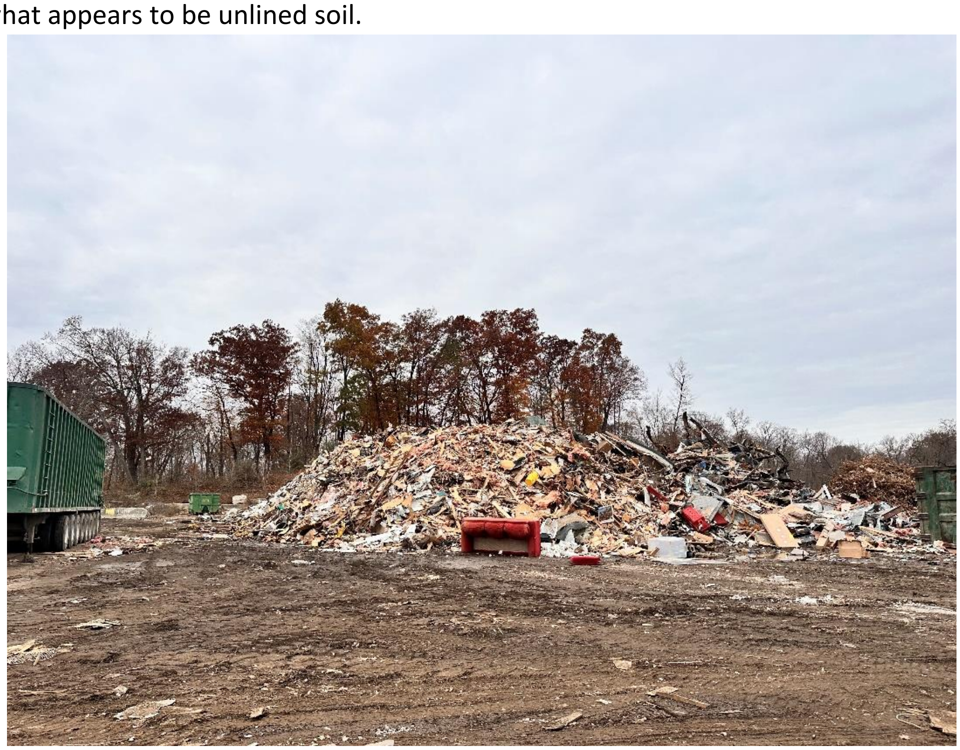
Image 2: View of a sinkhole facing southwest toward Highway M59 from the parking lot of the former CFC property.

Image 3: View facing north located adjacent and southwest of the former CFC building. Observed are asphalt and concrete piles of debris.

Image 4: View facing south at the northern end of the former CFC building. Totes of chemicals are stored on top of one another.

Image 5: View facing southwest at the northeast portion of the former CFC building. A frothy, clear liquid is observed to be discharging from a pipe connected to the northeast portion of the former CFC building, adjacent to the ECS, LLC facility. The liquid had a chemical odor.

Image 6: View facing northwest, north of the former CFC property on the same parcel. A pile of debris (i.e., furniture, construction material, wood, household waste, used car parts, etc.) was observed to be placed on what appears to be unlined soil.



Shiawassee River Superfund Site
Five-Year Review Site Inspection Photos from November 2, 2023

Image 7: View facing southwest, north of the former CFC property on the same parcel. Several excavators appear to be located near an exposed mound of soil. The mound of soil is located adjacent and east of the Shiawassee River.

Image 8: View facing southwest, north of the former CFC property on the same parcel. Excavator parts and wood debris are stored on what appears to be unlined soil.

Image 9: View facing north, northeast of the former CFC property on the same parcel. Landscaping material is stored on what appears to be unlined soil.

Image 10: View facing northwest at the Shiawassee River, west and adjacent to the former CFC property.

APPENDIX G

SITE INSPECTION CHECKLIST

NAME	EMAIL	PHONE #
Leah Werner	werner.Leah@epa.gov	312-886-0552
J. VandeWyngearde	james.d.vandewyngearde@adient.com	313 3199358
BRIAN FINLEY	BFINLEY@CEICOMPANIES	248-930-8628
Brad Hartwell	brad.hartwell@tetratech.com	248-719-9366
Angela Wallace	angela.wallace@adient.com	~~[illegible]~~ 810 853-1800
Lisa Tomlinson	lisa.tomlinson@arcadis.com	734.635.4470
MATT HANDYSIDE	MHANDYSIDE@CTICOMPANIES.com	248.229.6892
Mary Schafer	Schaferm2@Mi.gov	517.582.1663
John Allen	johnallen.regal@gmail.com	248-709-3387
Justin Connor	ConnorJ1@Mi.gov	517.898.7946

Site Inspection Checklist

I. SITE INFORMATION	
Site name: **Shiawassee River**	**Date of inspection:** **11/2/2023**
Location and Region: **Howell, MI – Region 5**	**EPA ID:** **MID980794473**
Agency, office, or company leading the FYR: EPA Region 5	**Weather/temperature:** Overcast and 30s
Remedy Includes: (Check all that apply)	
☐ Landfill cover/containment	☐ Monitored natural attenuation
☐ Access controls	☐ Groundwater containment
☐ Institutional controls	☐ Vertical barrier walls
☐ Groundwater pump and treatment ☐ Surface water collection and treatment	☒ Other: Upland and floodplain soil removal, river sediment removal, monitored natural recovery
Attachments:	
☒ Inspection team roster attached	☐ Site map attached

Site Inspection Checklist

II. INTERVIEWS (Check all that apply)

1. **O&M Site Manager** Name , Title , Click or tap to enter a date.

Interviewed: ☐ at site ☐ at office ☐ by phone Phone Number: Click here to enter text.

Problems, suggestions: ☐ Report attached

An O&M Plan to monitor and evaluate natural recovery of river sediments has not been prepared or submitted to EPA. On September 18, 2023, EPA requested that the PRPs provide a long-term monitoring plan (LTMP) for sediments for EPA review during the current Five-Year Review. At the time of this site inspection, an O&M Plan the LTMP has not been provided to EPA.

2. **O&M Staff** Name , Title , Click or tap to enter a date.

Interviewed: ☐ at site ☐ at office ☐ by phone Phone Number: Click here to enter text.

Problems, suggestions: ☐ Report attached

See above. EPA is unaware of any designated O&M staff.

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: EGLE

Contact: Mary Schafer, Senior Project Manager, 11/2/2023, P: 517-582-1663

Problems, suggestions: ☐ Report attached

According to the State, a sheen was observed in the river adjacent to the former CFC facility in the summer of 2023, potentially near the area of the former discharge line and overflow area. However, the site inspection did not identify a sheen. Soil movement is ongoing on-site. Concern that PFAS is present in the deeper aquifer, though the State does not have data on such contamination and PFAS investigation pertains only to OU2.

Agency: Click or tap here to enter text.

Contact: Name , Title , Click or tap to enter a date., P: Phone Number

Problems, suggestions: ☐ Report attached

Click or tap here to enter text.

Agency: Click or tap here to enter text.

Contact: Name , Title , Click or tap to enter a date., P: Phone Number

Problems, suggestions: ☐ Report attached

Click or tap here to enter text.

Agency: Click or tap here to enter text.

Contact: Name , Title , Click or tap to enter a date., P: Phone Number

Problems, suggestions:

Click or tap here to enter text.

4. **Other Interviews (optional):** ☐ Report attached

A Lucy Road Resources, LLC official indicated that wetland restoration is ongoing northeast of the former CFC property due to EGLE-imposed wetland violations.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: **See Sections II(1) and II(2) above**

2. Site-Specific Health and Safety Plan ☐ Readily available

☐ Contingency Plan/Emergency Response Plan ☐ Readily available

Remarks: Click or tap here to enter text.

3. O&M and OSHA Training Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

4. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A

☐ Other permits: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

5. Gas Generation Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

6. Settlement Monument Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

7. Groundwater Monitoring Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

8. Leachate Extraction Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

9. Discharge Compliance Records

☐ Air ☐ Readily available ☐ Up to date ☒ N/A

☐Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

10. Daily Access/Security Logs

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State

☐ PRP in-house ☐ Contractor for PRP

☐ Federal Facility in-house ☐ Contractor for Federal Facility

Remarks: Click or tap here to enter text.

2. O&M Cost Records

☐Readily available ☐ Up to date ☐ Funding mechanism/agreement in place

Original O&M cost estimate No known O&M plan for monitored natural recovery (MNR). ☐ Breakdown attached

Total annual cost by year for review period if available

From Click or tap to enter a date.	To Click or tap to enter a date.	Total cost Click or tap here to enter text.	☐ Breakdown attached
From Click or tap to enter a date.	To Click or tap to enter a date.	Total cost Click or tap here to enter text.	☐ Breakdown attached
From Click or tap to enter a date.	To Click or tap to enter a date.	Total cost Click or tap here to enter text.	☐ Breakdown attached
From Click or tap to enter a date.	To Click or tap to enter a date.	Total cost Click or tap here to enter text.	☐ Breakdown attached
From Click or tap to enter a date.	To Click or tap to enter a date.	Total cost Click or tap here to enter text.	☐ Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons:

Click or tap here to enter text.

V. ACCESS AND INSTITUTIONAL CONTROLS

☒ Applicable ☐ N/A

1. Fencing Damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Click or tap here to enter text.

2. Other Access Restrictions ☐ Location shown on site map ☐ Gates secured

Remarks: Click or tap here to enter text.

3. Institutional Controls (ICs)

A. Implementation and Enforcement

Site conditions imply ICs not properly implemented	☐ Yes	☒ No	☐ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	☒ No	☐ N/A
Type of monitoring (*e.g.*, self-reporting, drive by)	O&M Report		
Frequency	Annual		
Responsible party/agency	PRP		

Contact: Brian Finley, Project Scientist, 11/2/2023, P: 248-560-0728			
Reporting is up-to-date	☒ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☒ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☒ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☒ No	☐ N/A

Other problems or suggestions:

The PRP should remove discussion of the 2010 restrictive covenant from future O&M Inspection Reports.

B. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: The current landowner appears to be in compliance with the ROD requirement to maintain the property zoned industrial. However, the ROD also stipulates that deed restrictions are required and the 2010 covenant deed has been determined to be ineffective and not legally enforceable. Pursuant to the Partial CD, the PRP should use best efforts to secure a new deed restriction with the current landowner that can be enforced by the PRP and EPA.

4. General

A. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks: Click or tap here to enter text.

B. Land use changes on site ☒ N/A

Remarks: Click or tap here to enter text.

C. Land use changes off site ☐ N/A

Remarks: According to map in the 2010 Restrictive Covenant, the area north of the former CFC facility within the parcel boundary No. 4706-27-200-010, Livingston County, Michigan is not a part of the Site. The 2019 FYR Report mistakenly identified this area as included in the Site boundary. This area has undergone significant alteration since the land was purchased by Lucy Road Resources, LLC in 2010. Most off the areas within the parcel north of the former CFC facility have been cleared of all vegetation and appears to have been graded for storage of a variety of vehicles and other materials (e.g., tires, excavators, used car parts, construction debris, etc.). It appears that land use changes and grading may be ongoing, as an operating excavator near an exposed soil mound northwest of the property, adjacent to the Shiawassee River, was observed. A landscaping supply company that operates out of the former CFC property stores sand, soil, mulch, gravel, etc. in open three-sided 'bins' or bays on the southeastern portion of the property. It does not appear that there is a boundary layer between this material and the underlying soil/gravel. There is a detention basin at the northern end of the property. This basin has outfalls that are believed to lead to wetlands associated with the Shiawassee River. According to personnel from Lucy Road Resources LLC, wetland restoration is ongoing northeast of the property due to EGLE wetland violations.

VI. GENERAL SITE CONDITIONS

1. Roads ☒ Applicable ☐ N/A

Site Inspection Checklist

A. Roads damaged ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks: There are asphalt paved roads with cracks observed on the east and west of the property, leading to the northern portion of the property. A sinkhole was observed in the asphalt in the southwest portion of the parking lot of the former CFC property. According to an official from Lucy Road Resources, LLC, the sinkhole has been present since 2021. The Lucy Road Resource, LLC official had no knowledge of any planned repair. There is no requirement documented in a decision document to maintain the roads at a specific condition.

B. Other Site Conditions

Remarks: 1) A frothy, clear liquid with a chemical odor was observed actively discharging from a pipe along the northeast portion of the former CFC building, adjacent to the operations of the soap manufacturer, ECS, LLC. The discharge was reported by ECS, LLC as distilled water, a part of the soap manufacturing process. 2) Large debris piles are located on the area north of the former CFC property, including but not limited to construction debris, used cars, used tires, furniture, and wood debris. The debris piles appear to be stored on exposed soil. 3) Numerous totes storing chemicals were observed to be stored on top of one another inside the ECS, LLC facility as well as north and adjacent to the former CFC property. 4) Excavation of soil and grading activities appear to be ongoing northwest of the former CFC property, adjacent to the Shiwassee River.

VII. LANDFILL COVERS

1. Landfill Surface ☐ Applicable ☒ N/A

A. Settlement (Low Spots) ☐ Location Shown on Site Map ☐ Settlement Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Cracks ☐ Location Shown on Site Map ☐ Cracking Not Evident

Lengths: Click or tap here to enter text. Widths: Click or tap here to enter text. Depths: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. Erosion ☐ Location Shown on Site Map ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

D. Holes ☐ Location Shown on Site Map ☐ Holes Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

E. Vegetative Cover ☐ Grass ☐ Cover Properly Established

☐ Tress/Shrubs (indicate size and locations on a diagram ☐ No Signs of Stress

Remarks: Click or tap here to enter text.

F. Alternative Cover (armored rock, concrete, etc.) ☐ N/A

Remarks: Click or tap here to enter text.

G. Bulges ☐ Location Shown on Site Map ☐ Bulges Not Evident

Areal Extent: Click or tap here to enter text. Height: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

H. Wet Areas/Water Damage ☐ Wet Areas/Water Damage Not Evident

☐ Wet Areas ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

☐ Ponding ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

☐ Seeps ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

☐ Soft Subgrade ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

I. Slope Instability ☐ Location Shown on Site Map ☐ Slope Instability Not Evident

☐ Slides Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

2. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

A. Flows Bypass Bench ☐ Location Shown on Site Map ☐ N/A or Okay

Remarks: Click or tap here to enter text.

B. Bench Breached ☐ Location Shown on Site Map ☐ N/A or Okay

Remarks: Click or tap here to enter text.

C. Bench Overtopped ☐ Location Shown on Site Map ☐ N/A or Okay

Remarks: Click or tap here to enter text.

3. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

A. Settlement ☐ Location Shown on Site Map ☐ Settlement Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Material Degradation ☐ Location Shown on Site Map ☐ Degradation Not Evident

Material Type: Click or tap here to enter text. Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. Erosion ☐ Location Shown on Site Map ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

D. Undercutting ☐ Location Shown on Site Map ☐ Undercutting Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

E. Obstructions ☐ Location Shown on Site Map ☐ Undercutting Not Evident

Type: Click or tap here to enter text.

Areal Extent: Click or tap here to enter text. Size: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

F. Excessive Vegetative Growth ☐ Location Shown on Site Map ☐ Excessive Growth Not Evident

Areal Extent: Click or tap here to enter text. ☐ Vegetation in channels does not obstruct flow

Remarks: Click or tap here to enter text.

4. Cover Penetrations ☐ Applicable ☐ N/A

A. Gas Vents ☐ Active ☐ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☐ N/A

Remarks: Click or tap here to enter text.

B. Gas Monitoring Probes

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☐ N/A

Remarks: Click or tap here to enter text.

C. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ Evidence of leakage at penetration
☐ Needs Maintenance ☐ N/A
Remarks: Click or tap here to enter text.

D. Leachate Extraction Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ Evidence of leakage at penetration
☐ Needs Maintenance ☐ N/A
Remarks: Click or tap here to enter text.

E. Settlement Monuments ☐ Located ☐ Routinely Surveyed ☐ N/A
Remarks: Click or tap here to enter text.

5. Gas Collection and Treatment ☐ Applicable ☐ N/A

A. Gas Treatment Facilities

☐ Flaring ☐ Thermal Destruction ☐ Collection for Reuse
☐ Good condition ☐ Needs Maintenance
Remarks: Click or tap here to enter text.

B. Gas Collection Wells, Manifolds, and Piping

☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks: Click or tap here to enter text.

C. Gas Monitoring Facilities (e.g. gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks: Click or tap here to enter text.

6. Cover Drainage Layer ☐ Applicable ☐ N/A

A. Outlet Pipes Inspected ☐ Functioning ☐ N/A
Remarks: Click or tap here to enter text.

B. Outlet Rock Inspected ☐ Functioning ☐ N/A
Remarks: Click or tap here to enter text.

7. Detention/Sediment Ponds ☐ Applicable ☐ N/A

A. Siltation ☐ Siltation Not Evident ☐ N/A
Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Erosion ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. Outlet Works ☐ Functioning ☐ N/A

Remarks: Click or tap here to enter text.

D. Dam ☐ Functioning ☐ N/A

Remarks: Click or tap here to enter text.

8. Retaining Walls ☐ Applicable ☐ N/A

A. Deformations ☐ Location Shown on Site Map ☐ Deformation Not Evident

Horizontal Displacement: Click or tap here to enter text.

Vertical Displacement: Click or tap here to enter text.

Rotational Displacement: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Degradation ☐ Location Shown on Site Map ☐ Deformation Not Evident

Remarks: Click or tap here to enter text.

9. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

A. Siltation ☐ Location Shown on Site Map ☐ Siltation Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Vegetative Growth ☐ Location Shown on Site Map ☐ N/A

☐ Vegetation Does Not Impede Flow

Areal Extent: Click or tap here to enter text. Type: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. Erosion ☐ Location Shown on Site Map ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

D. Discharge Structure ☐ Functioning ☐ N/A

Remarks: Click or tap here to enter text.

VIII. VERTICAL BARRIER WALLS

☐ Applicable	☒ N/A

1. Settlement ☐ Location Shown on Site Map ☐ Settlement Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

2. Performance Monitoring Type of Monitoring: Click or tap here to enter text.

☐ Performance Not Monitored ☐ Evidence of Breaching

Frequency: Click or tap here to enter text. Head Differential: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

IX. GROUNDWATER/SURFACE WATER REMEDIES

☐ Applicable	☒ N/A

1. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

A. Pumps, Wellhead Plumbing, and Electrical ☐ N/A

☐ Good Condition ☐ All Required Wells Properly Operating ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

B. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Spare Parts and Equipment ☐ Needs to be Provided

☐ Readily Available ☐ Good Condition ☐ Requires Upgrade

Remarks: Click or tap here to enter text.

2. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A

A. Collection Structures, Pumps, and Electrical

☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

B. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Spare Parts and Equipment ☐ Needs to be Provided

☐ Readily Available ☐ Good Condition ☐ Requires Upgrade

Remarks: Click or tap here to enter text.

Site Inspection Checklist

3. Treatment System ☐ Applicable ☐ N/A

A. Treatment Train (Check components that apply)

☐ Metals removal ☐ Oil/Water Separation ☐ Bioremediation

☐ Air Stripping ☐ Carbon Absorbers

☐ Filters Click or tap here to enter text.

☐ Additive (e.g. chelation agent, flocculent) Click or tap here to enter text.

☐ Others Click or tap here to enter text.

☐ Good Condition ☐ Needs Maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually Click or tap here to enter text.

☐ Quantity of surface water treated annually Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Electrical Enclosures and Panels (properly rated and functional)

☐ N/A ☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Tanks, Vaults, Storage Vessels ☐ N/A

☐ Proper Secondary Containment ☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

D. Discharge Structure and Appurtenances

☐ N/A ☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

E. Treatment Building(s)

☐ N/A ☐ Good condition (esp. roof and doorways)

☐ Needs repair ☐ Chemicals and equipment properly stored

Remarks Click or tap here to enter text.

F. Monitoring Wells (Pump and Treatment Remedy) ☐ N/A

☐ Properly secured/locked ☐ Functioning

☐ Routinely sampled ☐ All required wells located

☐ Good condition ☐ Needs Maintenance

Remarks Click or tap here to enter text.

4. Monitoring Data

A. Monitoring Data:

☐ Is Routinely Submitted on Time ☐ Is of Acceptable Quality

B. Monitoring Data Suggests:

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

5. Monitored Natural Attenuation

A. Monitoring Wells (natural attenuation remedy) ☒ N/A

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ All required wells located ☐ Needs Maintenance ☐ Good condition

Remarks: Click or tap here to enter text.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

1. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).
The remedy required initial excavation of PCB-contaminated material followed by monitored natural recovery and implementation of ICs. Together, these elements were intended to "reduce the potential risk caused by exposure of PCBs to local residents and others, such as fishermen." Preliminary evaluation of the baseline sediment, surface water, and fish tissue data collected from 2020 to 2021 indicate that natural recovery appears to be occurring, however, long-term sediment cleanup value of 0.003-0.2 mg/kg PCBs has not been met at any of the Shiawassee River miles.

2. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.
The 2001 ROD states that "a long-term monitoring plan will be developed during remedial design to ensure that natural recovery is adequate to meet the long-term cleanup range in a reasonable timeframe and that these levels remain protective of mink or other appropriate ecological receptors." A long-term monitoring plan is still not developed and EPA is unable to assess whether monitoring natural recovery is occurring and is protective of ecological receptors.

3. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

A total PCB load gain analysis discussed in the draft 2020-2021 Baseline Sampling Data Report suggests a source of residual dissolved PCB contributions to the water column is located adjacent to the former CFC facility, within the area previously targeted by dredging. Additional source input may prevent achievement of the long-term cleanup goal, and additional mitigation to address ongoing source(s) may be required.

4. Early Indicators of Potential Remedy Problems

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

A long-term monitoring plan should be developed to include an approach to evaluate natural recovery, including a sampling plan and schedule to continue routine monitoring of PCB concentrations in sediment, surface water, and fish tissue for a robust analysis of natural recovery. The PRP will also need to submit MNR reports that evaluate comparison between the 2021 baseline data and LTM data and assesses whether natural recovery is occurring, surface sediment SWAC PCB concentration changes and rates of decline, and trend analysis with comparison to the long-term cleanup goal. Lastly, a conceptual site model should be developed in advance of the Long-Term Monitoring Plan to understand potential ongoing sources of PCBs to the river, transport, current exposure concentrations, and changes over time.